

Academic Research of Graduate School of Veterinary Medicine

**January – December
2019**



**Graduate School of Veterinary Medicine
Rakuno Gakuen University**



RAKUNO GAKUEN UNIVERSITY

酪農学園大学



酪農学園大学は、2014年度（公財）
日本高等教育評価機構による大学機関
別認証評価において大学評価基準に
適合していると認定されました。

Published by Graduate School of Veterinary Medicine
Rakuno Gakuen University
582 Midorimachi - Bunkyo-dai
Ebetsu, Hokkaido 069-8501
Japan

(Not for Sale)

March 2020

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2019年（1月～12月）の獣医学研究科英文業績集の発刊にあたって

酪農学園大学大学院

獣医学研究科長

桐澤 力雄

獣医学研究科では獣医学群教員が1年間に公表した英語論文を冊子体にまとめ、各教員の自己点検や研究の質保証、並びに関係各位に獣医学群教員の研究状況を紹介する目的で、2002年より業績集を刊行しています。

2019年の筆頭著者（FA）及び責任著者（CA）の論文合計は53報でした。過去5年間では、2014年：51報、2015年：44報、2016年：45報、2017年：48報、2018年：54報となっており、論文数はほぼ一定数を維持しています。分野別に見ていくと、生体機能学分野（教員12名）：14報、感染病理学分野（教員11名）：9報、衛生環境学分野（教員10名）：18報、伴侶動物医療学分野（10名）：3報、生産動物医療学分野（9名）：7報、保健看護学類（8名）：3報でした（同一論文でFAとCAが異なる分野の教員の場合、それぞれの分野にカウント）。研究活動が十分になされていない分野が一部可視化されているようです。過去4年間にFA/CA論文のない教員が11名（昨年13名）、そのうち5名（昨年4名）は全く論文がありません。長期にわたり論文が出ない教員は固定化されてきており、抜本的な対策を講じる必要があると考えております。代表的な競争的資金である科研費の学群教員の申請状況をみると、2016年度：38名、2017年度：38名、2018年度：34名、2019年度：36名、そして2020年度：44名でした。大学院担当教員で申請されていない方がいる一方で、嘱託助手の先生が2名申請されました。2020年度の申請率は応募可能な学群教員が55名でしたので80%（昨年は約60%）となります。この申請率向上の一因として、大学院の指導教員資格審査時の要件に競争的資金の申請件数を追加したことが大きかったと思います。この申請率は大学の研究基盤を映す鏡の一つですので、さらに上げていきたいと考えています。

科学技術指標2019によると自然科学系の科学論文数（2015-2017年平均）のトップはアメリカで、次いで中国（僅差）、ドイツ、そして日本となっております。日本は10年前が3位でしたので相対的な低下が起きているとともに、論文数も漸減しています。Top10%補正論文数も10年前の5位から9位に後退しています。これらの順位は昨年の指標（2014-2016年平均）と同じですが、シェアは何れも漸減しています。その一方で、中国では何れの論文数もシェアを伸ばしています。我が国の研究者を取り巻く状況は厳しく、研究者の魅力が低下しています。そこで、我が国の研究力強化を図るため、研究者総合科学技術・イノベーション会議（2020年1月23日）は若手研究者のポスト拡大と挑戦的研究費の提供、優秀な研究者に世界基準の待遇の実現するための施策を提示しました。今後の推移を期待して見ていきたいと思います。政府の科学技術予算はここ10年3兆5,000億円程度で推移していましたが、2018年度3兆8,400億円、2019年度4兆2,377億円、そして2020年度4兆3,787億円と増加しています。科研費においては、近年の2,200億円台から2018年度2,336億円、2019年度2,372億円と増加していましたが、2020年度は2,374億円と微増です。しかし、挑戦的研究の大幅拡充や若手研

究者への重点支援がなされています。

2019年度の獣医学専攻博士課程の修学者総数は30名で、今年度の修了認定者は7名（うち1名は3年での早期修了）です。獣医保健看護学専攻修士課程の修学者総数は2名で、今年度の修了認定者は1名です。2020年度の学術振興会特別研究員のDC1・農学に本研究科博士課程から1名内定になりました。昨年に続いての2年連続の内定となり快挙です。昨年のDC1内定により、今年度、第一種奨学生採用時返還免除内定候補者枠が大学院博士課程に1名付与されました。これは、獣医学研究科の外部評価が高くなっていることを意味しています、この制度は、博士課程1年在学時に内定候補者を推薦するというもので、博士課程進学者にとっては大きな魅力です。

大学院の学生を多く受け入れることは研究の活性化ならびに学類学生の教育に欠かせません。2019年度から「One Health フロンティア卓越大学院」が本格始動し、本学大学院からは1名だけですが、履修しています。今年は座学がメインでしたが、遠隔授業システムが導入されたことにより本学にしながら質の高い授業を受けており、教育の高度化がなされています。

最後に関係各位には本業績集をご高覧いただき、教員個々の研究内容などから共同研究、さらには広範な研究体制の構築等へのご高配いただけることを願っております。そして、それらから得られる研究成果が教育・社会へ大きく還元されることを期待しております。今後とも、ご指導ご鞭撻をよろしくお願い申し上げます。

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Yoshino, T., Iima, H., Matsumoto, F., **Asakawa, M.**
Nematol. Res., 49: 7-11, 2019. http://senchug.org/journal_rev.html.
- 2) Countermeasures for avian influenza outbreaks among captive avian collections at zoological gardens and aquariums in Japan.
Kakogawa, M., Onuma, M., Kirisawa, R., **Asakawa, M.**
J. Microbiol. Exp. 7: 167-171. 2019. doi: 10.15406/jmen.2019.07.00256

II. その他 <Others>

- 1) Detection of avian haemodsporidia from captive musophagid birds at a zoological garden in Japan.
Kakogawa, M., Ono, F., Inumaru, M., Sato, Y., **Asakawa, M.**
J. Vet. Med. Sci., 81: 1892-1895, 2019. doi: 10.1292/jvms.19-0483
- 2) *Pseudoleucochloridium ainohelicis* nom. nov. (Trematoda: Panopistidae), a replacement for *Glaphyrostomum soricis* found from long-clawed shrews in Hokkaido, Japan, with new data on its intermediate hosts.
Nakao, M., Sasaki, M., Waki, T., **Asakawa, M.**
Species Diversity, 24: 159-167, 2019. doi: 10.12782/specdiv.24.159
- 3) Comparison of the intestinal helminth community of the large Japanese field mouse (*Apodemus speciosus*) between urban, rural, and natural sites in Hokkaido, Japan.
Anders, J. L., Nakao, M., Uchida, K., Ayera, C., **Asakawa, M.**, Koizumi, I.

- Parasitol. Int.*, 70: 51-57, 2019. doi.10.1016/j.parint.2019.02.001
- 4) Epidemiological survey of tick-borne encephalitis virus infection in wild animals in Hokkaido and Honshu islands, Japan.
Jamsransuren, D., Yoshii, K., Kariwa, H., **Asakawa, M.**, Okuda, K., Yamaguchi, E., Fjii, K., Sasaki, M., Fukumoto, S., Matsumoto, K., Ogawa, H., Imai, K.
Jpn. J. Vet. Res., 67: 163-172, 2019. doi.org/10.14943/jjvr.67.2.163
- 5) Nematodes belonging to the genus *Ternidens* (Strongyloidea: Chabertiidae) found in a talapoin *Miopithecus talapoin*, imported for sale as a pet.
Hasegawa, H., Matsuura, K., **Asakawa, M.**
Jpn. J. Vet. Parasitol., 18: 65-71, 2019. https://jsvp-hp.blogspot.com/p/blog-page_20.html

[Research Note]

**First record of *Cyathostoma*
(*Hovorkonema*) sp. (Nematoda:
Syngamidae) from a red-crowned
crane, *Grus japonensis*, in Kushiro,
Hokkaido, Japan**

Tomoo Yoshino^{1,2}, Hiroko Iima^{1,2}, Fumio Matsumoto¹
and Mitsuhiro Asakawa^{2,*}

Summary

A red-crowned crane, *Grus japonensis*, chick died on August 6, 2013, in Kushiro, Hokkaido, Japan. In the postmortem examination, 20 individual nematodes were found in the nasal cavity and anterior thoracic air sacs. The chick died from severe inflammation of the air sacs, granulomatous pneumonia, and esophageal strangulation, caused by a heavy nematode infection. The nematodes were identified as *Cyathostoma* (*Hovorkonema*) sp., based on their measurements and morphological characteristics. This is the first host record of these nematodes from *G. japonensis* and the first geographical record from Japan. Considering the life cycle, the chick was infected with the nematodes by ingestion of earthworms, because the chick had been given many earthworms as food from the parents. Nematol. Res.

but from a week old, it showed several symptoms, such as eyeball protrusion, an increased amount of eye mucus, a head swing, and neck tilt. Also from 12-days-old, the chick experienced symptoms, such as gloom and head shaking, and its growth seemed to be slow. About three weeks after hatching, it lost its voice, no longer took bait on its own, and would not eat any food provided by the parents. As the chick appeared to be debilitated, the chick was captured for treatment. However, the chick showed open breathing, severe head shaking, lethargy, pulmonary noise was heard when breathing, and bait was expectorated with her mouth wide open. Then, gradually the lethargy increased, such that the chick was unable to stand and developed head drooping, and the chick died on August 6. In the postmortem examination performed at the Kushiro Zoo, 20 individual nematodes were obtained from the nasal cavity and the intracavitary and anterior thoracic air sacs. The collected nematode specimens were fixed in 70% ethanol, and the localized gross regions of the organs were fixed in a 15% formalin solution. The specimens were taken to the Wild Animal Medical Center of Rakuno Gakuen University for taxonomical and microscopic examination. The nematode specimens were cleared in a lacto-phenol solution. The organs were sectioned (4 or 5 μ m thickness), stained with Hematoxylin and Eosin (HE), and mounted using Canada balsam solution. Morphological and biometric data were recorded using a camera lucida (OLYMPUS DP20). The specimens have been deposited at the Kushiro Zoo (Postmortem No.

females were separated; the males had stronglyliform bursa and externo-dorsal rays that were markedly shorter than the medio-dorsal ray, without medial projection that did not extend beyond the margin of the bursa copulatrix; and the spicules were thin and equal. According to the

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Countermeasures for avian influenza outbreaks among captive avian collections at zoological gardens and aquariums in Japan

Abstract

Japan is situated along the East Asian Flyway, which is an important migratory route. Outbreaks of infectious disease could impact bird populations along this route, and is expected to have a negative influence on captive bird populations. Here, we provide a brief overview of the situation regarding avian influenza (AI) in both free-ranging and captive avian species in Japan. We also suggest suitable countermeasures for the prevention and management of AI outbreaks in zoological gardens and aquariums, with special reference to the control of free-ranging duck populations and/or individuals and the nationwide surveillance of AI viruses. Furthermore, we have disclosed the prominence of vaccination program for zoological collections in Japan.

Keywords: avian influenza, vaccination, zoological collection in Japan

Volume 7 Issue 3 - 2019

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Received: June 06, 2019 | Published: June 21, 2019

出典 doi: 10.15406/jmen.2019.07.00256

<https://medcraveonline.com/JMEN/countermeasures-for-avian-influenza-outbreaks-among-captive-avian-collections-at-zoological-gardens-and-aquariums-in-japan.html>

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NOTE

Wildlife Science

Detection of avian haemosporidia from captive musophagid birds at a zoological garden in Japan

Masayoshi KAKOGAWA^{1,2)}, Ayana ONO³⁾, Mizue INUMARU³⁾, Yukita SATO^{3)*} and Mitsuhiro ASAKAWA²⁾

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J. Vet. Med. Sci.
81(12): **-**, 2019
doi: 10.1292/jvms.19-0483

Received: 28 August 2019
Accepted: 23 October 2019
Advanced Epub:
4 November 2019

ABSTRACT. One captive musophagid bird at a zoological garden in Japan showed clinical symptoms and was found to be infected with avian haemosporidia. We subsequently collected blood from all musophagid birds kept in the garden and examined for avian haemosporidia using both microscopic and molecular examination. Only *Haemoproteus* gametocytes were observed in the blood of two Guinea turaco (*Tauraco persa*). Three genetic lineages of *Haemoproteus* were identified from three Guinea turacos and one genetic lineage of *Leucocytozoon* was identified from a grey plantain-eater (*Crinifer piscator*). Detected *Haemoproteus* lineages were all identical and completely different from those previously reported in Japan, suggesting that these birds were infected in their original habitat. This is the first record of *Haemoproteus* infection in Guinea turacos.

KEY WORDS: *Haemoproteus*, Japan, *Leucocytozoon*, musophagid bird, zoo

出典 doi: 10.1292/jvms.19-0483

<http://jsvetsci.jp/jvms/category/archives/#2019>

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***Pseudoleucochloridium ainoelicis* nom. nov.
(Trematoda: Panopistidae), a Replacement for
Glaphyrostomum soricis Found from Long-Clawed Shrews
in Hokkaido, Japan, with New Data on its Intermediate Hosts**

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(Received 11 January 2019; Accepted 12 June 2019)

<http://zoobank.org/67456F94-E6B4-4844-A1C5-F7CF5F133143>

Members of the genus *Glaphyrostomum* Braun, 1901 (Trematoda: Brachylaimidae) are parasites of birds. However, an exception occurs in *Glaphyrostomum soricis* Asakawa, Kamiya and Ohbayashi, 1988, which was described from the long-clawed shrew, *Sorex unguiculatus* Dobson, 1890, in Hokkaido, Japan. A recent DNA barcode-based trematode survey of land snails clearly showed that *Ainoelix editha* (A. Adams, 1868), a bradybaenid snail indigenous to Hokkaido, serves as the first and second intermediate hosts for a species of the genus *Pseudoleucochloridium* Pojmańska, 1959 (Panopistidae). Its adult stage was furthermore confirmed from *S. unguiculatus*. A comparison of adult morphology between *Pseudoleucochloridium* sp. and *G. soricis* revealed that both should be considered the same species. However, *Pseudoleucochloridium soricis* comb. nov. cannot be applied because *P. soricis* (Soltys, 1952) already exists as the type species of the genus. We, therefore, propose *Pseudoleucochloridium ainoelicis* nom. nov. as a replacement name for *G. soricis*.

Key Words: Trematoda, Panopistidae, *Pseudoleucochloridium*, new replacement name, Hokkaido.

出典 doi: 10.12782/specdiv.24.159

<https://http://jssz.sakura.ne.jp/spdiv/v24/index.html>

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Comparison of the intestinal helminth community of the large Japanese field mouse (*Apodemus speciosus*) between urban, rural, and natural sites in Hokkaido, Japan

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ARTICLE INFO

Keywords:

Ecosystem modification
Urbanization
Helminth community
Apodemus speciosus

ABSTRACT

Anthropogenic ecosystem modification has affected over 80% of the global land cover. Interest in its effects on wildlife has been growing over the past several decades, specifically in regard to biodiversity and ecosystem function. Parasites are of particular interest, because they directly impact animal health, and can be transmitted to humans through the process of zoonosis. However, most studies so far tended to focus on only one or two parasites with few looking at the entire community, thereby limiting our understanding of the effects of ecosystem modification on parasitic organisms. In this study, we estimated the intestinal helminth diversity and species richness of the large Japanese field mouse (*Apodemus speciosus*), as well as the prevalence and abundance of each species in two modified ecosystems, a rural agricultural area and an urban park. We then compared them to a natural area to see how they have been altered. We found that diversity, prevalence, and abundance were all highly altered within both modified ecosystems, but generally to a greater degree within the urban park. However, there was great variation in the direction and degree of response of each helminth species, suggesting that generalized trends may be difficult to ascertain. Furthermore, it is important to analyze the entire helminth community, because interspecific interactions and the effect that ecosystem modification has on them may help determine what species persist.

出典 doi: 10.1016/j.parint.2019.02.001

<https://www.elsevier.com/locate/parint>

最終責任者 Itsuro Koizumi (Corresponding Author)

Epidemiological survey of tick-borne encephalitis virus infection in wild animals on Hokkaido and Honshu islands, Japan

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Mitsuhiko Asakawa³⁾, Kei Okuda⁴⁾, Kei Fujii⁵⁾, Shinya Fukumoto⁶⁾,
Rika Umemiya-Shirafuji⁶⁾, Motoki Sasaki¹⁾, Kotaro Matsumoto¹⁾,
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Received for publication, October 3, 2018; accepted, November 14, 2018

Abstract

The first human case of tick-borne encephalitis (TBE) in Japan was recorded in southern Hokkaido in 1993 and was followed by four further cases in southern, central, and northern Hokkaido during 2016–2018. However, the distribution of TBE virus (TBEV) foci in Japan is unclear. Therefore, here, we serologically examined raccoons (*Procyon lotor*), sika deer (*Cervus nippon*), and wild boars (*Sus scrofa*) as sentinels of TBEV infection in Hokkaido and in Fukushima and Tochigi Prefectures in Honshu. A total of 1,649 serum samples collected between 2003 and 2018 were screened by enzyme-linked immunosorbent assay using subviral particles and confirmed using the virus neutralization test. In raccoons, the seroprevalence of TBEV was 5.9% (39/662 samples) in central Hokkaido in 2003–2005 and 0.8% (3/368 samples) in eastern Hokkaido in 2010–2018, revealing the presence of TBEV foci in these areas. In addition, 0.5% (2/414) of deer sampled in eastern Hokkaido in 2010–2017 and 2.4% (1/42) of deer sampled in Tochigi Prefecture in 2016–2018 were seropositive. On Honshu, seropositive rodents have previously been detected only in Shimane Prefecture. Therefore, the detection of seropositive animals in Tochigi Prefecture may indicate the widespread distribution of TBEV foci throughout Japan. TBEV and viral genes were not detected in 507 ticks collected in the same area of eastern Hokkaido where seropositive animals were found, reemphasizing the value of using serological examination of wild animals as a tool for revealing unknown TBE risk areas. Our findings also indicate that raccoons may be particularly useful sentinels.

出典 doi: doi.org/10.14943/jjvr.67.2.163

<https://eprints.lib.hokudai.ac.jp/dspace/handle/2115/74797>

最終責任者 Kunitoshi Imai (Corresponding Author)

Nematodes belonging to the genus *Ternidens* (Strongyloidea: Chabertiidae) found in a talapoin, *Miopithecus talapoin*, imported for sale as a pet

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ABSTRACT. Reexamination of preserved nematode specimens collected from a talapoin, *Miopithecus talapoin*, which died at a pet dealer in Tokyo, and tentatively classified as *Globocephalus* sp. revealed four female adults and one fourth-stage larva belonging to the genus *Ternidens* (Strongyloidea: Chabertiidae). The adults closely resembled *T. deminutus*, the only species currently recognized in the genus. A brief morphological description was made with a discussion on its possible transmission to humans from the pet monkeys. This is the first report of *Ternidens* from primates imported for sale as pets in Japan.

KEY WORDS : *Miopithecus*, pet dealer, talapoin, *Ternidens*, zoonosis

Nematodes collected from one talapoin and preserved in the Wild Animal Medical Center (WAMC), Rakuno Gakuen University (Accession No. As2565) were reexamined in this study. The talapoin was wild-caught and imported to Japan to be sold as a pet, but details such as its country of origin, duration of captivity, etc., were not available. Its carcass was frozen and transported to WAMC, where a necropsy was performed in July 2002. The methods of necropsy and collection of parasites are reported elsewhere [19]. Among the nematodes collected, those with a large buccal capsule comparable with that of *Globocephalus* were selected, cleared in a glycerol-ethanol solution by evaporating ethanol, and mounted on a glass slide with a 50% glycerol aqueous solution. They were observed under an Olympus BX50 microscope equipped with a differential interference contrast. The head of one fragmented worm was severed for en face observation.

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出典 https://jsvp-hp.blogspot.com/p/blog-page_20.html

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Glucuronidation as a metabolic barrier against zearalenone in rat everted intestine

Ieko T, Inoue S, Inomata Y, Inoue H, Fujiki J, **Iwano H.**
J. Vet. Med. Sci. Dec 16. 2019. doi: 10.1292/jvms.19-0570.

II. その他<Others>

- 1) Analysis of Corticosterone and Testosterone Synthesis in Rat Salivary Gland Homogenates.

Ieko T, Sasaki H, Maeda N, Fujiki J, **Iwano H.** Yokota H.
Front. Endocrinol. (Lausanne). 2019 Jul 17;10:479.
doi: 10.3389/fendo.2019.00479.

- 2) Effect of Mycoplasma bovis on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells.

Nishi K, Gondaira S, Okamoto M, Nebu T, Koiwa M, Ohtsuka H, Murai K, Matsuda K, Fujiki J, **Iwano H.** Nagahata H, Higuchi H.
Vet. Immunol. Immunopathol. 2019 Oct;216:109920.
doi: 10.1016/j.vetimm.2019.109920. Epub 2019 Aug 7.

- 3) Immunosuppression in cows following intramammary infusion of *Mycoplasma bovis*.

Gondaira S, Nishi K, Tanaka T, Yamamoto T, Nebu T, Watanabe R, Konnai S, Hayashi T, Kiku Y, Okamoto M, Matsuda K, Koiwa M, Iwano H, Nagahata H, Higuchi H.
Infect. Immun. 2019 Dec 16. pii: IAI.00521-19. doi: 10.1128/IAI.00521-19.



FULL PAPER

Toxicology

Glucuronidation as a metabolic barrier against zearalenone in rat everted intestine

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J. Vet. Med. Sci.
82(2): **-**, 2020
doi: 10.1292/jvms.19-0570

Received: 17 October 2019
Accepted: 28 November 2019
Advanced Epub:
16 December 2019

ABSTRACT. Zearalenone (ZON), produced by *Fusarium* fungi, exhibits estrogenic activity. Livestock can be exposed to ZON orally through contaminating feeds such as cereals, leading to reproductive disorders such as infertility and miscarriage via endocrine system disruption. However, the details of ZON metabolism remain unclear, and the mechanism of its toxicity has not been fully elucidated. In this study, we investigated the kinetics of ZON absorption and metabolism in rat segmented everted intestines. ZON absorption was confirmed in each intestine segment 60 min after application to the mucosal buffer at 10 μ M. Approximately half of the absorbed ZON was metabolized to α -zearalenol, which tended to be mainly glucuronidated in intestinal cells. In the proximal intestine, most of the glucuronide metabolized by intestinal cells was excreted to the mucosal side, suggesting that the intestine plays an important role as a first drug metabolism barrier for ZON. However, in the distal intestine, ZON metabolites tended to be transported to the serosal side. Glucuronide transported to the serosal side could be carried via the systemic circulation to the local tissues, where it could be reactivated by deconjugation. These results are important with regard to the mechanism of endocrine disruption caused by ZON.

KEY WORDS: absorption, everted intestine, glucuronidation, metabolism, zearalenone

出典 doi: 10.1292/jvms.19-0570.

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_19-0570/_article

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Analysis of Corticosterone and Testosterone Synthesis in Rat Salivary Gland Homogenates

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OPEN ACCESS

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Specialty section:

This article was submitted to
Cellular Endocrinology,
a section of the journal

Extra-adrenal steroid hormone production has been reported in several tissues, the biological role of which is interesting in terms of hormonal regulation of metabolism, growth, and behavior. In this report, we describe for the first time steroidogenesis in rat salivary glands. Enzyme activities associated with corticosterone and testosterone production were detected in rat salivary glands by LC-MS analysis. In tissue homogenates of rat salivary glands, progesterone was produced enzymatically *in vitro* from pregnenolone in the presence of NADPH and NADH. Deoxycorticosterone was produced from progesterone, corticosterone from deoxycorticosterone, and testosterone from androstenedione (but not pregnenolone from cholesterol) via enzymatic reactions using the same tissue homogenates. Immunoblotting analysis indicated the expression of 11 β -hydroxylase (cytochrome P450 11 β 1; CYP11 β 1), which mediated the production of corticosterone from deoxycorticosterone. However, CYP family 11 subfamily A member 1 (CYP11A1)-mediated production of pregnenolone from cholesterol was not detected in the salivary glands by immunoblotting using a specific antibody. These results indicate that corticosterone and testosterone are produced from pregnenolone in rat salivary glands. The initial substrate in salivary steroidogenesis and the roles of salivary corticosterone and testosterone are discussed.

Keywords: salivary glands, steroidogenesis, corticosterone, testosterone, steroid, pregnenolone, sulfate, conjugate

出典 doi: 10.3389/fendo.2019.00479.

<https://www.frontiersin.org/articles/10.3389/fendo.2019.00479/full>

最終責任者 Hiroshi Yokota (Corresponding Author)



Contents lists available at ScienceDirect

Veterinary Immunology and Immunopathology

journal homepage: www.elsevier.com/locate/vetimm



Research paper

Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells



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ARTICLE INFO

Keywords:

Mycoplasma bovis
Mycoplasma arthritis
Synovial cells
Inflammatory cytokines
Matrix metalloproteinases

ABSTRACT

Mycoplasma bovis causes chronic arthritis in calves. Mycoplasma arthritis shows severe inflammatory reactions in joints that is commonly treated with antibiotics and results in significant economic losses in the calf industry. A previous study showed that inflammatory cytokines and matrix metalloproteinases (MMPs) produced by synovial cells promote progression of the pathophysiology of bacterial arthritis. However, the mechanism underlying the pathogenesis of bovine Mycoplasma arthritis has not been fully clarified. In this study, we examined the immunologic response of bovine synovial tissue to *M. bovis*. We observed significant increases in expression of interleukin (IL)-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial tissue from Mycoplasma arthritis calves compared with tissues from normal calves. Expression of IL-6, IL-8, and MMP-1 mRNA was also induced in cultured synovial cells stimulated with *M. bovis*, but not expression of IL-1 β and MMP-3 mRNA. In contrast, the culture supernatant of peripheral blood mononuclear cells stimulated with *M. bovis* induced marked increases in the expression of IL-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial cells. Our results indicate that inflammatory cytokines and MMPs produced by synovial cells play a key role in the pathogenesis of Mycoplasma arthritis. We suggest that interactions between synovial cells and mononuclear cells in the presence of *M. bovis* induce expression of these cytokines and MMPs in synovial cells, resulting in severe inflammatory reactions in the joints.

出典 doi: 10.1016/j.vetimm.2019.109920.

<https://www.sciencedirect.com/science/article/pii/S0165242719300777?via%3Dihub>

最終責任者 Hidetoshi Higuchi (Corresponding Author)

Immunosuppression in cows following intramammary infusion of *Mycoplasma bovis*

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DOI: 10.1128/IAI.00521-19

Article

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ABSTRACT

Mycoplasma bovis (*M. bovis*) is a destructive pathogen that causes large economic losses in rearing cattle for beef and dairy worldwide. *M. bovis* causes suppression and evasion of host immune response; however, the mechanisms of host immune function involved in *M. bovis* mastitis have not been elucidated. The purpose of this study is to elucidate the characteristics of the bovine immune response to mycoplasmal mastitis. We evaluated the responsiveness of the bovine mammary gland following infusion of *M. bovis*. Somatic cell counts and bacterial counts in milk from the infected quarter were increased. However, the proliferation of peripheral blood mononuclear cells (blood MNCs) and mononuclear cells isolated from *M. bovis*-stimulated mammary lymph nodes (lymph node MNCs) did not differ from that in the unstimulated cells. Transcriptome analysis revealed that the mRNA levels of innate immune system-related genes in blood MNCs, complement factor D (CFD), ficolin 1 (FCN1), and tumor necrosis factor superfamily member 13 (TNFSF13), decreased following intramammary infusion of *M. bovis*. The mRNA levels of immune exhaustion-related genes, programmed cell death 1 (PD-1), programmed cell death-ligand 1 (PD-L1), lymphocyte activation gene 3 (LAG3), and cytotoxic T-lymphocyte-associated protein 4 (CTLA4), of milk mononuclear cells (milk MNCs) in the infected quarter were increased compared with those before infusion. Increase in immune exhaustion-related gene expression and decrease in innate immune response-related genes of MNCs in quarters from cows were newly characterized by *M. bovis*-induced mastitis. These results suggested that *M. bovis*-induced mastitis affected the immune function of bovine MNCs, which is associated with prolonged duration of infection with *M. bovis*.

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Mycoplasma bovis-induced Inhibition of Bovine Peripheral Blood Mononuclear Cell Proliferation Is Ameliorated after Blocking the Immune-Inhibitory Programmed Death 1 Receptor
Infect Immun, 2018

Therapeutic Effect of Nisin Z on Subclinical Mastitis in Lactating Cows
Antimicrob Agents Chemother, 2007

出典 doi: 10.1128/IAI.00521-19.

<https://iai.asm.org/content/early/2019/12/10/IAI.00521-19.long>

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- 1) Characterisation of antibiotic resistance of *Salmonella* isolated from dog treats in Japan.

Yukawa S, Uchida I, Tamura Y, Ohshima S, Hasegawa T (2019). *Epidemiology and Infection* 147, e102, 1-6. doi:10.1017/S0950268819000153.

Characterisation of antibiotic resistance of *Salmonella* isolated from dog treats in Japan

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Original Paper

Cite this article: Yukawa S, Uchida I, Tamura Y, Ohshima S, Hasegawa T (2019).

Characterisation of antibiotic resistance of *Salmonella* isolated from dog treats in Japan. *Epidemiology and Infection* **147**, e102, 1–6. <https://doi.org/10.1017/S0950268819000153>

Received: 3 May 2018

Revised: 12 December 2018

Accepted: 18 January 2019

Key words:

4,5,12:i-; antimicrobial resistance; *bla*_{TEM}; dog treats; *Salmonella*

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Abstract

Dog treats might be contaminated with *Salmonella*. In Canada and the USA, outbreaks of human salmonellosis related to exposure to animal-derived dog treats were reported. Consequently, surveillance data on *Salmonella* contamination of dog treats have been gathered in many countries, but not in Japan. In the current study, we investigated whether dog treats in Japan were contaminated with *Salmonella*. Overall, 303 dog treats (of which 255 were domestically produced) were randomly collected and the presence of *Salmonella* investigated. Seven samples were positive for *Salmonella enterica* subsp. *enterica*. Among these isolates, three were identified as serovar 4,5,12:i-; two were serovar Rissen; and two were serovar Thompson. All serovar 4,5,12:i- and Thompson isolates were resistant to one or more drugs. Two serovar Rissen isolates were fully susceptible to all tested antimicrobial agents. All *Salmonella* isolates were susceptible to cefotaxime, ciprofloxacin and nalidixic acid. The gene *bla*_{TEM} was detected in two serovar 4,5,12:i- isolates. The *bla*_{CTX-M} and *bla*_{CMY} genes were not detected in any isolates. This study demonstrated that dog treats in Japan could constitute a potential source of dog and human *Salmonella* infections, including multidrug-resistant *Salmonella* isolates.

出典 doi:10.1017/S0950268819000153.

<https://doi.org/10.1017/S0950268819000153>

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- 1) PCR primer design method for differentiating among salmonella serogroups based on an algorithm targeting gene-flanking regions.
Muramatsu Y, Tsukaya Y and Ikeda T and Uchida L, Osa Y, **Endoh D**.
Southwest Asian J. Trop. Med. Pub. Health 50: 848-859. 2019.
https://www.tn.mahidol.ac.th/seameo/2019-50-5/07_7762_15-848.pdf

II. その他<Others>

- 1) Encephalomyocarditis virus is potentially derived from eastern bent-wing bats living in East Asian countries.
Doysabasa KCC, Obab M, Furutaa M, Iidaa K, Omatsu T, Furuya T, Okada T, Sutummaporn K, Shimoda H, Wong M-L, Wu C-H, Ohmori Y, Kobayashi R, Hengjan Y, Yonemitsu K, Kuwata R, Kim Y-K, Han S-H, Sohn S-H, Han S-H, Suzuki K, Kimura J, Maeda K, Oh H-S, **Endoh D**, Mizutani T, Hondo E.
Virus Res. 259: 62-67. 2019. doi.org/10.1016/j.virusres.2018.10.020.
- 2) Estimation of Dose Rate for the Large Japanese Field Mouse (*Apodemus speciosus*) Distributed in the “Difficult-to-Return Zone” in Fukushima Prefecture.
Onuma M, **Endoh D**, Ishiniwa H, Tamaoki M.
In: “Low-Dose Radiation Effects on Animals and Ecosystems” pp 17-30, 2020, Springer, Berlin, Germany.
- 3) Molecular Evolution of Tryptophan Hydroxylases in Vertebrates: A Comparative Genomic Survey.
Xu J, Li Y, Lv Y, Bian C, You X, **Endoh D**, Teraoka H, Shi Q.
Genes 10: 203. 2019. doi.org/10.3390/genes10030203.
- 4) Extended proliferation of chicken-and Okinawa rail-derived fibroblasts by

expression of cell cycle regulators.

Katayama M, Kiyono T, Ohmaki H, Eitsuka T, **Endoh D**, Inoue-Murayama M, Nakajima N, Onuma M, Fukuda T.

J. Cell. Physiol. 234: 6709-6720. 2019. doi.org/10.1002/jcp.27417

PCR PRIMER DESIGN METHOD FOR DIFFERENTIATING AMONG *SALMONELLA* SEROGROUPS BASED ON AN ALGORITHM TARGETING GENE-FLANKING REGIONS

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Abstract. We applied an algorithm targeting length polymorphisms of intergenic sequences between gene-flanking regions for constructing PCR primer pairs to distinguish among serogroups of *Salmonella*, a major pathogen of humans and animals. From 43 constructed primer pairs, a pair capable in a single-step conventional PCR to categorize five serogroups of *Salmonella enterica* subsp *enterica* into three classes according to amplicon lengths (400, 800, and 900 bp, respectively). Nucleotide sequences of the amplicons were those of flanking regions *rfbH* and *rfbJ*. No amplicon was generated in other bacterial genera examined, indicative of the high specificity of this PCR primer pair. As more genetic information becomes available, the smaller number of primer pairs will be required in multiplex-PCR for differentiating *Salmonella* microorganisms using the novel primer design method.

Keywords: *Salmonella*, algorithm, gene-flanking region, PCR, serogroup

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Encephalomyocarditis virus is potentially derived from eastern bent-wing bats living in East Asian countries

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<https://doi.org/10.1016/j.virusres.2018.10.020>

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Highlights

- EMCV genome was widely found in fecal guanos in Taiwanese, Korean, and Japanese caves.
- *Miniopterus fuliginosus* is the main source of the fecal guano.
- It is possible that *Miniopterus fuliginosus* is one of the natural hosts of EMCV in East Asia.

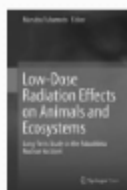
Abstract

Bats are reservoir hosts of many zoonotic viruses and identification of viruses that they carry is important. This study aimed to use high throughput screening to identify the viruses in fecal guano of Taiwanese insectivorous bats caves in order to obtain more information on bat-derived pathogenic viruses in East Asia. Guano samples were collected from two caves in Taiwan, pooled, and then subjected to Multiplex PCR-based next generation sequencing for viral identification. Subsequently, encephalomyocarditis virus (EMCV) sequence was detected and confirmed by reverse transcription PCR. EMCV is considered as rodent virus and thus, animal species identification through cytochrome oxidase I (COI) barcoding was further done to identify the viral source. Finally, determination of distribution and verification of the presence of EMCV in guano obtained from Japanese and South Korean caves was also done. We concluded that the guano collected was not contaminated with the excrement of rodents which were reported and presumed to live in Taiwan. Also, EMCV genome fragments were found in guanos of Japanese and South Korean caves. It is possible that the eastern bent-wing bat (*Miniopterus fuliginosus*) is one of the natural hosts of EMCV in East Asia.

出典 doi.org/10.1016/j.virusres.2018.10.020.

<https://www.sciencedirect.com/science/article/abs/pii/S0168170218305768>

最終責任者 Eiichi Hondo (Corresponding Author)




Low-Dose Radiation Effects on Animals and Ecosystems pp 17-30 | [Cite as](#)

Estimation of Dose Rate for the Large Japanese Field Mouse (*Apodemus speciosus*) Distributed in the “Difficult-to-Return Zone” in Fukushima Prefecture

Authors

Authors and affiliations

Manabu Onuma , Daiji Endoh, Hiroko Ishiniwa, Masanori Tamaoki

Open Access | Chapter

First Online: 11 November 2019

Abstract

Following the Fukushima Daiichi Nuclear Power Plant (FNPP) accident, dose rate for Muridae species in forests of Iitate Village, Fukushima, was estimated as 3.9 mGy/day over the first 30 days. According to the derived consideration reference levels (DCRLs) determined by the International Commission on Radiological Protection (ICRP), this dose level could be affecting reproduction of these rodents. However, information on dose rate for forest rodents after 2012 is limited. Therefore, the dose rate of forest rodents was calculated for large Japanese field mice (*Apodemus speciosus*) captured in the “difficult-to-return zone” in the Fukushima Prefecture from 2012 to 2016. External dose rate was calculated based on the ambient dose equivalent rate of gamma-radiation at the ground level of the trapping site. Internal dose rate was simulated using the EGS5 program based on cesium (Cs)-137 concentrations in the captured mice. Combining the external and internal doses, the total daily dose rate for the mice within the zone was estimated to be 0.201–0.547 mGy/day. In addition, the ratio of external dose rate to total dose rate was estimated to be 61.2–95.4%. Thus, it is concluded that the present radiation exposure of the field mice distributed in the trapping site did not affect their reproduction. However, it must be noticed that total dose rate exceeding 0.1 mGy/day, which offers very low probability of the occurrence of certain effects according to the DCRLs determined by ICRP, is still present in most of the zone (September 2018, Nuclear Regulation Authority, Japan). Thus, various indexes should be applied to evaluate the exposure effects on the field mice in this zone.

Keywords

Large Japanese field mouse *Apodemus speciosus* Dose rate EGS5 Cs-137

出典 doi.org/10.1007/978-981-13-8218-5_2.

https://link.springer.com/chapter/10.1007/978-981-13-8218-5_2

最終責任者 Manabu Onuma (First and Corresponding Author)

Article

Molecular Evolution of Tryptophan Hydroxylases in Vertebrates: A Comparative Genomic Survey

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Received: 17 January 2019; Accepted: 4 March 2019; Published: 8 March 2019



Abstract: Serotonin is a neurotransmitter involved in various physiological processes in the central and peripheral nervous systems. Serotonin is also a precursor for melatonin biosynthesis, which mainly occurs in the pineal gland of vertebrates. Tryptophan hydroxylase (TPH) acts as the rate-limiting enzyme in serotonin biosynthesis and is the initial enzyme involved in the synthesis of melatonin. Recently, two enzymes—TPH1 and TPH2—were reported to form the TPH family in vertebrates and to play divergent roles in serotonergic systems. Here, we examined the evolution of the TPH family from 70 vertebrate genomes. Based on the sequence similarity, we extracted 184 predicted *tph* homologs in the examined vertebrates. A phylogenetic tree, constructed on the basis of these protein sequences, indicated that *tph* genes could be divided into two main clades (*tph1* and *tph2*), and that the two clades were further split into two subgroups of tetrapods and Actinopterygii. In tetrapods, and some basal non-teleost ray-finned fishes, only two *tph* isotypes exist. Notably, *tph1* in most teleosts that had undergone the teleost-specific genome duplication could be further divided into *tph1a* and *tph1b*. Moreover, protein sequence comparisons indicated that TPH protein changes among vertebrates were concentrated at the NH₂-terminal. The tertiary structures of TPH1 and TPH2 revealed obvious differences in the structural elements. Five positively selected sites were characterized in TPH2 compared with TPH1; these sites may reflect the functional divergence in enzyme activity and substrate specificity. In summary, our current work provides novel insights into the evolution of *tph* genes in vertebrates from a comprehensive genomic perspective.

Keywords: tryptophan hydroxylase (TPH); serotonin; melatonin biosynthesis; phylogenetic analysis; molecular evolution; positive selection; vertebrate

出典 doi.org/10.3390/genes10030203.

<https://www.mdpi.com/2073-4425/10/3/203>

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Extended proliferation of chicken- and Okinawa rail-derived fibroblasts by expression of cell cycle regulators

Masafumi Katayama, Tohru Kiyono✉, Hitomi Ohmaki, Takahiro Eitsuka, Daiji Endoh, Miho Inoue-Murayama, Nobuyoshi Nakajima, Manabu Onuma✉, Tomokazu Fukuda✉

First published: 11 November 2018 | <https://doi.org/10.1002/jcp.27417> | Citations: 1

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Abstract

Although immortalized cultured cells are useful for various functional assays or transcriptome analysis, highly efficient and reproducible immortalization methods have not been developed in avian-derived cells. We introduced the simian virus 40 T antigen (*SV40T*) and human papillomavirus (*HPV*)-*E6E7* to chick and Okinawa rail (endangered species) derived fibroblast. As a result, neither the *SV40T* nor *E6E7* genes could induce avian cell immortality. Accordingly, we attempted to use a recently developed immortalization method, which involved the coexpression of mutant cyclin-dependent kinase 4 (CDK4), Cyclin D, and TERT (K4DT method) in these avian cells. Although the K4DT method could not efficiently induce the efficient immortalization in mass cell population, cellular division until the senescence was significantly extended by K4DT, we succeeded to obtain the immortalized avian cells (chick K4DT: one clone, Okinawa rail K4DT: three clones, Okinawa rail K4DT + telomerase RNA component: one clone) with K4DT expression. We conclude that K4DT expression is used to extend the cell division and immortalization of avian-derived cells.

Citing Literature



Supporting Information



出典 doi.org/10.1002/jcp.27417

<https://onlinelibrary.wiley.com/doi/abs/10.1002/jcp.27417>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Peripartum metabolic profiles in a Holstein dairy herd with alarm level prevalence of subclinical ketosis detected in early lactation.
Oikawa, S., Elsayed, H. K., Shibata, C., Chisato, K. and Nakada, K.
Can. J. Vet. Res. 83: 50-56. 2019. PMC6318827
- 2) Increased serum malondialdehyde concentration in cows with subclinical ketosis.
Senoh, T., **Oikawa, S.**, Nakada, K., Tagami, T., Iwasaki, T.
J. Vet. Med. Sci. 81(6): 817–820. 2019. doi: 10.1292/jvms.18-0777

II. その他<Others>

- 1) Effect of butyrate supplementation on the productivity of lactating dairy cows fed diets differing in starch content.
Izumi, K., Fukumori, R., **Oikawa, S.**, Oba, M.
J. Dairy Sci. 102: 11051-11056. 2019. doi.org/10.3168/jds.2019-17113
- 2) Association of postpartum diseases occurring within 60 days after calving with productivity and reproductive performance in dairy cows in Fukuoka: A cow-level, retrospective cohort study.
Goto, A., Takahara, K., Sugihara, T, **Oikawa, S.**, Katamoto, H., Nakada, K.
J. Vet. Med. Sci. 81(7): 1055–1062. 2019. doi: 10.1292/jvms.18-0384

Article

Peripartum metabolic profiles in a Holstein dairy herd with alarm level prevalence of subclinical ketosis detected in early lactation

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Abstract

The aim of this study was to characterize peripartum metabolic profiles, including the insulin sensitivity index, in cows diagnosed with subclinical ketosis (SCK) in the early stage of lactation. Cows that calved from January 2011 through December 2014 on a dairy farm with alarm level prevalence of SCK in Hokkaido, Japan ($n = 175$) were used. Blood and body condition scores (BCS) were obtained at regular health examinations in 2 consecutive periods, the first between 14 and 2 d before parturition, and the second between 3 and 14 d after parturition. Animals were divided into 3 groups at postpartum sampling: an SCK group with 35 multiparous and 15 primiparous cows having β -hydroxybutyrate (BHBA) concentrations ≥ 1.2 mM without clinical signs, a disease group of 36 multiparous and 9 primiparous cows that received treatment between parturition and postpartum sampling, and a control group consisting of 49 multiparous and 31 primiparous cows with BHBA concentrations < 1.2 mM. The prepartum revised quantitative insulin sensitivity check index was significantly lower in the multiparous SCK and disease groups than in the control group, demonstrating decreased insulin sensitivity in these cows, but not in primiparous cows. The prepartum BCS was significantly higher only in the multiparous SCK and disease groups. The prepartum apolipoprotein B-100 (ApoB-100) concentration was significantly decreased in the multiparous disease group, suggesting hepatic lipodosis. Conversely, primiparous cows had a higher prepartum ApoB-100 concentration. Prepartum decreased insulin sensitivity in the multiparous SCK and disease groups was considered to facilitate progression to SCK after calving.

Résumé

L'objectif de la présente étude était de caractériser les profils métaboliques péri-partum, incluant l'index de sensibilité à l'insuline, chez des vaches avec un diagnostic d'acétonémie subclinique (ASC) tôt en début de lactation. Les vaches qui ont mis bas entre janvier 2011 et décembre 2014 sur une ferme laitière avec une prévalence d'ASC à un degré d'alarme à Hokkaido, Japon ($n = 175$) ont été utilisées. Du sang et les pointages de condition corporelle (PCC) ont été obtenus au moment d'examens de santé réguliers lors de deux périodes consécutives, la première entre 14 et 2 j avant la parturition, et la seconde entre 3 et 14 j après la parturition. Les animaux ont été divisés en trois groupes lors de l'échantillonnage post-partum : un groupe ASC avec 35 vaches pluripares et 15 vaches primipares ayant des concentrations de β -hydroxybutyrate (BHBA) $\geq 1,2$ mM sans signe clinique, un groupe malade avec 36 vaches pluripares et 9 vaches primipares qui ont reçu un traitement entre le moment de la parturition et la prise d'échantillon post-partum, et un groupe témoin composé de 49 vaches multipares et 31 vaches primipares avec des concentrations de BHA $< 1,2$ mM. L'indice quantitatif de sensibilité à l'insuline révisé pré-partum était significativement plus bas dans les groupes de vaches multipares ASC et vaches malades que dans le groupe témoin, démontrant ainsi une diminution de la sensibilité à l'insuline chez ces vaches mais pas chez les vaches primipares. L'ASC pré-partum était significativement plus élevé seulement dans les groupes ASC multipares et malade. La concentration pré-partum d'apolipoprotéine B-100 (ApoB-100) était significativement diminuée chez les vaches multipares du groupe malade, suggérant une lipodose hépatique. Inversement, les vaches primipares avaient une concentration plus élevée d'ApoB-100. La sensibilité à l'insuline diminuée en pré-partum chez les vaches ASC multipares et vaches malades était considérée pour faciliter la progression d'ASC à la suite de la mise-bas.

(Traduit par Docteur Serge Messier)

出典 PMCID: PMC6318827

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6318827/>

最終責任者 Shin Oikawa (First Author and Corresponding Author)



NOTE

Internal Medicine

Increased serum malondialdehyde concentration in cows with subclinical ketosis

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J. Vet. Med. Sci.
81(6): 817–820, 2019
doi: 10.1292/jvms.18-0777

Received: 29 December 2018
Accepted: 2 April 2019
Published online in J-STAGE:
11 April 2019

ABSTRACT. The purpose of this study is to compare the assessment of pre- and postpartum oxidative stress-related causal indicators and other metabolites in cows with postpartum subclinical ketosis (SCK). The prepartum serum malondialdehyde concentration and body condition score (BCS) were elevated in the SCK cows (n=17) compared to healthy controls (n=12), while the insulin sensitivity check index was lower in the SCK cows than in the controls. Oxidative stress is enhanced in cows with prepartum higher BCS, causing decreased insulin sensitivity, and may be associated with onset of postpartum SCK. However, paraoxonase alone might be insufficient to assess the antioxidant state because of no difference in pre- and postpartum activities between the two groups.

KEY WORDS: cow, malondialdehyde, paraoxonase, subclinical ketosis

出典 DOI: 10.1292/jvms.18-0777

<https://doi.org/10.1292/jvms.18-0777>

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Short communication: Effects of butyrate supplementation on the productivity of lactating dairy cows fed diets differing in starch content

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ABSTRACT

The objective of this study was to evaluate the effects of butyrate supplementation on the dry matter intake (DMI), milk production, and blood metabolites of lactating dairy cows fed diets differing in starch content. Eight Holstein cows after peak lactation (58.6 ± 9.96 d in milk; mean \pm SD) were blocked by parity and assigned to 1 of 2 Latin squares (4×4) balanced for carryover effects with a 2×2 factorial arrangement of treatments. Treatments differed by dietary starch content (20.6 vs. 27.5%) and butyrate supplementation (butyrate vs. control) with 21-d periods. Experimental diets contained 36 and 30% corn silage, 18 and 15% grass silage, and 46 and 55% concentrates, respectively, for low starch and high starch diets, on a dry matter (DM) basis. Butyrate was provided as Gustor BP70 WS (Norel S.A., Madrid, Spain), containing 70% sodium butyrate and 30% fatty acid mixture, at 2% of dietary DM (providing butyrate at 1.1% of dietary DM), and control premix contained 70% wheat bran and 30% fatty acid mixture. Interaction effects between dietary starch content and butyrate supplementation were not observed for primary response variables, and milk yield was not affected by treatment. Butyrate supplementation increased serum β -hydroxybutyrate concentration compared with control (0.706 vs. 0.930 mM), but did not exceed 1.2 mM, a commonly accepted value for subclinical ketosis, and DMI was not affected. Cows fed butyrate had increased milk fat content (4.58 vs. 4.37%) and milk fat yield (1.51 vs. 1.42 kg/d), tended to have increased 4% fat-corrected milk yield (35.9 vs. 34.3 kg/d) and feed efficiency (1.56 vs. 1.50; 4% fat-corrected milk yield/DMI), and had decreased milk urea nitrogen (MUN) concentration (10.8 vs. 11.7 mg/

dL) compared with control. Cows fed high starch diets tended to have increased DMI (23.3 vs. 22.5 kg/d), increased milk protein yield (1.13 vs. 1.05 kg/d), and decreased MUN concentration (10.3 vs. 12.2 mg/dL). Inclusion of butyrate at 1.1% of dietary DM increased milk fat production and decreased MUN concentration without affecting DMI or increasing the risk of subclinical ketosis, regardless of dietary starch content.

Key words: butyrate, milk fat production, dietary starch content, milk urea nitrogen

Short Communication

Butyrate is one of the major VFA produced in the rumen and promotes development of rumen epithelial tissues (Sakata and Tamate, 1978; Simmons et al., 2009); many studies have evaluated the effect of butyrate administration on the development of the rumen and gastrointestinal tract in calves (Górka et al., 2011; Wanat et al., 2015; Górka et al., 2018). For lactating dairy cows, butyrate is used for de novo fatty acid synthesis in the mammary gland (Dils, 1986), and butyrate administration is expected to increase milk fat production. High starch diets, commonly fed to high-producing dairy cows, cause rapid acid accumulation in the rumen and decrease rumen pH, often leading to diet-induced milk fat depression (Harvatine et al., 2009; Kmicikewycz et al., 2015). Considering the effect of butyrate on promoting milk fat synthesis, adding butyrate to a high starch diet for high-yielding dairy cows may reduce the risk of milk fat depression. However, previous research is not consistent; some have reported that butyrate infusion or supplementation increased milk fat production (Rook et al., 1965; Huhtanen et al., 1993; Herrick et al., 2017) but others reported no effects (Herrick et al., 2018) or negative effects (Urtutia et al., 2019), and the discrepancy may be related to different dietary starch contents among the studies. The objective of the current study was to evaluate the

Received June 16, 2019.

Accepted July 18, 2019.

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出典 doi: 10.3168/jds.2019-17113

<https://doi.org/10.3168/jds.2019-17113>

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FULL PAPER

Theriogenology

Association of postpartum diseases occurring within 60 days after calving with productivity and reproductive performance in dairy cows in Fukuoka: A cow-level, retrospective cohort study

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ABSTRACT. Peripartum disorders in dairy cows negatively influence their productivity and reproductive performance. However, only a few reports have clearly indicated the influence of such disorders on the productivity and reproductive performance at a local-area or cow-level in Japan. This study aimed to elucidate the influence of diseases occurring within 60 days after calving on subsequent productivity and reproductive performance. Accordingly, a wide-area database on dairy production was used for epidemiological analysis; subsequently, multivariable analysis was performed to investigate the association of such diseases with productivity or reproductive performance in 6,545 cows from 178 farms in Fukuoka. We used 305-day energy-corrected milk (305 ECM) as an index of productivity and conception and culling as indices of reproductive performance. With regard to causality, mixed-effects model was used for analyzing the association between disease and productivity, and Cox proportional hazard model was used for analyzing the association between disease and reproductive performance. Compared to the disease absence group, the disease presence group demonstrated significantly lower 305 ECM [−154 kg; 95% confidence interval (CI), −229 to −79] and risk of pregnancy [hazard ratio (HR), 0.85; 95% CI, 0.80–0.91] and higher risk of culling (HR, 1.36; 95% CI, 1.17–1.59). These results indicate that, in Fukuoka, dairy cows affected by diseases within 60 days after calving exhibit lower productivity and reproductive performance. Therefore, proper dairy cow management during the peripartum period to prevent diseases during early lactation may maintain or improve productivity.

KEY WORDS: dairy cow, epidemiological analysis, peripartum period, productivity, reproductive performance

J. Vet. Med. Sci.
81(7): 1055–1062, 2019
doi: 10.1292/jvms.18-0384

Received: 5 July 2018
Accepted: 21 May 2019
Advanced Epub:
12 June 2019

出典 DOI: 10.1292/jvms.18-0384

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6656816/>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) A novel mouse model of adult T - cell leukemia cell invasion into the spinal cord.
Ohsugi T, Tanaka S, Iwasaki K, Nagano Y, Kozako T, Matsuda K, Hirose T and Takehana K.
Animal Model Exp. Med., 2: 64-67, 2019. doi: 10.1002/ame2.12053.
- 2) Anesthetic effect of a mixture of alfaxalone, medetomidine, and butorphanol for inducing surgical anesthesia in ICR, BALB/c, and C57BL/6 mouse strains.
Tsukamoto Y, Yamada N, Miyoshi K, Yamashita K and **Ohsugi T**.
J. Vet. Med. Sci., 81: 937-945, 2019. doi: 10.1292/jvms.18-0712.

II. その他<Others>


- 1) New SIRT2 inhibitors: histidine-based bleomycin spin-off.
Ali T F S, Ciftci H I, Radwan M O, Koga R, **Ohsugi T**, Okiyama Y, Honma T, Nakata A, Ito A, Yoshida M, Fujita M, Otsuka M.
Bioorg. Med. Chem. 27: 1767-1775, 2019. doi: 10.1016/j.bmc.2019.03.003.
- 2) Anti-cancer activity of the cell membrane-permeable phytic acid prodrug.
Masunaga T, Murao N, Tateishi H, Koga R, **Ohsugi T**, Otsuka M, Fujita M.
Bioorg. Chem. 92:103240, 2019. doi: 10.1016/j.bioorg.2019.103240.
- 3) High expression of NAMPT in adult T-cell leukemia/lymphoma and anti-tumor activity of a NAMPT inhibitor.
Kozako T, Aikawa A, **Ohsugi T**, Uchida Y I, Kato N, Sato K, Ishitsuka K, Yoshimitsu M, Honda S I.

Eur. J. Pharmacol. 865: 172738, 2019. doi: 10.1016/j.ejphar.2019.172738.

- 4) Targeting Excessive EZH1 and EZH2 Activities for Abnormal Histone Methylation and Transcription Network in Malignant Lymphomas.

Yamagishi M, Hori M, Fujikawa D, **Ohsugi T**, Honma D, Adachi N, Katano H, Hishima T, Kobayashi S, Nakano K, Nakashima M, Iwanaga M, Utsunomiya A, Tanaka Y, Okada S, Tsukasaki K, Tobinai K, Araki K, Watanabe T, Uchimaru K. *Cell Rep.* 29: 2321-2337.e7, 2019. doi: 10.1016/j.celrep.2019.10.083

A novel mouse model of adult T-cell leukemia cell invasion into the spinal cord

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Funding information

Japan Leukemia Research Fund; Grant-in-Aid for Scientific Research from the Japan Society for the Promotion of Science, Grant/Award Number: No. 24500493

Abstract

Adult T-cell leukemia (ATL) is a mature T-cell malignancy caused by human T-cell leukemia virus type I infection, and 10%-25% of patients show central nervous system (CNS) involvement. CNS involvement significantly reduces survival and there are no effective treatments for CNS involvement. Therefore, an appropriate animal model is required to evaluate the inhibitory effects of novel drugs on the progression of ATL with CNS involvement. Here, we established a mouse model of ATL with CNS involvement using NOD.Cg-Prkdc^{scid}Il2rg^{tm1Wjl}/SzJ mice inoculated with ATL cells intramuscularly in the postauricular region, and these mice showed paraparesis. Of the 10 mice inoculated with ATL cells intramuscularly (I.M.) at 5 weeks of age, 8 (80%) showed paraparesis, whereas none of the 10 mice inoculated with ATL cells subcutaneously (S.C.) showed paraparesis. In the I.M. group, PCR detected HTLV-1-specific genes in the thoracic and lumbar vertebrae; however, in the S.C. group, the vertebrae were negative for HTLV-1 genes. Histological analysis revealed a particularly high incidence of tumors, characterized by accumulation of the injected cells, in the thoracic vertebrae of mice in the I.M. group. Tumor cell infiltration was relatively high in the bone marrow. Spinal cord compression caused by invasion of the tumor mass outside the pia mater was observed in the thoracic vertebrae of the spinal cord. In conclusion, we have reported a mouse model of tumor growth with paraparesis that may be used to assess novel therapeutic agents for ATL with CNS involvement.

KEYWORDS

adult T-cell leukemia (ATL), central nervous system (CNS), human T-cell leukemia virus type I (HTLV-1), mice, NOD.Cg-Prkdc^{scid}Il2rg^{tm1Wjl}/SzJ mice

出典 doi: 10.1002/ame2.12053.

<https://onlinelibrary.wiley.com/doi/full/10.1002/ame2.12053>

最終責任者 Takeo Ohsugi (First Author and Corresponding Author)



FULL PAPER

Laboratory Animal Science

Anesthetic effect of a mixture of alfaxalone, medetomidine, and butorphanol for inducing surgical anesthesia in ICR, BALB/c, and C57BL/6 mouse strains

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ABSTRACT. The anesthetic effects of alfaxalone combined with medetomidine and butorphanol were investigated for ICR, BALB/c, and C57BL/6 mice. Mice were administered a combination of 0.5 or 0.75 mg/kg medetomidine and 5 mg/kg butorphanol with 30 or 40 mg/kg alfaxalone (0.5MBA30, 0.75MBA30 and 0.75MBA40, respectively). The drug combinations were administered subcutaneously and were compared with a widely used combination of 0.3 mg/kg medetomidine, 4 mg/kg midazolam, and 5 mg/kg butorphanol (MMB). All three MBA combinations achieved surgical anesthesia, although the recovery time was longer with 0.75MBA30 and 0.75MBA40 compared with 0.5MBA30. Furthermore, several mice exhibited a considerable jumping reaction immediately after injection with 0.75MBA30 and 0.75MBA40. Therefore, 0.5MBA30 may be suitable for inducing surgical anesthesia in the mouse strains tested. The anesthetic scores for 0.5MBA30 were improved compared with those of MMB in all three mouse strains; however, the body temperature drop in C57BL/6 mice was greater with 0.5MBA30. Our results show that the alfaxalone combination, 0.5MBA30, should allow surgical operations that are more stable in more strains of mice than MMB, although the combination may cause hypothermia, especially in C57BL/6 mice.

KEY WORDS: alfaxalone, anesthesia, butorphanol, medetomidine, mice

J. Vet. Med. Sci.
81(6): 937–945, 2019
doi: 10.1292/jvms.18-0712

Received: 27 November 2018
Accepted: 23 April 2019
Published online in J-STAGE:
10 May 2019

出典 doi: 10.1292/jvms.18-0712.

https://www.jstage.jst.go.jp/article/jvms/81/6/81_18-0712/_article

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New SIRT2 inhibitors: Histidine-based bleomycin spin-off

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ABSTRACT

Bleomycin is considered to exert its antitumor activity via DNA cleavage mediated by activated oxygen generated from the iron complex in its chelator moiety. Spin-offs from this moiety, HPH-1Trt and HPH-2Trt, with anti-cancer activities were recently synthesized. In this paper, we developed inhibitors of nicotinamide adenine dinucleotide-dependent deacetylase isoform 2 of Sirtuin protein (SIRT2), based on HPH-1Trt/HPH-2Trt, and aimed to generate new anti-cancer drugs. HPH-1Trt and HPH-2Trt had *in vitro* anti-SIRT2 inhibitory activity with 50% inhibitory concentration (IC₅₀) values of 5.5 and 8.8 μM, respectively. A structural portion of HPH-1Trt/HPH-2Trt, a tritylhistidine derivative TH-1, had stronger activity (IC₅₀ = 1.7 μM), and thus, fourteen derivatives of TH-1 were synthesized. Among them, TH-3 had the strongest activity (IC₅₀ = 1.3 μM). Selective binding of TH-3 in the pocket of SIRT2 protein was confirmed with a molecular docking study. Furthermore, TH-3 strongly lowered viability of the breast cancer cell line MCF7 with an IC₅₀ of 0.71 μM. A structure-activity relationship study using cell lines suggested that the mechanism of TH-3 to suppress MCF7 cells involves not only SIRT2 inhibition, but also another function. This compound may be a new candidate anti-cancer drug.



出典 doi: 10.1016/j.bmc.2019.03.003.

<https://www.sciencedirect.com/science/article/pii/S0968089619302196?via%3Dihub>

最終責任者 Mikako Fujita, Masami Otsuka (Corresponding Author)



Anti-cancer activity of the cell membrane-permeable phytic acid prodrug

Takuya Masunaga ^{a,1}, Naoki Murao ^{a,1}, Hiroshi Tateishi ^{a,1}, Ryoko Koga ^a, Takao Ohsugi ^b, Masami Otsuka ^{a,*} 
Mikako Fujita ^a 

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<https://doi.org/10.1016/j.bioorg.2019.103240>

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Highlights

- Synthesis of a prodrug of IP6 (Pro-IP6) and identification of IP6 generated from Pro-IP6 in cells.
- Selective anti-cancer effects including apoptosis and inhibitory effects of Akt activation of Pro-IP6.
- Effect of Pro-IP6 to reduce size of cancer in mice with adult T-cell leukemia.
- Establishment of a new tool to elucidate IP6 biology.

Abstract

Phytic acid (IP6) is an ingredient in cereals and legumes, and limited amounts of this compound are considered to enter the cell and exert anti-cancer effects. These effects have been seen by studying cells treated with around 1–5 mM IP6. However, such a large amount of IP6 chelates metals and changes the pH in cell culture medium. To overcome this problem, we synthesized a prodrug of IP6 (Pro-IP6) and elucidated generation of IP6 from Pro-IP6 in cells. Cellular experiments using Pro-IP6 demonstrated selective anti-cancer effects including apoptosis and inhibition of Akt activation. Furthermore, an *in vivo* study using mice with adult T-cell leukemia also showed that Pro-IP6 reduced the size of the cancer. Taken together, Pro-IP6 is a useful biological tool and may lead to development of new anti-cancer drugs.

出典 doi: 10.1016/j.bioorg.2019.103240.

<https://www.sciencedirect.com/science/article/abs/pii/S0045206819308399?via%3Dihub>

最終責任者 Masami Otsuka, Mikako Fujita (Corresponding Author)

Full length article

High expression of NAMPT in adult T-cell leukemia/lymphoma and anti-tumor activity of a NAMPT inhibitor

Tomohiro Kozako ^{a, *}, Akiyoshi Aikawa ^a, Takeo Ohsugi ^b, Yu-ichiro Uchida ^c, Naho Kato ^a, Keisuke Sato ^a, Kenji Ishitsuka ^{c, d}, Makoto Yoshimitsu ^{c, d}, Shin-ichiro Honda ^a

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<https://doi.org/10.1016/j.ejphar.2019.172738>

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Abstract

Adult T-cell leukemia/lymphoma (ATL) is a malignancy of mature T lymphocytes induced by human T-cell leukemia virus-1 and has a poor outcome. New molecular targets for the prevention and treatment of ATL are needed urgently. We previously reported high expression of Sirtuin 1, a nicotinamide adenine dinucleotide (NAD⁺)-dependent histone/protein deacetylase, in primary acute-type ATL cells. NAD⁺ biosynthesis via nicotinamide phosphoribosyltransferase (NAMPT) modulates Sirtuin 1 activity. Here, we examined the expression and effects of inhibiting NAMPT, a rate-limiting enzyme in NAD⁺ biosynthesis, in ATL cells. We found that peripheral blood mononuclear cells from patients with acute-type ATL expressed significantly higher levels of NAMPT protein than cells from healthy subjects. FK866, a NAMPT inhibitor, induced apoptosis of freshly isolated ATL cells *ex vivo* and HTLV-1-infected T-cell lines *in vitro*, which was accompanied by activation of caspases, DNA fragmentation, and disruption of mitochondrial transmembrane potential. However, a pan-caspase inhibitor failed to prevent this FK866-induced cell death, while FK866 increased the caspase-independent cell death mediator endonuclease G. Intriguingly, FK866 also activated autophagy, as demonstrated by increases in protein levels of autophagosome marker LC3-II. Thus, FK866 simultaneously activated apoptosis and autophagy. Finally, FK866 treatment markedly decreased the growth of human ATL tumor xenografts in immunodeficient mice. We showed that NAMPT is highly expressed in primary ATL cells *ex vivo*, and that FK866 induces autophagy and caspase-dependent and -independent cell death pathways *in vitro* and has an anti-tumor activity *in vivo*. These results suggest a novel therapeutic strategy for patients with this fatal disease.

出典 doi: 10.1016/j.ejphar.2019.172738.

<https://www.sciencedirect.com/science/article/pii/S0014299919306909?via%3Dihub>

最終責任者 Tomohiro Kozako (Corresponding Author)

Targeting Excessive EZH1 and EZH2 Activities for Abnormal Histone Methylation and Transcription Network in Malignant Lymphomas

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<https://doi.org/10.1016/j.celrep.2019.10.083>

SUMMARY

Although global H3K27me3 reprogramming is a hallmark of cancer, no effective therapeutic strategy for H3K27me3-high malignancies harboring *EZH2*^{WT/WT} has yet been established. We explore epigenome and transcriptome in *EZH2*^{WT/WT} and *EZH2*^{WT/Mu} aggressive lymphomas and show that mutual interference and compensatory function of co-expressed EZH1 and EZH2 rearrange their own genome-wide distribution, thereby establishing restricted chromatin and gene expression signatures. Direct comparison of leading compounds introduces potency and a mechanism of action of the EZH1/2 dual inhibitor (valemistat). The synthetic lethality is observed in all lymphoma models and primary adult T cell leukemia-lymphoma (ATL) cells. Opposing actions of EZH1/2-polycomb and SWI/SNF complexes are required for facultative heterochromatin formation. Inactivation of chromatin-associated genes (*ARID1A*, *SMARCA4/BRG1*, *SMARCB1/SNF5*, *KDM6A/UTX*, *BAP1*, *KMT2D/MLL2*) and oncovirus infection (HTLV-1, EBV) trigger EZH1/2 perturbation and H3K27me3 deposition. Our study provides the mechanism-based rationale

for chemical dual targeting of EZH1/2 in cancer epigenome.

INTRODUCTION

Histone H3 regulation, particularly H3 lysine 27 trimethylation (H3K27me3), is a central process for chromatin condensation and gene silencing. The suppressive histone mark is catalyzed by polycomb repressive complex 2 (PRC2), which includes either enhancer of zeste homolog 1 (EZH1) or EZH2 as an enzymatically active core subunit, as well as other components, such as EED and SUZ12. A heterozygous gain-of-function (GoF) mutation of *EZH2* has been observed in certain lymphoma types, contributing to increased H3K27me3 (Morin et al., 2010; Béguelin et al., 2013). In contrast, many other cancer types, including the majority of malignant lymphomas and various solid tumors, also show overexpression of EZH2 and global H3K27me3 accumulation irrespective of *EZH2* gene mutation (Comet et al., 2016; Fujikawa et al., 2016). Epigenomic studies, particularly those addressing chromatin and transcription regulation, have demonstrated that inappropriate H3K27me3 deposition is a critical determinant of the abnormal transcriptome of various cancers (Pfister and Ashworth, 2017; Yamagishi and Uchamaru, 2017).

Because H3K27me3 is an enzymatic product, this reversible property provides a good foundation for the development of epigenetic drugs. Several small compounds have been

出典 doi: 10.1016/j.celrep.2019.10.083

<https://www.sciencedirect.com/science/article/pii/S2211124719314056>

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- 1) Role of neurotensin in the regulation of gastric motility in healthy conscious sheep

Onaga T, Shimoda T, Ohishi T, Yasui Y, Hayashi H.

Small Ruminant Research 172: 31–41, 2019.

doi.org/10.1016/j.smallrumres.2019.01.012

II. その他<Others>



Role of neurotensin in the regulation of gastric motility in healthy conscious sheep



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ARTICLE INFO

Keywords:
Neurotensin
Forestomach
Rumen
Contraction
Inhibition
Ileal-brake
Sheep

ABSTRACT

The goal of present study was to determine the effects of the intravenous (i.v.) administration of neurotensin (NT) on the ovine forestomach and abomasal motility in conscious sheep. NT injection at 0.3 nmol/kg slightly raised abomasal pressure, although the effect was not dose-dependent. A bolus i.v. injection of NT at 1 or 3 nmol/kg significantly inhibited the amplitude of cyclic ruminal contractions. NT injection did not alter omasal motility. Pre-injection of an NT receptor subtype-1 antagonist, SR 48692, at 60 nmol/kg immediately before NT injection did not block the inhibitory effect of NT. In an *in vitro* study using smooth muscle strips of the rumen dorsal sac, NT application at 0.3–10 μmol/L did not inhibit the bethanechol (BCh, 10 μmol/L)-induced tonic contractions of either the longitudinal and circular muscle strips, nor did NT inhibit the electrical field stimulation (EFS)-induced phasic contractions of the muscle strips. The results suggest that circulating NT selectively inhibits the amplitude of cyclic rumen contractions presumably by inhibiting the gastric center in the medulla oblongata and/or the vagus nerves, but not through its peripheral action. An elevation in the plasma concentration of NT appears able to exert the ileal brake-like effect on ruminal motility in sheep.

出典 <https://doi.org/10.1016/j.smallrumres.2019.01.012>

Small Ruminant Research 172: 31–41, 2019.

<https://www.sciencedirect.com/journal/small-ruminant-research/vol/172/suppl/C>

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- 1) Effects of Propolis Extract and Propolis-Derived Compounds on Obesity and Diabetes: Knowledge from Cellular and Animal Models.

Kitamura H.

Molecules 24: E4394. 2019. doi: 10.3390/molecules24234394.

- 2) Introduction of a plasmid and a protein into bovine and swine cells by water-in-oil droplet electroporation.

Ishino T, Kurita H, Kirisawa R, Shimamoto Y, Numano R, **Kitamura H.**

J. Vet. Med. Sci. in press. doi: 10.1292/jvms.19-0475.

- 3) Inhibition of ubiquitin-specific protease 2 causes accumulation of reactive oxygen species, mitochondria dysfunction, and intracellular ATP decrement in C2C12 myoblasts.

Hashimoto M, Saito N, Ohta H, Yamamoto K, Tashiro A, Nakazawa K, Inanami O, **Kitamura H.**

Physiol. Rep. 7: e14193. 2019. doi: 10.14814/phy2.14193.

II. その他<Others>

Review

Effects of Propolis Extract and Propolis-Derived Compounds on Obesity and Diabetes: Knowledge from Cellular and Animal Models

Hiroshi Kitamura 

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Academic Editor: Lesław Juszczak

Received: 7 November 2019; Accepted: 29 November 2019; Published: 1 December 2019



Abstract: Propolis is a natural product resulting from the mixing of bee secretions with botanical exudates. Since propolis is rich in flavonoids and cinnamic acid derivatives, the application of propolis extracts has been tried in therapies against cancer, inflammation, and metabolic diseases. As metabolic diseases develop relatively slowly in patients, the therapeutic effects of propolis in humans should be evaluated over long periods of time. Moreover, several factors such as medical history, genetic inheritance, and living environment should be taken into consideration in human studies. Animal models, especially mice and rats, have some advantages, as genetic and microbiological variables can be controlled. On the other hand, cellular models allow the investigation of detailed molecular events evoked by propolis and derivative compounds. Taking advantage of animal and cellular models, accumulating evidence suggests that propolis extracts have therapeutic effects on obesity by controlling adipogenesis, adipokine secretion, food intake, and energy expenditure. Studies in animal and cellular models have also indicated that propolis modulates oxidative stress, the accumulation of advanced glycation end products (AGEs), and adipose tissue inflammation, all of which contribute to insulin resistance or defects in insulin secretion. Consequently, propolis treatment may mitigate diabetic complications such as nephropathy, retinopathy, foot ulcers, and non-alcoholic fatty liver disease. This review describes the beneficial effects of propolis on metabolic disorders.

Keywords: propolis; bee product; metabolic disorder; type 2 diabetes; oxidative stress

出典 doi: 10.3390/molecules24234394.

<https://www.mdpi.com/1420-3049/24/23/4394>

最終責任者 Hiroshi Kitamura (First Author and Corresponding Author)



FULL PAPER

Biochemistry

Introduction of a plasmid and a protein into bovine and swine cells by water-in-oil droplet electroporation

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J. Vet. Med. Sci.
82(1): **-**, 2020
doi: 10.1292/jvms.19-0475

Received: 25 August 2019
Accepted: 19 November 2019
Advanced Epub:
27 November 2019

ABSTRACT. Instrument cost is a major problem for the transduction of DNA fragments and proteins into cells. Water-in-oil droplet electroporation (droplet-EP) was recently invented as a low-cost and effective method for the transfection of plasmids into cultured human cells. We here applied droplet-EP to livestock animal cells. Although it is difficult to transfect plasmids into bovine fibroblasts using conventional lipofection methods, droplet-EP enabled us to introduce an enhanced green fluorescent protein (EGFP)-expressing plasmid into bovine earlobe fibroblasts. The optimal transfection condition was 3.0 kV, which allowed 19.1% of the cells to be transfected. For swine earlobe fibroblasts, the maximum transfection efficacy was 14.0% at 4.0 kV. After transfection with droplet-EP, 69.1% of bovine and 76.5% of swine cells were viable. Furthermore, droplet-EP successfully transduced *Escherichia coli* recombinant EGFP into frozen-thawed bovine sperm at 1.5 kV. Flow cytometry analysis revealed that 71.5% of spermatozoa exhibited green fluorescence after transfection. Overall, droplet-EP is suitable for the transfection of plasmids and proteins into cultured livestock animal cells.

KEY WORDS: bovine cell, electroporation, sperm, swine cell

出典 doi: 10.1292/jvms.19-0475

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_19-0475/_article

最終責任者 Hiroshi Kitamura (Corresponding Author)

ORIGINAL RESEARCH

Inhibition of ubiquitin-specific protease 2 causes accumulation of reactive oxygen species, mitochondria dysfunction, and intracellular ATP decrement in C2C12 myoblastsMayuko Hashimoto¹, Natsuko Saito¹, Haru Ohta¹, Kumiko Yamamoto², Asuka Tashiro¹, Kosuke Nakazawa¹, Osamu Inanami² & Hiroshi Kitamura¹ ¹ Laboratory of Veterinary Physiology, School of Veterinary Medicine, Rakuno Gakuen University, Ebetsu, Japan² Laboratory of Radiation Biology, Graduate School of Veterinary Medicine, Hokkaido University, Sapporo, Japan**Keywords**

USP, myoblast, mitochondria, respiratory chain, oxidative phosphorylation.

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Funding Information

This work was supported by the Japan Society for the Promotion of Scientific Kakenhi (15K06805 and 18K06035), Suhara Memorial Foundation, and Rakuno Gakuen University Research Fund (No. 18-02 and 19-03).

Received: 20 March 2019; Revised: 4 July 2019; Accepted: 10 July 2019

doi: 10.14814/phy2.14193

Physiol Rep, 7 (14), 2019, e14193,
<https://doi.org/10.14814/phy2.14193>**Abstract**

Ubiquitin-specific protease 2 (USP2) is considered to participate in the differentiation of myoblasts to myotubes, however, its functions in myoblasts under growth conditions remain elusive. In this study, we analyzed the physiological roles of USP2 in myoblasts using *Usp2* knockout (KO) C2C12 cells as well as a USP2 specific inhibitor. In addition to the disruption of differentiation, clustered regularly interspaced short palindromic repeats/Cas9-generated *Usp2*KO cells exhibited inhibition of proliferation compared to parental C2C12 cells. *Usp2*KO cells reduced the accumulation of intracellular adenosine triphosphate (ATP) content and oxygen consumption. Moreover, *Usp2*KO cells had fragmented mitochondria, suggesting that mitochondrial respiration was inactive. The deficiency of *Usp2* did not affect the enzymatic activities of respiratory chain complexes I, III, IV, and V. However, mitochondrial membrane permeability—evaluated using calcein AM-cobalt staining—was increased in *Usp2*KO cells. The membrane potential of *Usp2*KO cells was clearly decreased. *Usp2*KO cells accumulated reactive oxygen species (ROS) in the mitochondria. The USP2-selective inhibitor MI364 also increased the levels of mitochondrial ROS, and modulated the membrane potential and morphology of the mitochondria. These effects were followed by a decrement in the intracellular content of ATP. Based on these findings, we speculate that USP2 may be involved in maintaining the integrity of the mitochondrial membrane. This process ensures the supply of ATP in myoblasts, presumably leading to proliferation and differentiation.

出典 doi: 10.14814/phy2.14193

<https://physoc.onlinelibrary.wiley.com/doi/full/10.14814/phy2.14193japan.html>

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- 1) Isolation of an equine foamy virus and sero-epidemiology of the viral infection in horses in Japan.

Kirisawa R., Toishi Y, Hashimoto H, Tsunoda N.

Viruses 11: 613. 2019. doi: 10.3390/v11070613.

- 2) Isolation and molecular characterization of a variant of Chinese gC₂ genotype II pseudorabies virus from a hunting dog infected by biting a wild boar in Japan and its pathogenicity in a mouse model

Minamiguchi K, Kojima S, Sakumoto K, **Kirisawa R.**

Virus Genes 55:322–331. 2019. doi: 10.1007/s11262-019-01659-x.

II. その他<Others>

- 1) Countermeasures for avian influenza outbreaks among captive avian collections at zoological gardens and aquariums in Japan.

Kakogawa M, Onuma, M, **Kirisawa R.**, Asakawa M.

J. Microbiol. Exp. 7: 167-171. 2019. doi: 10.15406/jmen.2019.07.00256

Article

Isolation of an Equine Foamy Virus and Sero-Epidemiology of the Viral Infection in Horses in Japan

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Received: 10 June 2019; Accepted: 3 July 2019; Published: 5 July 2019



Abstract: An equine foamy virus (EFV) was isolated for the first time in Japan from peripheral blood mononuclear cells of a broodmare that showed wobbler syndrome after surgery for intestinal volvulus and the isolate was designated as EFVeca_LM. Complete nucleotide sequences of EFVeca_LM were determined. Nucleotide sequence analysis of the long terminal repeat (LTR) region, *gag*, *pol*, *env*, *tas*, and *bel2* genes revealed that EFVeca_LM and the EFV reference strain had 97.2% to 99.1% identities. For a sero-epidemiological survey, indirect immunofluorescent antibody tests were carried out using EFVeca_LM-infected cells as an antigen against 166 sera of horses in five farms collected in 2001 to 2002 and 293 sera of horses in eight farms collected in 2014 to 2016 in Hokkaido, Japan. All of the farms had EFV antibody-positive horses, and average positive rates were 24.6% in sera obtained in 2001 to 2002 and 25.6% in sera obtained in 2014 to 2016 from broodmare farms. The positive rate in a stallion farm (Farm A) in 2002 was 10.7%, and the positive rates in two stallion farms, Farms A and B, in 2015 were 40.9% and 13.3%, respectively. The results suggested that EFV infection is maintained widely in horses in Japan.

Keywords: equine foamy virus; isolation; Japan; sero-epidemiology; spumaretrovirus

出典 doi:10.3390/v11070613.

<https://www.mdpi.com/1999-4915/11/7/613>

最終責任者 Rikio Kirisawa (First Author and Corresponding Author)



Isolation and molecular characterization of a variant of Chinese gC-genotype II pseudorabies virus from a hunting dog infected by biting a wild boar in Japan and its pathogenicity in a mouse model

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Received: 12 December 2018 / Accepted: 19 March 2019 / Published online: 27 March 2019
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Abstract

We isolated a variant of Chinese pseudorabies virus from a hunting dog with symptoms similar to Aujeszky's disease and designated the isolate MY-1 strain. The dog developed symptoms 6 days after hunting and biting a wild boar and died the day after onset. The *Bam* HI restriction profile of MY-1 DNA was different from those of the Japanese reference strain Yamagata-S81 and two vaccine strains, Bartha and Begonia, and resembled *Bam* HI-RFLP (restriction fragment length polymorphism) type IV. Complete nucleotide sequences were determined, and phylogenetic analyses revealed that MY-1 belonged to the same cluster of old Chinese strains and variant strains isolated recently in China, but most of the open reading frames of MY-1 were located on a different branch from those of these Chinese strains. Based on a gC phylogenetic analysis, MY-1 belonged to gC-genotype II composed of those Chinese strains. In mice, the 50% lethal dose (LD_{50}) of MY-1 ($10^{3.0}$ TCID₅₀) was almost the same as those of Yamagata-S81 and Bartha. The LD_{50} value of Begonia was $10^{2.45}$ TCID₅₀. The mean survival periods of mice after infection with 10^4 TCID₅₀ of MY-1, Yamagata-S81 and Bartha were 3.9 days, 2.3 days, and 8.0 days, respectively. The results suggested that the variant of Chinese PRV with slightly weaker pathogenicity than that of wild virulent viruses might be maintained in wild boars in Japan. Furthermore, we would like to propose that old Chinese strains, recent Chinese variant strains, and MY-1 should be grouped as an Asian type PRV.

Keywords Aujeszky's disease · Pseudorabies virus · Phylogenetic analysis · Wild boar · Hunting dog

出典 doi: 10.1007/s11262-019-01659-x.

<https://link.springer.com/article/10.1007%2Fs11262-019-01659-x>

最終責任者 Rikio Kirisawa (Corresponding Author)

Countermeasures for avian influenza outbreaks among captive avian collections at zoological gardens and aquariums in Japan

Abstract

Japan is situated along the East Asian Flyway, which is an important migratory route. Outbreaks of infectious disease could impact bird populations along this route, and is expected to have a negative influence on captive bird populations. Here, we provide a brief overview of the situation regarding avian influenza (AI) in both free-ranging and captive avian species in Japan. We also suggest suitable countermeasures for the prevention and management of AI outbreaks in zoological gardens and aquariums, with special reference to the control of free-ranging duck populations and/or individuals and the nationwide surveillance of AI viruses. Furthermore, we have disclosed the prominence of vaccination program for zoological collections in Japan.

Keywords: avian influenza, vaccination, zoological collection in Japan

Volume 7 Issue 3 - 2019

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Received: June 06, 2019 | Published: June 21, 2019

出典 doi: 10.15406/jmen.2019.07.00256

<https://medcraveonline.com/JMEN/countermeasures-for-avian-influenza-outbreaks-among-captive-avian-collections-at-zoological-gardens-and-aquariums-in-japan.html>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Sequential changes in serum zinc concentrations in calves with experimentally induced endotoxin shock measured by the particle-induced X-ray emission method.
Shimamori T, Tsukano K, Sera K, Noda J, **Suzuki K.**
J. Vet. Med. Sci. 81(2): 165-168. 2019. doi: 10.1292/jvms.18-0527.
- 2) Plasma amino acid abnormalities in calves with diarrhea.
Tsukano K, **Suzuki K.**
J. Vet. Med. Sci. 81(4): 517-521. 2019. doi: 10.1292/jvms.18-0645.
- 3) Serum iron concentration as a marker of inflammation in young cow with dehorning operation.
Tsukano K, Shimamori T, Fukuda T, Nishi Y, Otsuka M, Kitade Y, **Suzuki K.**
J. Vet. Med. Sci. 81(4): 626-628. 2019. doi: 10.1292/jvms.19-0002.
- 4) Relationship between bronchoalveolar lavage fluid and plasma endotoxin activity in calves with bronchopneumonia.
Nishi Y, Tsukano K, Otsuka M, Tsuchiya M, **Suzuki K.**
J. Vet. Med. Sci. 81(7):1043-1046. 2019. doi: 10.1292/jvms.18-0643.
- 5) Accuracy of the point-of-care glucose meter for use in calves.
Nishi Y, Murakami Y, Otsuka M, Tsukano K, Ajito T, **Suzuki K.**
J. Vet. Med. Sci. 2019. 81(9):1301-1304. 2019. doi: 10.1292/jvms.19-0272.

II. その他<Others>

- 1) Low-field magnetic resonance imaging and computed tomography of a calf with aqueductal stenosis caused by web: compared with normal calves.
Hori A, **Suzuki K.**, Koiwa M, Miyoshi K, Nakade T.
J. Vet. Med. Sci. 81(1): 42-47. 2019. doi:10.1292/jvms.18-0020.

- 2) Transcriptional profiling of cytochrome P450 genes in the liver of adult zebrafish, *Danio rerio*.
Kubota A, Kawai YK, Yamashita N, Lee JS, Kondoh D, Zhang S, Nishi Y, **Suzuki K**, Kitazawa T, Teraoka H.
J. Toxicol. Sci. 44(5):347-356. 2019. doi: 10.2131/jts.44.347.
- 3) Plasma diamine oxidase activity decline with diarrhea severity in calves indicating systemic dysfunction related to intestinal mucosal damage.
Fukuda T, Tsukano K, Nakatsuji H, **Suzuki K**.
Res. Vet. Sci. 126:127-130. 2019. doi: 10.1016/j.rvsc.2019.08.027.
- 4) Next-generation sequencing analysis of bacterial flora in bovine protothecal mastitic milk and feces.
Miura A, Kurumisawa T, Kano R, Ito T, **Suzuki K**, Kamata H.
J. Vet. Med. Sci. 81(11): 1547-1551. 2019. doi: 10.1292/jvms.18-0649.
- 5) Evaluation of Probiotic Therapy for Calf Diarrhea with Serum Diamine Oxidase Activity as an Indicator.
Fukuda T, Otsuka M, Nishi K, Nishi Y, Tsukano K, Noda J, Higuchi H, **Suzuki K**.
Jap. J. Vet. Res. 67(4): 305-311. 2019. doi:10.14943/jjvr.67.4.305.



NOTE

Internal Medicine

Sequential changes in serum zinc concentrations in calves with experimentally induced endotoxin shock measured by the particle-induced X-ray emission method

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J. Vet. Med. Sci.
81(2): 165–168, 2019
doi: 10.1292/jvms.18-0527

Received: 1 September 2018
Accepted: 2 December 2018
Published online in J-STAGE:
17 December 2018

ABSTRACT. The aim of the present study was to measure changes in the serum concentrations of some elements in endotoxin-challenged calves using a particle-induced X-ray emission analysis and to screen for elements useful as diagnostic markers. The results obtained revealed that serum Zn concentrations were more accurate diagnostic markers for detecting endotoxin shock in calves than other elements. Serum Zn level in endotoxin-challenged calf was significantly lower from 8 to 12 hr after the endotoxin challenge than pre-challenge values. In addition, serum Zn concentrations in calves from 4 to 24 hr after endotoxin challenges were significantly lower than those of control. Our results indicate that serum Zn concentration has potential as diagnostic markers for detecting inflammation in calves with endotoxin shock.

KEY WORDS: endotoxin, particle-induced x-ray emission, zinc

出典 doi: 10.1292/jvms.18-0527.

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_18-0527/_article/-char/ja

最終責任者 Kazuyuki Suzuki (Corresponding Author)



NOTE

Internal Medicine

Plasma amino acid abnormalities in calves with diarrhea

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J. Vet. Med. Sci.
81(4): 517–521, 2019
doi: 10.1292/jvms.18-0645

Received: 1 November 2018
Accepted: 28 January 2019
Published online in J-STAGE:
12 February 2019

ABSTRACT. Since few studies have been published investigating plasma amino acid abnormalities in calves with illnesses, the aim of this study was to examine plasma amino acid abnormalities in calves with diarrhea. Forty-three Holstein calves aged 10.9 ± 5.6 days old were used for this study. Thirty-one of the 43 calves exhibited clinical signs of diarrhea without severe acidemia. The other 12 healthy calves were used as the control. Concentrations of plasma essential amino acids, non-essential amino acids, branched-chain amino acids, glucogenic amino acids, and ketogenic amino acids in diarrheic calves with hypoaminoacidemia were significantly lower than those in healthy calves. No significant differences were observed between diarrheic calves with normoaminoacidemia and healthy calves when looking at these parameters.

KEY WORDS: amino acid, calf, diarrhea, hypoaminoacidemia

出典 doi: 10.1292/jvms.18-0645.

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_18-0645/_article/-char/ja

最終責任者 Kazuyuki SUZUKI (Corresponding Author)



NOTE

Internal Medicine

Serum iron concentration as a marker of inflammation in young cows that underwent dehorning operation

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J. Vet. Med. Sci.
81(4): 626–628, 2019
doi: 10.1292/jvms.19-0002

Received: 4 January 2019
Accepted: 14 February 2019
Published online in J-STAGE:
1 March 2019

ABSTRACT. This study aimed to assess the usefulness of serum iron (Fe) concentration as a marker of inflammation caused by the dehorning operation. Five young Holstein cows aged 205.0 ± 10.7 days and weighing 207.2 ± 24.1 kg underwent the dehorning operation. Blood samples were withdrawn before dehorning (pre) and at time periods of $t=0.5, 2, 4, 6, 8, 12, 24$, and 48 hr. The serum amyloid A (SAA) concentration was significantly high at $t=48$ hr ($P<0.01$). The serum Fe concentration significantly decreased, reaching 90.0 ± 36.4 $\mu\text{g/dl}$ at $t=24$ hr ($P<0.001$). Therefore, serum Fe concentration showed significant and negative correlation with SAA concentration ($r^2=0.500$, $P<0.01$). In conclusion, serum Fe concentration is a useful marker of inflammation in young cows that have undergone the dehorning operation.

KEY WORDS: calf, dehorning, Inflammation, iron, serum amyloid A

出典 doi: 10.1292/jvms.19-0002.

https://www.jstage.jst.go.jp/article/jvms/81/4/81_19-0002/_pdf

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NOTE

Internal Medicine

Relationship between bronchoalveolar lavage fluid and plasma endotoxin activity in calves with bronchopneumonia

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J. Vet. Med. Sci.
81(7): 1043–1046, 2019
doi: 10.1292/jvms.18-0643

Received: 1 November 2018
Accepted: 24 May 2019
Advanced Epub:
12 June 2019

ABSTRACT. The aim of this study was to investigate the relationship between the endotoxin activity in plasma and that in bronchoalveolar lavage fluid (BALF) in bronchopneumonia. Thirty-three calves were included in this study (17 healthy calves and 16 calves with respiratory disease). In the calves with bronchopneumonia, the median endotoxin activity in plasma (0.437 EU/ml, $P<0.001$) and BALF (29.45 EU/ml, $P<0.001$) was significantly higher than in the control calves. Plasma endotoxin activity was significantly and positively correlated with that in BALF ($r^2=0.900$, $P<0.001$). Based on the receiver operating characteristics curves, we propose a diagnostic cutoff point for plasma endotoxin activity (0.104 EU/ml, $AUC=0.914$, $P<0.001$, Se 81.3% and Sp 82.4%) for identification of bronchopneumonia in calves which could die within a week.

KEY WORDS: bronchopneumonia, bronchoalveolar lavage fluid, calf, endotoxin, *Mycoplasma bovis*

出典 doi: 10.1292/jvms.18-0643.

https://www.jstage.jst.go.jp/article/jvms/81/7/81_18-0643/_article

最終責任者 Kazuyuki Suzuki (Corresponding Author)



NOTE

Internal Medicine

Accuracy of the point-of-care glucose meter for use in calves

Yasunobu NISHI¹⁾, Yoshiki MURAKAMI¹⁾, Marina OTSUKA¹⁾, Kenji TSUKANO¹⁾,
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J. Vet. Med. Sci.
81(9): 1301–1304, 2019
doi: 10.1292/jvms.19-0272

Received: 17 May 2019
Accepted: 3 July 2019
Advanced Epub: 15 July 2019

ABSTRACT. The aim of this study was to evaluate the accuracy and precision of portable blood glucose meters, such as i-STAT 1 and Precision Xceed, for use in calves. Whole blood and plasma samples were obtained from eleven calves that received 2.5 or 5.0% dextrose-containing polyelectrolyte isotonic solutions. Measurements using the i-STAT 1 ($r^2=0.99$, $P<0.0001$) and Precision Xceed ($r^2=0.96$, $P<0.0001$) were well correlated with those by the hexokinase method, which is the gold standard. Although the accuracy of i-STAT 1 was equivalent to that of the hexokinase method, there was an autocorrelation in the residuals between the results from the Precision Xceed and the hexokinase method. Thus, the i-STAT 1 can be used to measure the blood glucose concentration in cattle.

KEY WORDS: accuracy, cattle, cow-side test, glucose, portable blood glucose meter

出典 doi: 10.1292/jvms.19-0272.

https://www.jstage.jst.go.jp/article/jvms/81/9/81_19-0272/_article/-char/ja/

最終責任者 Kazuyuki Suzuki (Corresponding Author)



NOTE

Surgery

Low-field magnetic resonance imaging and computed tomography of a calf with aqueductal stenosis caused by web: comparison with normal calves

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J. Vet. Med. Sci.
81(1): 42–47, 2019
doi: 10.1292/jvms.18-0020

Received: 17 January 2018
Accepted: 31 October 2018
Published online in J-STAGE:
14 November 2018

ABSTRACT. A 6-day-old female Holstein displayed a dome-shaped skull and cardiac murmur on physical examination. Neurological abnormalities included progressive ataxia, decreased pupillary light reflex, and blindness soon after birth. On diagnostic imaging, CT identified expanded ventricles and thyroid hypoplasia on the left side. MRI detected expanded ventricles, especially in the rostral cerebrum at the mesencephalic aqueduct, compared with normal calves, so we suspected hydrocephalus causing stenosis of the mesencephalic aqueduct. Postmortem examination revealed a structure in the mesencephalic aqueduct resembling the "web" type of aqueductal stenosis described in humans. This case report indicates the utility of describing mesencephalic aqueductal stenosis by web and detection of other malformations on CT and MRI for antemortem diagnosis in calves.

KEY WORDS: aqueductal stenosis, calf, CT, MRI

出典 doi:10.1292/jvms.18-0020

https://www.jstage.jst.go.jp/article/jvms/81/1/81_18-0020/_article/-char/ja/

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Original Article

Transcriptional profiling of cytochrome P450 genes in the liver of adult zebrafish, *Danio rerio*

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(Received December 12, 2018; Accepted February 19, 2019)

ABSTRACT — Increasing use of zebrafish in biomedical, toxicological and developmental studies requires explicit knowledge of cytochrome P450 (CYP), given the central role of CYP in oxidative biotransformation of xenobiotics and many regulatory molecules. A full complement of *CYP* genes in zebrafish and their transcript expression during early development have already been examined. Here we established a comprehensive picture of *CYP* gene expression in the adult zebrafish liver using a RNA-seq technique. Transcriptional profiling of a full complement of *CYP* genes revealed that *CYP2AD2*, *CYP3A65*, *CYP1A*, *CYP2P9* and *CYP2Y3* are major *CYP* genes expressed in the adult zebrafish liver in both sexes. Quantitative real-time RT-PCR analysis for selected *CYP* genes further supported our RNA-seq data. There were significant sex differences in the transcript levels for *CYP1A*, *CYP1B1*, *CYP1D1* and *CYP2N13*, with males having higher expression levels than those in females in all cases. A similar feature of gender-specific expression was observed for *CYP2AD2* and *CYP2P9*, suggesting sex-specific regulation of constitutive expression of some *CYP* genes in the adult zebrafish liver. The present study revealed several “orphan” *CYP* genes as dominant isozymes at transcript levels in the adult zebrafish liver, implying crucial roles of these *CYP* genes in liver physiology and drug metabolism. The current results establish a foundation for studies with zebrafish in drug discovery and toxicology.

Key words: Zebrafish, Cytochrome P450, CYP, Liver, Transcript expression

出典 doi: 10.2131/jts.44.347.

https://www.jstage.jst.go.jp/article/jts/44/5/44_347/_article/-char/ja/

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Contents lists available at ScienceDirect

Research in Veterinary Science

journal homepage: www.elsevier.com/locate/rvsc



Plasma diamine oxidase activity decline with diarrhea severity in calves indicating systemic dysfunction related to intestinal mucosal damage

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ARTICLE INFO

Keywords:

Calf
Diamine oxidase
Diarrhea
Intestinal damage
Nutrition

ABSTRACT

The aim of the present study was to investigate whether abnormalities in plasma diamine oxidase (DAO) activity reflect the degree of intestinal mucosal disorder in calves with diarrhea. A total of 50 Holstein calves were enrolled. Thirty-six of the 50 calves presented diarrhea and were sub-classified by severity based on fecal status (0: firm, 1: pasty, 2: loose, and 3: watery) and blood pH (acidemia: blood pH < 7.25) as follows: Seventeen calves exhibiting watery diarrhea and/or fall into acidemia were sub-categorized into the severe group. The other nineteen calves exhibiting pasty or loose diarrhea and not fall into acidemia were sub-categorized into the moderate group. The remaining 14 calves without diarrhea were assigned to the control group. The plasma DAO activity was significantly lower ($p < .01$) in the calves with severe or moderate diarrhea than in the control group. In addition, the plasma DAO activity was significantly lower ($p < .05$) in the severe group than in the moderate group. The relationship between plasma DAO activity and fecal score ($r = -0.55$, $p < .01$) in calves with diarrhea were found to have significantly and negatively correlated by Spearman's rank test in this study. Our results suggested that plasma DAO activity reflect the degree of intestinal mucosal disorder due to diarrhea.

出典 doi: 10.1016/j.rvsc.2019.08.027.

<https://www.sciencedirect.com/science/article/pii/S0034528819303984>

最終責任者 Kenji Tsukano (Corresponding Author)



FULL PAPER

Internal Medicine

Next-generation sequencing analysis of bacterial flora in bovine protothecal mastitic milk and feces

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J. Vet. Med. Sci.

81(11): 1547–1551, 2019

doi: 10.1292/jvms.18-0649

Received: 19 December 2018

Accepted: 16 March 2019

Advanced Epub:

26 March 2019

ABSTRACT. The aim of the present study was to evaluate the bacterial flora in the udder and intestinal environments in cows with and without protothecal mastitis. We used next-generation sequencing (NGS) analysis to identify 16S rRNA genes from bacterial flora present in 13 milk and 13 fecal samples from protothecal mastitic and healthy dairy cows in the Aichi region of Japan. Sequences associated with 5 species (*Calothrix desertica*, *Corynebacterium simulans*, *Corynebacterium striatum*, *Empedobacter felsenii*, and *Rothia endophytica*) showed the highest prevalence in samples of milk and feces from animals with protothecal mastitis. This range of species differed from those detected in the milk and feces from healthy cows.

KEY WORDS: bacterial flora, bovine protothecal mastitis, next-generation sequencing, *Prototheca zopfii*

出典 doi: 10.1292/jvms.18-0649.

https://www.jstage.jst.go.jp/article/jvms/81/11/81_18-0649/_pdf

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Evaluation of probiotic therapy for calf diarrhea with serum diamine oxidase activity as an indicator

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Received for publication, April 23, 2019; accepted, July 21, 2019

Abstract

The objectives of study were to examine whether probiotic therapy is alternative to antibiotic therapy in diarrheic calves, and to examine whether the serum diamine oxidase (DAO) activity in calves are related to diarrhea. Twenty-two diarrheic Japanese black calves were received probiotics (n=11) or antibiotics (n=11) therapy for up to 8 days from the initial examination, respectively. There was no significant difference between treatments in the variations of fecal score and serum biochemical value. Serum DAO activity increased significantly in only probiotic treatment, from 64.4 ± 7.2 on day 1 to 76.3 ± 5.1 IU/ml on day 8. Our results suggested that probiotics therapy could be alternative to antibiotic therapy, and could be affecting serum DAO activity in diarrheic calves.

Key Words: calf, diamine oxidase, probiotics

出典 doi:10.14943/jjvr.67.4.305.

<https://eprints.lib.hokudai.ac.jp/dspace/handle/2115/76208>

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II. その他<Others>

1) Relationship between mRNA of immune factors expressed by milk somatic cells and bacteria present in healthy lactating Holstein cows.

Ohtsuka H, Hirose H, Murakami K, Murata R, Kato T, **Tajima M.**

J. Vet. Res. 63; 369-373, 2019. doi: 10.2478/jvetres-2019-0042.

SHORT COMMUNICATION

Relationship between mRNA of immune factors expressed by milk somatic cells and bacteria present in healthy lactating Holstein cows

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Received: January 9, 2019

Accepted: July 2, 2019

Abstract

Introduction: The characteristics of immune factors in somatic cells from lactating dairy cows and their association with commensal bacteria in normal milk have not been clarified. This study investigated the relationship between the pathogenic bacteria in milk and somatic cell immune factors in healthy lactating cows. **Material and Methods:** In total 44 healthy Holstein cows were studied on one farm. Milk samples were collected aseptically using a cannula and these samples were cultured for detection of bacteria and analysis of mRNA of immune factors expressed by somatic cells. Cows were divided into two groups based on the microbial status of their milk samples: 12 cows showed bacteria in cultures (positive group), and the other 32 cows did not (negative group). **Results:** The mRNA levels of IL-6, lactotransferrin, and cathelicidin expressed by somatic cells after milking decreased significantly compared to those before milking in both groups ($P < 0.05$). There were significantly lower mRNA levels of IL-6 and cathelicidin in the positive group compared to those in the negative group before milking. **Conclusion:** These results suggest that mRNA levels of IL-6 and cathelicidin expressed by the somatic cells may be affected by the presence of bacteria in healthy lactating dairy cows.

Keywords: cows, milk, bacteria, immune factor, somatic cells.

出典 doi: 10.2478/jvetres-2019-0042

<https://content.sciendo.com/view/journals/jvetres/63/3/article-p369.xml>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Sugiyama S, Uno Y, Amano T, Kitazawa T, **Teraoka H.**
Genetic diversity of cytochrome P450 3A with different metabolic activity in domestic cats.
J Vet Med Sci. 81: 598-600. 2019. doi: 10.1292/jvms.18-0692.
- 2) Xu J, Li Y, Lv Y, Bian C, You X, Endoh D, **Teraoka H.**, Shi Q.
Molecular Evolution of Tryptophan Hydroxylases in Vertebrates: A Comparative Genomic Survey.
Genes (Basel). 10. pii: E203.3. 2019. doi: 10.3390/genes10030203.
- 3) Kubota A, Kawai YK, Yamashita N, Lee JS, Kondoh D, Zhang S, Nishi Y, Suzuki K, Kitazawa T, **Teraoka H.**
Transcriptional profiling of cytochrome P450 genes in the liver of adult zebrafish, *Danio rerio*.
J Toxicol Sci. 44: 347-356. 2019. doi: 10.2131/jts.44.347.
- 4) Sugiyama S, Uno Y, Amano T, Kitazawa T, **Teraoka H.**
Genetic diversity of cytochrome P450 1A2 with different metabolic activity in domestic cats.
J. Vet. Med. Sci. 81: 980-982. 2019. doi: 10.1292/jvms.19-0106.
- 5) Sugiyama S, Uno Y, Amano T, Kitazawa T, **Teraoka H.**
Genetic diversity of cytochrome P450 2A with different metabolic activity in domestic cats.
J. Vet. Med. Sci. 81: 983-985. 2019. doi: 10.1292/jvms.19-0107.
- 6) Ono Y, Sugiyama S, Matsushita M, Kitazawa T, Amano T, Uno Y, Ikushiro S, **Teraoka H.**
Limited expression of functional cytochrome p450 2c subtypes in the liver and small intestine of domestic cats.
Xenobiotica. 2019. 49: 627-635. doi: 10.1080/00498254.2018.1483543.

II. その他<Others>

- 1) Chen X, Fang M, Chernick M, Wang F, Yang J, Yu Y, Zheng N, **Teraoka H**, Nanba S, Hiraga T, Hinton DE, Dong W.

The case for thyroid disruption in early life stage exposures to thiram in zebrafish (*Danio rerio*).

Gen. Comp. Endocrinol. 271: 73-81. 2019. doi: 10.1016/j.ygcen.2018.11.003.



NOTE

Toxicology

Genetic diversity of cytochrome P450 3A with different metabolic activity in domestic cats

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J. Vet. Med. Sci.

81(4): 598–600, 2019

doi: 10.1292/jvms.18-0692

Received: 21 November 2018

Accepted: 20 February 2019

Published online in J-STAGE:
4 March 2019

ABSTRACT. Knowledge on genetic polymorphisms of metabolising enzymes including cytochrome P450 (CYP) is very limited in cats. We investigated polymorphisms in CYP3A131, one of the major CYP isoforms in the feline liver and small intestine. Eight non-synonymous variants and one synonymous variant of feline CYP3A131 were identified in 29 cats. A major non-synonymous type was not observed. Metabolic parameters (K_m and V_{max}) of dibenzylfluorescein hydroxylation were ranged within about 2 times for the identified non-synonymous variants by using a heterologous coexpression system of CYP3A131 and feline cytochrome P450 reductase in *Escherichia coli*. The results confirmed the polymorphic nature of CYP3A131 as a basis for effective application of medicines and prevention of adverse reactions in the treatment of domestic cats.

KEY WORDS: cytochrome P450, domestic cat, polymorphism, xenobiotic

出典 doi: 10.1292/jvms.18-0692.

<https://doi.org/10.1292/jvms.18-0692>

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Article

Molecular Evolution of Tryptophan Hydroxylases in Vertebrates: A Comparative Genomic Survey

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Received: 17 January 2019; Accepted: 4 March 2019; Published: 8 March 2019



Abstract: Serotonin is a neurotransmitter involved in various physiological processes in the central and peripheral nervous systems. Serotonin is also a precursor for melatonin biosynthesis, which mainly occurs in the pineal gland of vertebrates. Tryptophan hydroxylase (TPH) acts as the rate-limiting enzyme in serotonin biosynthesis and is the initial enzyme involved in the synthesis of melatonin. Recently, two enzymes—TPH1 and TPH2—were reported to form the TPH family in vertebrates and to play divergent roles in serotonergic systems. Here, we examined the evolution of the TPH family from 70 vertebrate genomes. Based on the sequence similarity, we extracted 184 predicted *tph* homologs in the examined vertebrates. A phylogenetic tree, constructed on the basis of these protein sequences, indicated that *tph* genes could be divided into two main clades (*tph1* and *tph2*), and that the two clades were further split into two subgroups of tetrapods and Actinopterygii. In tetrapods, and some basal non-teleost ray-finned fishes, only two *tph* isotypes exist. Notably, *tph1* in most teleosts that had undergone the teleost-specific genome duplication could be further divided into *tph1a* and *tph1b*. Moreover, protein sequence comparisons indicated that TPH protein changes among vertebrates were concentrated at the NH₂-terminal. The tertiary structures of TPH1 and TPH2 revealed obvious differences in the structural elements. Five positively selected sites were characterized in TPH2 compared with TPH1; these sites may reflect the functional divergence in enzyme activity and substrate specificity. In summary, our current work provides novel insights into the evolution of *tph* genes in vertebrates from a comprehensive genomic perspective.

Keywords: tryptophan hydroxylase (TPH); serotonin; melatonin biosynthesis; phylogenetic analysis; molecular evolution; positive selection; vertebrate

出典 doi: 10.3390/genes10030203.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6470480/>

最終責任者 Hiroki Teraoka and Qiong Shi (Co-corresponding Author)

Original Article

Transcriptional profiling of cytochrome P450 genes in the liver of adult zebrafish, *Danio rerio*

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(Received December 12, 2018; Accepted February 19, 2019)

ABSTRACT — Increasing use of zebrafish in biomedical, toxicological and developmental studies requires explicit knowledge of cytochrome P450 (CYP), given the central role of CYP in oxidative biotransformation of xenobiotics and many regulatory molecules. A full complement of CYP genes in zebrafish and their transcript expression during early development have already been examined. Here we established a comprehensive picture of CYP gene expression in the adult zebrafish liver using a RNA-seq technique. Transcriptional profiling of a full complement of CYP genes revealed that CYP2AD2, CYP3A65, CYP1A, CYP2P9 and CYP2Y3 are major CYP genes expressed in the adult zebrafish liver in both sexes. Quantitative real-time RT-PCR analysis for selected CYP genes further supported our RNA-seq data. There were significant sex differences in the transcript levels for CYP1A, CYP1B1, CYP1D1 and CYP2N13, with males having higher expression levels than those in females in all cases. A similar feature of gender-specific expression was observed for CYP2AD2 and CYP2P9, suggesting sex-specific regulation of constitutive expression of some CYP genes in the adult zebrafish liver. The present study revealed several “orphan” CYP genes as dominant isozymes at transcript levels in the adult zebrafish liver, implying crucial roles of these CYP genes in liver physiology and drug metabolism. The current results establish a foundation for studies with zebrafish in drug discovery and toxicology.

Key words: Zebrafish, Cytochrome P450, CYP, Liver, Transcript expression

出典 doi: 10.2131/jts.44.347.

<https://doi.org/10.2131/jts.44.347>

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NOTE

Toxicology

Genetic diversity of cytochrome P450 2A with different metabolic activities in domestic cats

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J. Vet. Med. Sci.
81(7): 983–985, 2019
doi: 10.1292/jvms.19-0107

Received: 22 February 2019
Accepted: 6 May 2019
Advanced Epub:
21 May 2019

Advanced Epub:
21 May 2019

ABSTRACT. Knowledge of genetic polymorphisms of cytochrome P450 (CYP), the most important xenobiotic metabolizing enzyme, is very limited in cats. Preliminarily, we investigated genetic polymorphisms in CYP2A13, one of the major CYP isoforms in the liver and lung. Four synonymous and three non-synonymous polymorphic variants were identified in feline CYP2A13 in domestic cats in Japan, without an obvious major type. Metabolic parameters, Km and Vmax, of coumarin hydroxylation of CYP2A13 were shown to range within two times for the identified non-synonymous polymorphic variants by using heterologous coexpression system in *Escherichia coli*. The results confirmed the polymorphic nature of CYP2A13 as a basis for effective application of medicines and prevention of adverse reactions in treatment of domestic cats.

KEY WORDS: cytochrome P450, domestic cat, polymorphism, xenobiotic

KEY WORDS: cytochrome P450, domestic cat, polymorphism, xenobiotic

出典 doi: 10.1292/jvms.19-0106.

<https://doi.org/10.1292/jvms.19-0106>

最終責任者 Hiroki Teraoka (Corresponding Author)



NOTE

Toxicology

Genetic diversity of cytochrome P450 2A with different metabolic activities in domestic cats

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J. Vet. Med. Sci.
81(7): 983–985, 2019
doi: 10.1292/jvms.19-0107

Received: 22 February 2019
Accepted: 6 May 2019
Advanced Epub:
21 May 2019

ABSTRACT. Knowledge of genetic polymorphisms of cytochrome P450 (CYP), the most important xenobiotic metabolizing enzyme, is very limited in cats. Preliminarily, we investigated genetic polymorphisms in CYP2A13, one of the major CYP isoforms in the liver and lung. Four synonymous and three non-synonymous polymorphic variants were identified in feline CYP2A13 in domestic cats in Japan, without an obvious major type. Metabolic parameters, *K_m* and *V_{max}*, of coumarin hydroxylation of CYP2A13 were shown to range within two times for the identified non-synonymous polymorphic variants by using heterologous coexpression system in *Escherichia coli*. The results confirmed the polymorphic nature of CYP2A13 as a basis for effective application of medicines and prevention of adverse reactions in treatment of domestic cats.

KEY WORDS: cytochrome P450, domestic cat, polymorphism, xenobiotic

出典 doi: 10.1292/jvms.19-0107.

<https://doi.org/10.1292/jvms.19-0107>

最終責任者 Hiroki Teraoka (Corresponding Author)

RESEARCH ARTICLE



Limited expression of functional cytochrome p450 2c subtypes in the liver and small intestine of domestic cats

Yuka Ono^a, Souta Sugiyama^a, Mayu Matsushita^a, Takio Kitazawa^a, Tomoko Amano^b, Yasuhiro Uno^c, Shinichi Ikushiro^d and Hiroki Teraoka^a

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ABSTRACT

1. Compared to information for herbivores and omnivores, knowledge on xenobiotic metabolism in carnivores is limited. The cytochrome P450 2C (CYP2C) subfamily is recognized as one of the most important CYP groups in human and dog. We identified and characterized CYP2C isoforms and variants in cat, which is an obligate carnivore.
2. Quantitative RT-PCR and immunoblot analyses were carried out to evaluate the expression of CYP2C in the liver and small intestine. A functional CYP2C isoform was heterologously expressed in yeast microsomes to determine the enzymatic activity.
3. Cat had two CYP2C genes, 21 and 41, in the genome; however, CYP2C21P was a pseudogene that had many stop codons. Three splicing variants of CYP2C41 were identified (v1–v3), but only one of them (v1) showed a complete deduced amino acid sequence as CYP2C protein. Transcripts of feline CYP2C41v1 were detected but the amounts were negligible or very small in the liver and small intestine. Immunoreactivity to an antihuman CYP2C antibody was confirmed in the recombinant feline CYP2C41v1 but not in the feline liver.
4. Recombinant feline CYP2C41v1 metabolized several substrates, including dibenzylfluorescein that is specific to human CYP2C.
5. The results suggest a limited role of functional CYP2C isoforms in xenobiotic metabolism in cat.

ARTICLE HISTORY

Received 22 February 2018
Revised 29 May 2018
Accepted 29 May 2018

KEYWORDS

Carnivore; cytochrome P450 2C; domestic cats; xenobiotics

出典 doi: 10.1080/00498254.2018.1483543.

<https://doi.org/10.1080/00498254.2018.1483543>

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Contents lists available at ScienceDirect

General and Comparative Endocrinology

journal homepage: www.elsevier.com/locate/ygcen



The case for thyroid disruption in early life stage exposures to thiram in zebrafish (*Danio rerio*)



Xing Chen^{a,f,g}, Mingliang Fang^{b,c}, Melissa Chernick^b, Feng Wang^a, Jingfeng Yang^a, Yongli Yu^a, Na Zheng^c, Hiroki Teraoka^d, Satomi Nanba^d, Takeo Hiraga^d, David E. Hinton^{b,*}, Wu Dong^{a,b,*}

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ARTICLE INFO

Keywords:

Thiram
Zebrafish
Thyroid
Acute exposure
Notochord

ABSTRACT

Thiram, a pesticide in the dithiocarbamate chemical family, is widely used to prevent fungal disease in seeds and crops. Its off-site movement to surface waters occurs and may place aquatic organisms at potential harm. Zebrafish embryos were used for investigation of acute (1 h) thiram exposure (0.001–10 μ M) at various developmental stages. Survival decreased at 1 μ M and 10 μ M and hatching was delayed at 0.1 μ M and 1 μ M. Notochord curvatures were seen at 0.1 and 1 μ M thiram when exposure was initiated at 2 and at 10 hpf. Similar notochord curvatures followed exposure to the known TPO inhibitor, methimazole (MMI). Changes were absent in embryos exposed at later stages, i.e., 12 hpf. In embryos exposed to 0.1 or 1 μ M at 10 hpf, levels of the thyroid enzyme, Deiodinase 3, increased by 12 hpf. Thyroid peroxidase (TPO), important in T4 synthesis, decreased by 48 hpf in embryos exposed to 1 μ M at 10 hpf. Thiram toxicity was stage-dependent and early life stage exposure may be responsible for adverse effects seen later. These effects may be due to impacts on the thyroid via regulation of specific thyroid genes including TPO and Deiodinase 3.

出典 doi: 10.1016/j.ygcen.2018.11.003.

<https://www.sciencedirect.com/science/article/pii/S0016648018303587?via%3Dihub>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Association of postpartum diseases occurring within 60 days after calving with productivity and reproductive performance in dairy cows in Fukuoka: A cow-level, retrospective cohort study.

Goto A, Takahara K, Sugiura T, Oikawa S, Katamoto H, **Nakada K.**

J. Vet. Med. Sci., 81(7):1055-1062. 2019.

doi: 10.1292/jvms.18-0384

II. その他<Others>

- 1) Peripartum metabolic profiles in a Holstein dairy herd with alarm level prevalence of subclinical ketosis detected in early lactation.
Oikawa S, Elsayed HK, Shibata C, Chisato K, **Nakada K.**
Can. J. Vet. Res., 83(1):50-56. 2019.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6318827/>

- 2) Increased serum malondialdehyde concentration in cows with subclinical ketosis.
Senoh T, Oikawa S, **Nakada K.**, Tagami T, Iwasaki T.
J. Vet. Med. Sci., 81(6):817-820. 2019.
doi: 10.1292/jvms.18-0777

- 3) RGB-D video-based individual identification of dairy cows using gait and texture analyses.

Okura F, Ikuma S, Makihara Y, Muramatsu D, **Nakada K.**, Yagi Y.

Comput. Electr. Agr. 165(2019)104944. 2019.

<https://doi.org/10.1016/j.compag.2019.104944>



Association of postpartum diseases occurring within 60 days after calving with productivity and reproductive performance in dairy cows in Fukuoka: A cow-level, retrospective cohort study

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ABSTRACT. Peripartum disorders in dairy cows negatively influence their productivity and reproductive performance. However, only a few reports have clearly indicated the influence of such disorders on the productivity and reproductive performance at a local-area or cow-level in Japan. This study aimed to elucidate the influence of diseases occurring within 60 days after calving on subsequent productivity and reproductive performance. Accordingly, a wide-area database on dairy production was used for epidemiological analysis; subsequently, multivariable analysis was performed to investigate the association of such diseases with productivity or reproductive performance in 6,545 cows from 178 farms in Fukuoka. We used 305-day energy-corrected milk (305 ECM) as an index of productivity and conception and culling as indices of reproductive performance. With regard to causality, mixed-effects model was used for analyzing the association between disease and productivity, and Cox proportional hazard model was used for analyzing the association between disease and reproductive performance. Compared to the disease absence group, the disease presence group demonstrated significantly lower 305 ECM [−154 kg; 95% confidence interval (CI), −229 to −79] and risk of pregnancy [hazard ratio (HR), 0.85; 95% CI, 0.80–0.91] and higher risk of culling (HR, 1.36; 95% CI, 1.17–1.59). These results indicate that, in Fukuoka, dairy cows affected by diseases within 60 days after calving exhibit lower productivity and reproductive performance. Therefore, proper dairy cow management during the peripartum period to prevent diseases during early lactation may maintain or improve productivity.

KEY WORDS: dairy cow, epidemiological analysis, peripartum period, productivity, reproductive performance

J. Vet. Med. Sci.
81(7): 1055–1062, 2019
doi: 10.1292/jvms.18-0384

Received: 5 July 2018
Accepted: 21 May 2019
Advanced Epub:
12 June 2019

出典 doi: 10.1292/jvms.18-0384

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6656816/>

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Peripartum metabolic profiles in a Holstein dairy herd with alarm level prevalence of subclinical ketosis detected in early lactation

Shin Oikawa, Hanan K. Elsayed, Chihoko Shibata, Kyoko Chisato, Ken Nakada

Abstract

The aim of this study was to characterize peripartum metabolic profiles, including the insulin sensitivity index, in cows diagnosed with subclinical ketosis (SCK) in the early stage of lactation. Cows that calved from January 2011 through December 2014 on a dairy farm with alarm level prevalence of SCK in Hokkaido, Japan ($n = 175$) were used. Blood and body condition scores (BCS) were obtained at regular health examinations in 2 consecutive periods, the first between 14 and 2 d before parturition, and the second between 3 and 14 d after parturition. Animals were divided into 3 groups at postpartum sampling: an SCK group with 35 multiparous and 15 primiparous cows having β -hydroxybutyrate (BHBA) concentrations ≥ 1.2 mM without clinical signs, a disease group of 36 multiparous and 9 primiparous cows that received treatment between parturition and postpartum sampling, and a control group consisting of 49 multiparous and 31 primiparous cows with BHBA concentrations < 1.2 mM. The prepartum revised quantitative insulin sensitivity check index was significantly lower in the multiparous SCK and disease groups than in the control group, demonstrating decreased insulin sensitivity in these cows, but not in primiparous cows. The prepartum BCS was significantly higher only in the multiparous SCK and disease groups. The prepartum apolipoprotein B-100 (ApoB-100) concentration was significantly decreased in the multiparous disease group, suggesting hepatic lipidosis. Conversely, primiparous cows had a higher prepartum ApoB-100 concentration. Prepartum decreased insulin sensitivity in the multiparous SCK and disease groups was considered to facilitate progression to SCK after calving.

出典 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6318827/>

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NOTE

Internal Medicine

Increased serum malondialdehyde concentration in cows with subclinical ketosis

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J. Vet. Med. Sci.
81(6): 817–820, 2019
doi: 10.1292/jvms.18-0777

Received: 29 December 2018
Accepted: 2 April 2019
Published online in J-STAGE:
11 April 2019

ABSTRACT. The purpose of this study is to compare the assessment of pre- and postpartum oxidative stress-related causal indicators and other metabolites in cows with postpartum subclinical ketosis (SCK). The prepartum serum malondialdehyde concentration and body condition score (BCS) were elevated in the SCK cows (n=17) compared to healthy controls (n=12), while the insulin sensitivity check index was lower in the SCK cows than in the controls. Oxidative stress is enhanced in cows with prepartum higher BCS, causing decreased insulin sensitivity, and may be associated with onset of postpartum SCK. However, paraoxonase alone might be insufficient to assess the antioxidant state because of no difference in pre- and postpartum activities between the two groups.

KEY WORDS: cow, malondialdehyde, paraoxonase, subclinical ketosis

出典 doi: 10.1292/jvms.18-0777.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6612486/>

最終責任者 Shin Oikawa (Corresponding Author)



Contents lists available at ScienceDirect

Computers and Electronics in Agriculture

journal homepage: www.elsevier.com/locate/compag

RGB-D video-based individual identification of dairy cows using gait and texture analyses



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ARTICLE INFO

Keywords:

Dairy cow
Animal identification
RGB-D video
Gait analysis
Texture analysis

ABSTRACT

The growth of computer vision technology can enable the automatic assessment of dairy cow health, for instance, the detection of lameness. To monitor the health condition of each cow, it is necessary to identify individual cows automatically. Tags using microchips, which are attached to the cow's body, have been employed for the automatic identification of cows. However, tagging requires a substantial amount of effort from dairy farmers as well as induces stress on the cows because of the body-mounted devices. A method for cow identification based on three-dimensional video analysis using RGB-D cameras, which capture images with RGB color information as well as subject distance from the camera, is proposed. Cameras are mostly maintenance-free, do not contact the cow's body, and have high compatibility with existing vision-based health monitoring systems. Using RGB-D videos of walking cows, a unified approach using two complementary features for identification, gait (i.e., walking style) and texture (i.e., markings), is developed.

出典 <https://doi.org/10.1016/j.compag.2019.104944>

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教授 中出 哲也

I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Low-field magnetic resonance imaging and computed tomography of a calf with aqueductal stenosis caused by web: comparison with normal calves.
Hori A., Suzuki K., Koiwa M., Miyoshi K. and **Nakade T.**
J. Vet. Med. Sci. 81(1): 42–47, 2019. doi: 10.1292/jvms.18-0020

II. その他<Others>

- 1) Vision outcome with antiglaucoma and prognostic factors in canine glaucoma: A 6-years retrospective study in Japan.
Kubo A., Ito Y., Masuko A., Maehara S., Miyasho T. and **Nakade T.**
Japanese Journal of Veterinary Research, 67(1): 93-102. 2019.
doi: 10.14943/jjvr.67.1.93.
- 2) Assessment of meibomian gland morphology by noncontact infrared meibography in Shih Tzu dogs with or without keratoconjunctivitis sicca.
Kitamura Y., Maehara S., **Nakade T.**, Miwa Y., Arita R., Iwashita H. and Saito A.
Veterinary Ophthalmology 22: 744-750. 2019. doi: 10.1111/vop.12645.
- 3) Indocyanine green angiography findings with Collie eye anomaly in Hokkaido dogs.
Masuko A., Maehara S., Hayashi M., Kato R., Shimode A., Yamato O. and **Nakade T.**
Japanese Journal of Veterinary Research, 68(1): 9-16. 2019.
doi: 10.14943/jjvr.68.1.9



NOTE

Surgery

Low-field magnetic resonance imaging and computed tomography of a calf with aqueductal stenosis caused by web: comparison with normal calves

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J. Vet. Med. Sci.
81(1): 42–47, 2019
doi: 10.1292/jvms.18-0020

Received: 17 January 2018
Accepted: 31 October 2018
Published online in J-STAGE:
14 November 2018

ABSTRACT. A 6-day-old female Holstein displayed a dome-shaped skull and cardiac murmur on physical examination. Neurological abnormalities included progressive ataxia, decreased pupillary light reflex, and blindness soon after birth. On diagnostic imaging, CT identified expanded ventricles and thyroid hypoplasia on the left side. MRI detected expanded ventricles, especially in the rostral cerebrum at the mesencephalic aqueduct, compared with normal calves, so we suspected hydrocephalus causing stenosis of the mesencephalic aqueduct. Postmortem examination revealed a structure in the mesencephalic aqueduct resembling the “web” type of aqueductal stenosis described in humans. This case report indicates the utility of describing mesencephalic aqueductal stenosis by web and detection of other malformations on CT and MRI for antemortem diagnosis in calves.

KEY WORDS: aqueductal stenosis, calf, CT, MRI

出典 doi: 10.1292/jvms.18-0020.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6361635/>

最終責任者 Tetsuya Nakade (Corresponding Author)

Vision outcome with antiglaucoma therapy and prognostic factors in canine glaucoma: A 6-years retrospective study in Japan

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Received for publication, June 6, 2018; accepted, September 17, 2018

Abstract

Vision outcome provides invaluable information in clinical decision making in the management of canine glaucoma. In the present study, data of glaucoma dogs were retrospectively evaluated for vision outcome by treatment modality (with or without surgical implantation of the Ahmed glaucoma valve, AGV) and by type of glaucoma, sex and breed in cases of medically treated glaucoma. Among 1990 dogs presented with eye diseases between 2011 and 2017, 224 dogs (11.3%) were diagnosed with glaucoma at initial presentation and 228 eyes of 207 dogs have follow-up records of at least 30 days were included in the analysis. At the time of first presentation, 62/228 eyes (27.2%) were visual. Visual preservation rates were constantly significantly higher in dogs that received AGV placement with a median time to vision loss of 76.4 weeks vs. 9.6 weeks in dogs that received medical treatment alone. Among dogs treated medically, vision outcome was comparable between two types of glaucoma (*i.e.*, primary and secondary) and between sexes. Medically treated Shiba dogs showed significantly lower vision preservation rates and a shorter median time to vision loss compared to other breeds. These results suggest that AGV implants result in better vision outcome compared to medical therapy alone and should be considered in dogs that are visual at the time of presentation and suitable for surgery. And Shiba dogs are considered as the factor that indicate poor vision outcome of medical treatment alone in the present study.

Key Words: Antiglaucoma therapy, canine glaucoma, prognostic factors, vision outcome

出典 doi: 10.14943/jjvr.67.1.93.

<https://eprints.lib.hokudai.ac.jp/dspace/handle/2115/72747>

最終責任者 Akira Kubo (First Author and Corresponding Author)

Assessment of meibomian gland morphology by noncontact infrared meibography in Shih Tzu dogs with or without keratoconjunctivitis sicca

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Abstract

Objective: To investigate meibomian gland (MG) morphology by noncontact infrared meibography in Shih Tzu dogs with or without keratoconjunctivitis sicca (KCS).

Procedures: Fourteen eyes of 12 Shih Tzu dogs (mean age of 10.7 years, range of 7–13 years) presented to Yakumo Animal Hospital or Triangle Animal Eye Clinic from 2011 to 2017 with clinical signs and a Schirmer tear test (STT) result consistent with KCS (<10 mm/min) were examined. Twenty-eight eyes of 16 Shih Tzu dogs (mean age of 12.4 years, range of 8 to 15 years) with a STT > 15 mm/min served as healthy controls. Both groups of dogs underwent routine slitlamp biomicroscopy followed by noncontact infrared meibography of the upper eyelid with both desktop-type and mobile-type systems.

Results: Meibography revealed morphological abnormalities of MGs in 13 eyes of 11 dogs with KCS. The abnormalities included gland shortening in 64% and gland dropout in 64% of the 14 eyes in the KCS group. Morphological changes were also observed in MGs of 16 eyes of 10 dogs in the control group. These changes included shortening in 46% and dropout in 17.8% of the 28 eyes in the control group. Dropout was significantly more common in eyes with KCS than in control eyes ($P < 0.01$).

Conclusions: The frequency of MG abnormalities is increased in Shih Tzus with KCS compared with control animals. A reduced quality of the tear film associated with increased evaporation and reduced retention of tear fluid likely exacerbates the effects of a reduced tear volume in animals with aqueous deficiency.

KEYWORDS

dog, keratoconjunctivitis sicca, meibomian gland, morphology, noncontact infrared meibography, Shih Tzu

出典 doi: 10.1111/vop.12645.

<https://onlinelibrary.wiley.com/doi/10.1111/vop.12645>

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Indocyanine green angiography findings with Collie eye anomaly in Hokkaido dogs.

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Received for publication, March 5, 2019; accepted, September 26, 2019

Abstract

Collie eye anomaly (CEA) is an inherited, congenital ocular disorder caused by a defective mesodermal differentiation in the posterior segment of the eye. Major ocular finding of CEA is abnormalities of choroidal vessels, that is choroidal hypoplasia. Indocyanine green angiography (IA) is one of the useful ocular examination to observe choroidal vessels in both human and dogs. The purpose of this study was to evaluate IA with CEA in Hokkaido dogs, which is one of the traditional Japanese breed and natural monument in Japan. Ten Hokkaido dogs that had been carried out genetic tests in advance were included in this study. Dogs included in this study had ophthalmic examination, such as menace response, dazzle reflex, direct and indirect pupillary light reflex, slit-lamp biomicroscopy, simple funduscopy, and IA. According to the result of genetic tests, they were classified as 8 affected and 2 carrier dogs. Simple funduscopy revealed choroidal hypoplasia bilaterally and temporal or dorsotemporal area to the optic disc in all affected dogs. With IA, we could observe the abnormalities of choroidal vessels not only at the area coincided with choroidal hypoplasia with simple funduscopy but also at the area detected normal with simple funduscopy in affected dogs. No abnormalities on fundus were observed with both simple funduscopy and IA in all carrier dogs. In conclusion, it was revealed that choroidal hypoplasia in CEA Hokkaido dogs was existed also in the area that could not be observed with simple funduscopy.

Key Words: choroidal hypoplasia, Collie eye anomaly, Hokkaido dog, indocyanine green angiography

出典 doi: 10.14943/jjvr.68.1.9

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I. 筆頭または責任著者 <First or Corresponding Author>

II. その他<Others>

1. Zamoto-Niikura A, Hagiwara K, Imaoka K, Morikawa S, Ishihara C, Hanaki KI. Epidemiological survey of *Babesia divergens* Asia lineage in wild sika deer (*Cervus nippon*) by using direct PCR, in Japan.
Jpn. J. Infect. Dis. 2019 Sep 30. doi: 10.7883/yoken.JJID.2019.096.
2. Prasertbun R, Mori H, Sukthana Y, Popruk S, Kusolsuk T, Hagiwara K, Mahittikorn A. "*Enterocytozoon bieneusi* and *Cryptosporidium*: a cross-sectional study conducted throughout Thailand".
BMC Infect. Dis. 2019. 19(1):808. doi: 10.1186/s12879-019-4422-4.
3. Morine K, Kawano K, Demura Y, Baba K, Sofue Y, Tsedendamba P, Matsumoto T, Hagiwara K, Karthaus O, Kai K, Hoshino B.
"Imaging of micro-organisms on topsoil particles collected from different landscape in the Gobi Desert."
E3S Web of Conferences. Vol. 99. EDP Sciences, 2019.
doi:10.1051/e3sconf/20199901011
4. Purevsuren Tsedendamba, J. Dulam, K. Baba, K. Hagiwara, J. Noda, K. Kawai, G. Sumiya, C. McCarthy, K. Kai and B. Hoshino.
Northeast Asian Dust Transport: A Case Study of a Dust Storm Event from 28 March to 2 April 2012.
Atmosphere 2019, 10, 69. doi:10.3390/atmos10020069

Short Communication

Epidemiological Survey of *Babesia divergens* Asia Lineage in Wild Sika Deer (*Cervus nippon*) by Using Direct PCR in Japan

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SUMMARY: *Babesia divergens* is the major causal agent of zoonotic human babesiosis across Europe. Previously, we reported the detection of a *B. divergens* Asia lineage in wild sika deer (*Cervus nippon*) in Japan which was genetically closely related to the European *B. divergens*. To further elucidate its etiology, we conducted a large epidemiological survey by combining lineage-specific PCR system and blood direct PCR. The infection rate of the Asia lineage was 6.6% (116/1,747) throughout Japan, where Hokkaido (45%), Nagano (17%), Iwate (12%), Gunma (11%), and Yamanashi (11%) were highly enzootic (> 10%) among the 30 prefectures examined. European *B. divergens* was not detected. A geographical information system (GIS) map revealed dense populations of PCR-positive deer in the mountains including the Japanese Alps in eastern Honshu and Hokkaido. These areas markedly overlapped with the major habitats of *Ixodes persulcatus*, a principal tick vector responsible for the transmission of babesiosis. Other areas in southern Japan including Miyazaki, Kagoshima, and Shimane Prefectures, where positive sika deer were sporadically detected, were also habitats for other tick species involved in the enzootic cycle as *I. persulcatus* were scarce. The rise in human babesiosis cases is occasionally attributed to healthy blood donors who were unaware of tick bites and *Babesia* infection. Therefore, there is an urgent need to investigate whether infections in humans have occurred in Japan.

Human babesiosis is an emerging tick-borne disease caused mainly by a zoonotic pathogen *Babesia divergens* (*B. divergens* EU lineage) across Europe. We previously reported that in Japan, wild sika deer (*Cervus nippon*) carried a parasite that was genetically closely related to the European *B. divergens* (*B. divergens* Asia lineage) (1,2). However, due to insufficient statistical data, it was impossible to draw definite conclusions regarding the geographical distribution of the pathogen.

To investigate deer in large numbers, we first developed a rapid detection system by applying the blood direct PCR (Phusion Blood Direct PCR kit, Thermo Fisher Scientific, Wilmington, DE, USA) to the lineage-specific nested PCR methodology (2). To evaluate the effectiveness of the direct PCR methodology for detecting intra-erythrocytic *Babesia* parasites, direct PCR was performed on freshly prepared hamster's erythrocytes infected with *B. microti* IpSG 13-1-2 strain (infection rate of 5.7%) (National Institute of Infectious Diseases approval no.114014), according to the manufacturer's instructions. *B. microti* was used for this test as isolation of *B. divergens* was unsuccessful. Desired amplicons were obtained by using primers

targeting 18S rRNA of *Babesia*, Piro0F, and Piro6R (3). Hamster's red blood cells (RBCs) were used as template at 2–5% of total volumes (Fig. 1A). Based on this result, deer screening was performed as follows: For the 1st PCR, 0.4 µl of RBCs were added directly to a 20 µl mixture. Next, 1 µl of the 1st PCR amplified product was used in a 20 µl mixture (ExTaq, Takara Bio Inc., Shiga, Japan) (2). To detect *B. divergens* Asia lineage, primers targeting 18S rRNA, div101F/div1353R and divJA/div1296R were used for the 1st and 2nd PCR, respectively (2). Fig. 1B shows that the direct nested PCR method was highly effective for analyzing the field samples. After screening sika deer by the direct nested PCR, DNA was extracted randomly from the PCR-positive RBCs (50 samples) and further used for performing general nested PCR (2).

Blood samples from wild sika deer, which were hunted from 2012–2018 in Japan, were collected from hunters. With each blood sample, information such as the deer's age, sex, body weight, and geographical location where the deer was hunted were noted. Geographical location details for the 42 deer samples collected from Hokkaido (including 18 of the total positives) were not available. Blood was collected in heparin-coated tubes and sent to the laboratory for further analysis. Erythrocytes were separated by centrifugation and were then used in the direct nested PCR. A total of 1,609 samples were examined and their results are listed in Table 1. Table 1 also includes the result of our previous studies published in 2007 and 2008 (1). Based on the results of both the studies, we calculated the overall infection rate as 6.6 % (116/1,747). Among 30 prefectures examined, positive

Received April 5, 2019. Accepted August 26, 2019.

J-STAGE Advance Publication September 30, 2019.

DOI: 10.7883/yoken.JJID.2019.096

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出典 doi: 10.7883/yoken.JJID.2019.096.

<https://doi.org/10.7883/yoken.JJID.2019.096>

最終責任者 Zamoto-Niikura A

RESEARCH ARTICLE

Open Access

"*Enterocytozoon bieneusi* and *Cryptosporidium*: a cross-sectional study conducted throughout Thailand"



Rapeepun Prasertbun¹, Hirotake Mori^{1,2}, Yaowalark Sukthana¹, Supaluk Popruk¹, Teera Kusolsuk³, Katsuro Hagiwara⁴ and Aongart Mahittikorn^{1*}

Abstract

Background: *Enterocytozoon bieneusi* and *Cryptosporidium* spp. are prevalent zoonotic parasites associated with a high burden among children. To date only limited molecular epidemiological data on *E. bieneusi* and *Cryptosporidium* spp. in humans living in Thailand has been published.

Methods: PCR-based tools were used to detect and characterize *E. bieneusi* and *Cryptosporidium* spp. The internal transcribed spacer (ITS) region of the rRNA gene was used to investigate *E. bieneusi*, and the small subunit (SSU) rRNA gene was used to investigate *Cryptosporidium* spp., and 697 fecal samples from villagers and school children in rural areas in Thailand were analyzed.

Results: The infection rates were 2.15% (15/697) for *E. bieneusi* and 0.14% (1/697) for *Cryptosporidium* spp. The prevalence of *E. bieneusi* was significantly high in Loei province. Sequence analysis indicated that the *Cryptosporidium* isolate was *C. parvum*. Nine *E. bieneusi* genotypes were identified, EbpC, Peru12, TMH6, TMH3, TMH7, H, D, and two novel genotypes TMLH1 and TMLH2. *E. bieneusi* prevalence was significantly higher in male participants than in female participants, and in children aged 3–15 years than in participants aged > 15 years.

Conclusions: The prevalence, genotypes, and zoonotic potential of *E. bieneusi* were found to vary significantly high even in one country. Transmission routes and key animal carriers of *E. bieneusi* may be associated with differences in hygiene, sanitation, and cultural behaviors. Further molecular studies including longitudinal studies will be required to unveil epidemiological characteristics of these opportunistic intestinal protozoa in all over the countries.

Keywords: *Enterocytozoon*, *Cryptosporidium*, Thailand

出典 doi: 10.1186/s12879-019-4422-4.

最終責任者 Mahittikorn A

Imaging of micro-organisms on topsoil particles collected from different landscape in the Gobi Desert

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Abstract. This study shows the results of field experiments of soil particles saltation and laboratory experiments of imaging of the surface structure of dust particles. In the Gobi area, dust occurs when the wind speed at ground level exceeds 7 m/s. It has been reported that bacteria are attached to dust, but the details of its attachment are unknown. It is also expected that these bacteria will fly at the time of occurrence of dust, and fundamental research is important to clarify the relationship between dust components and bacteria.

1 BACKGROUND OF THE STUDY

The Gobi desert of Mongolia is the main source region of Asian dust storms. Due to climatic factors and artificial development such as overgrazing and open pitting, the area has unprecedented serious environmental problems [1-4].

The destroyed topsoil is exposed to wind, making dust more likely to occur than in the past. Also, there is the possibility that various microorganisms are attached to the soil particles [5-9]. Dust storms in arid and semi-arid areas are not only effected by weather conditions such as strong winds at the time of occurrence, but also effected by the surface condition (for example, conditions of soil dry condition, vegetation, snow cover etc.). Fig. 1 (a, b) shows the monthly average wind speed, the number of dust occurrence and the vegetation status around our study area of Sainshand (the capital of Dornogovi Province in Mongolia located in the eastern Gobi desert steppe). As shown in Fig. 1, the main dust season is in spring when the wind speed is highest and the ground surface is almost bare (indicated by a NDVI value close to zero).

Experiments on dust particles mobilization are very important to determine the threshold wind speed velocity for dust entrainment in the truly grand roughness and moisture conditions of field. It has been reported that bacteria are attached to dust, but the details of its attachment are unknown. In this paper, *E. coli* known as bacteria present in the arid environment (or grazing area) and similar in size to other bacteria was used as model bacteria.

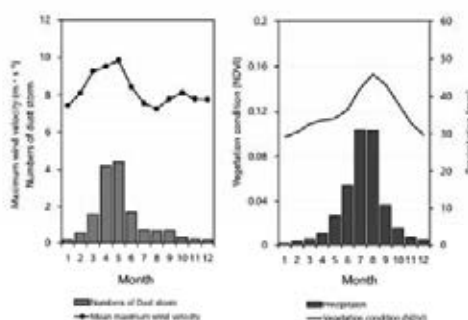






Fig. 1. Monthly means of numbers of dust storm (left), maximum wind velocity, and precipitation and vegetation condition (NDVI) (right) in the study area.

In this study, we used multiple precision equipment's, such as a field emission-type scanning electron microscope (FE-SEM, © JSM-7800F, JEOL Ltd.), a fluorescence microscope (BX 51, © Olympus Corporation) and a Raman image microscope (In Via, © Renishaw Ltd.), to identify microorganisms attached to the soil samples from the Mongolian Gobi desert. We examine the collected soil samples and aimed at imaging of microorganisms attached to the top soil surface. In order to investigate the relationship between wind speed and saltation of soil particles at the field site, we used a handmade equipment.

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Article

Northeast Asian Dust Transport: A Case Study of a Dust Storm Event from 28 March to 2 April 2012

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Received: 14 January 2019; Accepted: 2 February 2019; Published: 6 February 2019



Abstract: The distribution and transport of windblown dust that occurred in Northeast Asia from 28 March to 2 April 2012 was investigated. Data of particulate matter less than 10 micrometers (PM₁₀) near the surface and light detection and ranging (LiDAR) measurements from the ground up to 18 km were used in the study. A severe dust event originated over southern Mongolia and northern China on 28 March 2012, and the widespread dust moved from the source area southeastward toward Japan over several days. Windblown dust reached Japan after two days from the originating area. LiDAR measurements of the vertical distribution of the dust were one to two km thick in the lower layer of the atmosphere, and increased with the increasing distance from the source area.

Keywords: LiDAR; dust storm; PM₁₀; Northeast Asia; Gobi desert

1. Introduction

Dust storms are a common phenomenon in the desert regions of Northeast Asia, especially in the Gobi desert in southern Mongolia, northern China, and Taklamakan desert in northwest China [1–8]. Eastward and southeastward moving cyclones and the northwesterly wind often transport large amounts of fine dust particles to the eastern parts of China, the Korean Peninsula, and Japan [8]. Frequent Asian Dust vents in Japan during 2000–2002 followed severe dust outbreaks in East Asia [7].

Dust concentrations of PM₁₀ increase by at least double during severe dust events in comparison with normal atmospheric conditions [9,10]. PM₁₀ dust particles are the primary source of the yellow dust phenomenon that spreads across Northeast Asia [11]. Research has shown that Asian dust often reaches Korea [12–15], Taiwan [16–18], and Japan [7,8].

The transport of desert dust from Asia to the North Pacific atmosphere has been well documented [19–25]. The peak frequencies of dust storms occur from March to June and September [1]. Dust storms are classified as a type of natural disaster, which can affect ecosystems, human life,

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- 1) Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells. Nishi K, Gondaira S, Okamoto M, Nebu T, Koiwa M, Ohtsuka H, Murai K, Matsuda K, Fujiki J, Iwano H, Nagahata H, **Higuchi H**.
Vet. Immunol. Immunopathol. 2019 Oct;216:109920.
doi:10.1016/j.vetimm.2019.109920.

- 2) Immunosuppression in cows following intramammary infusion of *Mycoplasma bovis*.
Gondaira S, Nishi K, Tanaka T, Yamamoto T, Nebu T, Watanabe R, Konnai S, Hayashi T, Kiku Y, Okamoto M, Matsuda K, Koiwa M, Iwano H, Nagahata H, **Higuchi H**.
Infect. Immun. 2019 Dec 16. pii: IAI.00521-19. doi: 10.1128/IAI.00521-19.

II. その他 <Others>

- 1) Cytokine levels of peripheral blood mononuclear cells in the clinical cases of Holstein calves infected with *Mycoplasma bovis*.
Ohtsuka H, Nakazono M, Kondoh T, **Higuchi H**, Tajima M, Koiwa M.
J. Vet. Med. Sci. 2019 Nov 8. doi: 10.1292/jvms.19-0161.
- 2) Prevalence and characterization of *Staphylococcus aureus* isolated in raw milk from cows in Hokkaido, Japan.
Thongratsakul S, Usui M, **Higuchi H**, Takahashi T, Sato T, Poolkhet C, Tamura Y.
Trop. Anim. Health Prod. 2019 Dec 16. doi: 10.1007/s11250-019-02169-6.



Contents lists available at ScienceDirect

Veterinary Immunology and Immunopathology

journal homepage: www.elsevier.com/locate/vetimm



Research paper

Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells



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ARTICLE INFO

Keywords:

Mycoplasma bovis

Mycoplasma arthritis

Synovial cells

Inflammatory cytokines

Matrix metalloproteinases

ABSTRACT

Mycoplasma bovis causes chronic arthritis in calves. *Mycoplasma arthritis* shows severe inflammatory reactions in joints that is commonly treated with antibiotics and results in significant economic losses in the calf industry. A previous study showed that inflammatory cytokines and matrix metalloproteinases (MMPs) produced by synovial cells promote progression of the pathophysiology of bacterial arthritis. However, the mechanism underlying the pathogenesis of bovine *Mycoplasma arthritis* has not been fully clarified. In this study, we examined the immunologic response of bovine synovial tissue to *M. bovis*. We observed significant increases in expression of interleukin (IL)-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial tissue from *Mycoplasma arthritis* calves compared with tissues from normal calves. Expression of IL-6, IL-8, and MMP-1 mRNA was also induced in cultured synovial cells stimulated with *M. bovis*, but not expression of IL-1 β and MMP-3 mRNA. In contrast, the culture supernatant of peripheral blood mononuclear cells stimulated with *M. bovis* induced marked increases in the expression of IL-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial cells. Our results indicate that inflammatory cytokines and MMPs produced by synovial cells play a key role in the pathogenesis of *Mycoplasma arthritis*. We suggest that interactions between synovial cells and mononuclear cells in the presence of *M. bovis* induce expression of these cytokines and MMPs in synovial cells, resulting in severe inflammatory reactions in the joints.

出典 doi: 10.1016/j.vetimm.2019.109920.

<https://www.sciencedirect.com/science/article/pii/S0165242719300777?via%3Dihub>

最終責任者 Hidetoshi Higuchi (Corresponding Author)

Immunosuppression in cows following intramammary infusion of *Mycoplasma bovis*

Satoshi Gondaira, Koji Nishi, Takahiro Tanaka, Takashi Yamamoto, Takanori Nebu, Reina Watanabe, Satoru Konnai, Tomohito Hayashi, Yoshio Kiku, Mariko Okamoto, Kazuya Matsuda, Masateru Koike, Hidetomo Iwano, Hajime Nagahata, Hidetoshi Higuchi

DOI: 10.1128/IAI.00521-19

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ABSTRACT

Mycoplasma bovis (*M. bovis*) is a destructive pathogen that causes large economic losses in rearing cattle for beef and dairy worldwide. *M. bovis* causes suppression and evasion of host immune response; however, the mechanisms of host immune function involved in *M. bovis* mastitis have not been elucidated. The purpose of this study is to elucidate the characteristics of the bovine immune response to mycoplasmal mastitis. We evaluated the responsiveness of the bovine mammary gland following infusion of *M. bovis*. Somatic cell counts and bacterial counts in milk from the infected quarter were increased. However, the proliferation of peripheral blood mononuclear cells (blood MNCs) and mononuclear cells isolated from *M. bovis*-stimulated mammary lymph nodes (lymph node MNCs) did not differ from that in the unstimulated cells. Transcriptome analysis revealed that the mRNA levels of innate immune system-related genes in blood MNCs, complement factor D (CFD), ficolin 1 (FCN1), and tumor necrosis factor superfamily member 13 (TNFSF13), decreased following intramammary infusion of *M. bovis*. The mRNA levels of immune exhaustion-related genes, programmed cell death 1 (PD-1), programmed cell death-ligand 1 (PD-L1), lymphocyte activation gene 3 (LAG3), and cytotoxic T-lymphocyte-associated protein 4 (CTLA4), of milk mononuclear cells (milk MNCs) in the infected quarter were increased compared with those before infusion. Increase in immune exhaustion-related gene expression and decrease in innate immune response-related genes of MNCs in quarters from cows were newly characterized by *M. bovis*-induced mastitis. These results suggested that *M. bovis*-induced mastitis affected the immune function of bovine MNCs, which is associated with prolonged duration of infection with *M. bovis*.

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Mycoplasma bovis-induced Inhibition of Bovine Peripheral Blood Mononuclear Cell Proliferation Is Ameliorated after Blocking the Immune-Inhibitory Programmed Death 1 Receptor
Infect Immun, 2018

Therapeutic Effect of Nisin Z on Subclinical Mastitis in Lactating Cows
Antimicrob Agents Chemother, 2007

出典 doi: 10.1128/IAI.00521-19.

<https://iai.asm.org/content/early/2019/12/10/IAI.00521-19.long>

最終責任者 Hidetoshi Higuchi (Corresponding Author)

Cytokine levels of peripheral blood mononuclear cells in the clinical cases of Holstein calves infected with *Mycoplasma bovis*

Hiromichi OHTSUKA, Masatomo NAKAZONO, Takahiro KONDOH, Hidetoshi HIGUCHI, Motoshi TAJIMA, Masateru KOIWA

✚ Author information

Keywords: calf, clinical case, immune factor, *Mycoplasma bovis*, peripheral blood mononuclear cell

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Article ID: 19-0161

DOI

<https://doi.org/10.1292/jvms.19-0161>

✚ Details

Article overview

➤ Abstract

➤ Information related to the author

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**Abstract**

The immune related factors of peripheral blood mononuclear cells (PBMC) were analyzed in the clinical cases with *Mycoplasma (M.) bovis* infection. Seventy-eight Holstein calves in one farm were used. These calves were divided into three groups; the calves with *M. bovis* infection of poor outcome after treatment (Non-Recovery Group), the calves with *M. bovis* infection recovered (Recovery Group) and clinically healthy calves (Control Group). Blood samples were collected at days of the first medical treatment and the final treatment or euthanasia. IL-17A levels in the Non-Recovery Group were higher than those in the Recovery Group on both days. Our result suggested that the IL-17A of PBMC is an important factor to affect outcome of the calves with *M. bovis* infection.

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出典 doi: 10.1292/jvms.19-0161.

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_19-0161/_article

最終責任者 Hiromichi Ohtsuka (Corresponding Author)

Prevalence and characterization of *Staphylococcus aureus* isolated in raw milk from cows in Hokkaido, Japan

[Sukanya Thongratsakul](#) , [Masaru Usui](#), [Hidetoshi Higuchi](#), [Toshihiko Takahashi](#), [Tomomi Sato](#), [Chaithep Poolkhet](#) & [Yutaka Tamura](#)

[Tropical Animal Health and Production](#) (2019) | [Cite this article](#)

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Abstract

The aim of this study was to characterize the phenotypes and genotypes of *Staphylococcus aureus* isolated from raw bovine milk in Hokkaido, Japan. *S. aureus* isolates were identified in 135 of 436 milk samples from cows with and without signs of mastitis from three farms in Hokkaido. These clinical isolates were characterized for antimicrobial susceptibility patterns, molecular typing using phage-open-reading frame typing (POT), coagulase gene type, virulence genes, and biofilm-associated genes and were evaluated for biofilm-forming ability. Most isolates were susceptible to the antimicrobial agents tested. The highest rate of resistance was to ampicillin. Molecular typing of all *S. aureus* isolates indicated a predominance of coagulase type VI and o-17-34 POT type, and virulence genes were highly prevalent in the isolates from all farms. Moreover, a high percentage of the o-17-34 POT type isolates showed extensive formation of biofilm. These findings will help veterinarians and farmers to understand the epidemiology of *S. aureus* so that they can monitor the transmission and spread of this pathogen and control it more effectively.

出典 doi: 10.1007/s11250-019-02169-6.

<https://link.springer.com/article/10.1007%2Fs11250-019-02169-6>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Assessing food safety risks in low and middle-income countries.

Makita K., ds Haan N, Nguyen-Viet H, Grace D.

Encyclopedia of food security and sustainability (book). Volume 3, 448-453.

2019. doi.org/10.1016/B978-0-08-100596-5.21576-X

- 2) Computation of risk assessment modelling.

Makita K., Sina SK, Lindahl J, Desissa F.

Encyclopedia of food security and sustainability (book). Volume 3, 371-380.

2019. doi.org/10.1016/B978-0-08-100596-5.22554-7

- 3) FTA-sodium hydroxide-based polymerase chain reaction (PCR): an efficient and cheaper option for *Theileria parva* detection in dairy cattle in Mbarara, Uganda.

Uchida L, Byaruhanga J, Okamura I, Miyama T, Muramatsu Y, Vudriko P,

Makita K.

J. Vet. Med. Sci. 82(2). <https://doi.org/10.1292/jvms.19-0521>. 2019

II. その他<Others>

- 1) A comparative review of prevention of rabies incursion between Japan and other rabies-free countries or regions.

Yamada A, **Makita K.**, Kadowaki H, Ito N, Sugiyama M, Kwan NCL, Sugiura K.

Jpn. J. Infect. Dis. 72, 203-10. 2019. doi.org/10.7883/yoken.JJID.2018.431

- 2) Cardiovascular effects of intravenous colforsin in normal and acute respiratory

acidosis canine models: A dose-response study.

Itami T, Hanazono K, Oyama N, Sano T, **Makita K**, Yamashita K.

PLoS ONE 14(7), e0213414. 2019. doi.org/10.1371/journal.pone.0213414

- 3) Aflatoxin exposure from milk in rural Kenya and the contribution to the risk of liver cancer.

Sirma AJ, **Makita K**, Randolph DG, Senerwa D, Lindahl JF.

Toxins 11, 469. 2019. doi.org/10.3390/toxins11080469

Assessing Food Safety Risks in Low and Middle-Income Countries

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Abstract

Foodborne disease in low and middle-income countries has a health burden comparable to malaria, HIV/AIDS or tuberculosis. In these countries, majority of foods are distributed through informal value chains and sold in wet markets. Such informal value chains tend to have direct or indirect contamination from unhygienic environment, and ecosystem thinking is important. Moreover, risk of foodborne disease may be different between gender and wealth sub populations.

In controlling food safety risks, Hazard Analysis Critical Control Point and risk analysis are useful frameworks. In this chapter, Codex Alimentarius and OIE framework risk analyses are introduced, and application of these framework into informal value chains using participatory methods is explained. Ecosystem health approach includes both environmental risks and the sociological aspects. Food may be produced in contaminated environment, or contaminated through food distribution and handling. Moral hazard and poverty may be associated with the food safety risks. The roles of women in cooking, care taking of family members, and agriculture are traditionally important in food safety risks. Such ecosystem and gender aspects should be included in risk assessment, so that effective intervention programs can be designed.

出典 doi.org/10.1016/B978-0-08-100596-5.21576-X

<https://doi.org/10.1016/B978-0-08-100596-5.21576-X>

最終責任者 Kohei Makita (First Author and Corresponding Author)

Computation of Risk Assessment Modelling

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Introduction

The demand for risk assessment to evaluate the safety of foods is increasing in low and middle income countries, but almost no textbook descriptions of risk assessment modelling for informal markets, where much of the food is bought, are available. This chapter introduces practical methods for learners and risk assessors to tackle this problem.

Deterministic and Stochastic Assessment

Risk assessment is the scientific evaluation of known or potential adverse health effects resulting from human exposure to foodborne hazards. Qualitative risk assessments evaluate adverse health effects in non-numerical terms such as “high risk” or “negligible risk”. Quantitative risk assessments provide numerical estimates of risk such as ten cases of salmonellosis for every 10,000 meals consumed. There are two types of quantitative risk assessments: deterministic and stochastic. Deterministic uses single values (called ‘point-estimates’) of parameters in modelling, while stochastic risk assessment deals with distributions of the parameters. Both types can estimate the probability of illness with the quantity of hazard ingested and the response using a dose-response relationship, if this is available. The big difference between them is the property to show uncertainty and variability of the result estimated. Stochastic assessment has this property, while deterministic does not. Uncertainty is a lack of knowledge – how much we do not know, while variability is a variation in a system of physical world, such as difference in amount of consumption, volume of food distribution, and ambient temperature of a day.


出典 doi.org/10.1016/B978-0-08-100596-5.22554-7

<https://doi.org/10.1016/B978-0-08-100596-5.22554-7>

最終責任者 Kohei Makita (First Author and Corresponding Author)

FTA-Sodium hydroxide-based polymerase chain reaction (PCR): an efficient and cheaper option for *Theileria parva* detection in dairy cattle in Mbarara, Uganda

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 著者情報

キーワード: dairy cow, East Coast fever, FTA card, sodium hydroxide, *Theileria parva*

ジャーナル フリー 早期公開

論文ID: 19-0521

 <https://doi.org/10.1292/jvms.19-0521>

 詳細

記事の概要

抄録

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East Coast fever is caused by *Theileria parva*, and poses serious concerns for dairy farmers owing to massive economic losses. In the current study, we compared three methods (DNA extraction kits, FTA-NaOH and FTA-TENT) of DNA extraction to identify the most economical and reliable method. A survey for *T. parva* prevalence was conducted in dairy cattle in Mbarara, Uganda. *Cytochrome C oxidase subunit I (COI)* and *T. parva-p104* genes were amplified to compare the methods. FTA-NaOH-based polymerase chain reaction (PCR) yielded the best detection rate for both *COI* gene and *p104* gene. Prevalence of *T. parva* was 45.0% and 83.3% at animal and farm-level respectively. FTA-NaOH based-PCR is simple, highly sensitive and cost-effective tool for *T. parva* diagnosis in resource constrained settings.

出典 doi.org/10.1292/jvms.19-0521

<https://doi.org/10.1292/jvms.19-0521>

最終責任者 Kohei Makita (Corresponding Author)

Invited Review

A Comparative Review of Prevention of Rabies Incursion between Japan and Other Rabies-Free Countries or Regions

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2. Rabies in Japan
3. Problem statement associated with current rabies preventive measures in Japan
4. Risk assessment for rabies in Japan
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 - 6-4. France
 - 6-5. Hong Kong
7. Conclusion

SUMMARY: Although rabies still kills many people, the global eradication of human rabies is considered to be feasible. Progress towards eradication may differ among regions with differing socio-economic statuses; therefore, states that successfully eradicate this disease must be vigilant for rabies re-emergence. Here, we discuss challenges that remain concerning current rabies prevention measures and risk assessment results concerning possible rabies introduction and spread in rabies-free Japan. We summarize the preventative measures undertaken by representative rabies-free countries and regions. Our risk assessment results show that the risk of rabies reintroduction under current circumstances is very low, and that subsequent spread of the disease would be minimal because of quite low value of basic reproduction number. Similar assessments conducted in other rabies-free areas also showed limited risks of introduction. The majority of rabies-free countries maintain their rabies-free status through strict import quarantine of carnivorous animals, efficient surveillance of animal rabies including wildlife, quick emergency responses, and raising public awareness of the disease. To maintain the current rabies-free status in Japan, we strongly recommend maintaining the current quarantine system and reinforcing stakeholder compliance for those involved in international movement of dogs. Moreover, sustainable surveillance systems targeting wildlife are indispensable.

出典 doi.org/10.7883/yoken.JJID.2018.431

<https://doi.org/10.7883/yoken.JJID.2018.431>

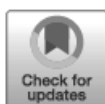
最終責任者 Akio Yamada (First Author and Corresponding Author)

RESEARCH ARTICLE

Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study

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OPEN ACCESS

Citation: Itami T, Hanazono K, Oyama N, Sano T, Makita K, Yamashita K (2019) Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study. PLoS ONE 14(7): e0213414. <https://doi.org/10.1371/journal.pone.0213414>

Editor: Ferenc Gallyas, Jr., University of PECS Medical School, HUNGARY

Received: February 18, 2019

Accepted: June 25, 2019

Published: July 10, 2019

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Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Funding: This work was supported by JSPS KAKENHI Grant Number JP 26861516. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing interests: The authors have declared that no competing interests exist.

Abstract

In acidosis, catecholamines are attenuated, and higher doses are often required to improve cardiovascular function. Colforsin activates adenylate cyclase in cardiomyocytes without beta-adrenoceptor. Here, six beagles were administered colforsin or dobutamine four times during eucapnia (partial pressure of arterial carbon dioxide 35–40 mm Hg; normal) and hypercapnia (ibid 90–110 mm Hg; acidosis) conditions. The latter was induced by CO₂ inhalation. Anesthesia was induced with propofol and maintained with isoflurane. Cardiovascular function was measured by thermodilution and a Swan-Ganz catheter at baseline and 60 min after 0.3 µg/kg/min (low), 0.6 µg/kg/min (middle), and 1.2 µg/kg/min (high) colforsin administration. The median pH was 7.38 [range 7.33–7.42] and 7.01 [range 6.96–7.08] at baseline in the Normal and Acidosis conditions, respectively. Endogenous adrenaline and noradrenaline levels at baseline were significantly ($P < 0.05$) higher in the Acidosis than in the Normal condition. Colforsin induced cardiovascular effects similar to those caused by dobutamine. Colforsin increased cardiac output in the Normal condition (baseline: 3.9 ± 0.2 L/kg/m² [mean \pm standard error], low: 5.2 ± 0.4 L/kg/min², middle: 7.0 ± 0.4 L/kg/m², high: 9.4 ± 0.2 L/kg/m²; $P < 0.001$) and Acidosis condition (baseline: 6.1 ± 0.3 L/kg/m², low: 6.2 ± 0.2 L/kg/m², middle: 7.2 ± 0.2 L/kg/m², high: 8.3 ± 0.2 L/kg/m²; $P < 0.001$). Colforsin significantly increased heart rate and decreased systemic vascular resistance compared to values at baseline. Both drugs increased pulmonary artery pressure, but colforsin (high: 13.3 ± 0.6 mmHg in Normal and 20.1 ± 0.2 mmHg in Acidosis) may have lower clinical impact on the pulmonary artery than dobutamine (high: 19.7 ± 0.6 in Normal and 26.7 ± 0.5 in Acidosis). Interaction between both drugs and experimental conditions was observed in terms of cardiovascular function, which were similarly attenuated with colforsin and dobutamine under acute respiratory acidosis.

出典 doi.org/10.1371/journal.pone.0213414

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0213414>

最終責任者 Takaharu Itami (First Author and Corresponding Author)

Article

Aflatoxin Exposure from Milk in Rural Kenya and the Contribution to the Risk of Liver Cancer

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Received: 24 June 2019; Accepted: 25 July 2019; Published: 10 August 2019



Abstract: Milk is an important commodity in Kenya; the country has the largest dairy herd and highest per capita milk consumption in East Africa. As such, hazards in milk are of concern. Aflatoxin M₁ (AFM₁) is a toxic metabolite of aflatoxin B₁ (AFB₁) excreted in milk by lactating animals after ingesting AFB₁-contaminated feeds. This metabolite is injurious to human health, but there is little information on the risk to human health posed by AFM₁ in milk in rural Kenya. To fill this gap, a quantitative risk assessment (QRA) applying probabilistic statistical tools to quantify risks was conducted. This assessed the risk of liver cancer posed by AFM₁ in milk, assuming 10-fold lower carcinogenicity than AFB₁. Data from four agro-ecological zones in Kenya (semi-arid, temperate, sub-humid and humid) were used. We estimated that people were exposed to between 0.3 and 1 ng AFM₁ per kg body weight per day through the consumption of milk. The annual incidence rates of cancer attributed to the consumption of AFM₁ in milk were 3.5×10^{-3} (95% CI: 3×10^{-3} – 3.9×10^{-3}), 2.9×10^{-3} (95% CI: 2.5×10^{-3} – 3.3×10^{-3}), 1.4×10^{-3} (95% CI: 1.2×10^{-3} – 1.5×10^{-3}) and 2.7×10^{-3} (95% CI: 2.3×10^{-3} – 3×10^{-3}) cancers per 100,000 in adult females, adult males, children 6–18 years old, and in children less than five years old, respectively. Our results show that aflatoxin exposure from milk contributes relatively little to the incidence of liver cancer. Nonetheless, risk managers should take action based on cumulative exposure from all sources of aflatoxins.

出典 doi.org/10.3390/toxins11080469

<https://www.mdpi.com/2072-6651/11/8/469>

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- 1) *Bergeyella zoohelcum* isolated from oral cavities of therapy dogs.

Muramatsu Y, Haraya N, Horie K, Uchida L, Kooriyama T, Suzuki A, Horiuchi M.

Zoon. Publ. Hlth. 2019. 66 (8):936-942.

doi: 10.1111/zph.12644

- 2) PCR primer design method for differentiating among *Salmonella* serogroups based on an algorithm targeting gene-flanking regions.

Muramatsu Y, Tsukaya Y, Ikeda T, Uchida L, Osa Y, Endoh D.

Southeast Asian J Trop Med Publ Hlth 50(5): 848-859. 2019

https://www.tm.mahidol.ac.th/seameo/2019-50-5/07_7762_15-848.pdf

II. その他<Others>

- 1) FTA-Sodium hydroxide-based polymerase chain reaction (PCR): an efficient and cheaper option for *Theileria parva* detection in dairy cattle in Mbarara, Uganda.

Uchida L, Byaruhanga J, Okamura I, Miyama T, **Muramatsu Y**, Vudriko P, Makita K.

J. Vet. Med. Sci. 2019 Dec 25.

doi: 10.1292/jvms.19-0521

Bergeyella zoohelcum isolated from oral cavities of therapy dogs

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Funding Information

Ministry of Health, Labour and Welfare, Grant/Award Number: 20330701; Japan Society for the Promotion of Science, Grant/Award Number: 17K09243; Rakuno Gakuen University, Grant/Award Number: Grant-in-Aid for Cooperative Research from Rakuno

Abstract

Bergeyella zoohelcum causes rare but severe human clinical diseases, which mostly arise from animal bites. Notably, *Bergeyella* infections can also occur in older people after prolonged exposure to dogs or cats without biting. We detected *B. zoohelcum* in oral cavities of therapy dogs in close contact with older people residing in nursing homes. Twenty-two bacterial isolates were identified as *B. zoohelcum* by using matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS) and 16S rRNA gene sequencing. Our results showed that MALDI-TOF MS is an effective tool for rapid identification of rarely isolated, difficult-to-identify microorganisms, such as *B. zoohelcum*, derived from not only human clinical samples but also animal samples. To our knowledge, this is the first report on detection of *B. zoohelcum* from therapy dogs. We have provided information on dog-assisted therapy to improve the relationship between humans and animals in ageing societies, particularly for preventive healthcare of older people living in nursing care facilities.

KEYWORDS

ageing society, *Bergeyella zoohelcum*, older people, oral cavity, therapy dog

出典 doi: 10.1111/zph.12644

<http://dx.doi.org/10.1111/zph.12644>

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PCR PRIMER DESIGN METHOD FOR DIFFERENTIATING AMONG *SALMONELLA* SEROGROUPS BASED ON AN ALGORITHM TARGETING GENE-FLANKING REGIONS

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Abstract. We applied an algorithm targeting length polymorphisms of intergenic sequences between gene-flanking regions for constructing PCR primer pairs to distinguish among serogroups of *Salmonella*, a major pathogen of humans and animals. From 43 constructed primer pairs, a pair capable in a single-step conventional PCR to categorize five serogroups of *Salmonella enterica* subsp *enterica* into three classes according to amplicon lengths (400, 800, and 900 bp, respectively). Nucleotide sequences of the amplicons were those of flanking regions rfbH and rfbJ. No amplicon was generated in other bacterial genera examined, indicative of the high specificity of this PCR primer pair. As more genetic information becomes available, the smaller number of primer pairs will be required in multiplex-PCR for differentiating *Salmonella* microorganisms using the novel primer design method.

Keywords: *Salmonella*, algorithm, gene-flanking region, PCR, serogroup

FTA-Sodium hydroxide-based polymerase chain reaction (PCR): an efficient and cheaper option for *Theileria parva* detection in dairy cattle in Mbarara, Uganda

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Keywords: dairy cow, East Coast fever, FTA card, sodium hydroxide, *Theileria parva*

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Article ID: 19-0521

 <https://doi.org/10.1292/jvms.19-0521>

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Abstract

East Coast fever is caused by *Theileria parva*, and poses serious concerns for dairy farmers owing to massive economic losses. In the current study, we compared three methods (DNA extraction kits, FTA-NaOH and FTA-TENT) of DNA extraction to identify the most economical and reliable method. A survey for *T. parva* prevalence was conducted in dairy cattle in Mbarara, Uganda. *Cytochrome C oxidase subunit I (COI)* and *T. parva-p104* genes were amplified to compare the methods. FTA-NaOH-based polymerase chain reaction (PCR) yielded the best detection rate for both *COI* gene and *p104* gene. Prevalence of *T. parva* was 45.0% and 83.3% at animal and farm-level respectively. FTA-NaOH based-PCR is simple, highly sensitive and cost-effective tool for *T. parva* diagnosis in resource constrained settings.

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出典 doi: 10.1292/jvms.19-0521

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Sedative and physiological effects of low-dose intramuscular alfaxalone in rabbits.
Ishikawa Y, Sakata H, Tachibana Y, Itami T, Oyama N, Umar MA, Sano T, **Yamashita K.**
J. Vet. Med. Sci. 81:851-856. 2019. doi: 10.1292/jvms.18-0618.
- 2) Effect of sevoflurane anesthesia on neuromuscular blockade produced by rocuronium infusion in dogs.
Sakata H, Ishikawa Y, Ishihara G, Oyama N, Itami T, Umar MA, Sano T, **Yamashita K.**
J. Vet. Med. Sci. 81:425-433. 2019. doi: 10.1292/jvms.18-0479.

II. その他<Others>

- 1) New criteria of burst suppression on electroencephalogram in dogs anesthetized with sevoflurane.
Koyama C, Haruna T, Hagihira S, **Yamashita K.**
Res. Vet. Sci. 123:171-177. 2019. doi: 10.1016/j.rvsc.2019.01.012.
- 2) Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study.
Itami T, Hanazono K, Oyama N, Sano T, Makita K, **Yamashita K.**
PLoS One. 14:e0213414. 2019. doi: 10.1371/journal.pone.0213414.
- 3) Anesthetic effect of a mixture of alfaxalone, medetomidine, and butorphanol for inducing surgical anesthesia in ICR, BALB/c, and C57BL/6 mouse strains.
Tsukamoto Y, Yamada N, Miyoshi K, **Yamashita K.**, Ohsugi T.
J. Vet. Med. Sci. 81:937-945. 2019. doi: 10.1292/jvms.18-0712.



FULL PAPER

Surgery

Sedative and physiological effects of low-dose intramuscular alfaxalone in rabbits

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ABSTRACT. To evaluate sedative and physiological effects of low dose intramuscular (IM) alfaxalone, six healthy rabbits were administered single IM doses of alfaxalone at 1 mg/kg (IM1), 2.5 mg/kg (IM2.5), or 5 mg/kg (IM5) with a minimum of 7-day washout period. Sedative effects were subjectively evaluated using a composite measure scoring system (maximum sedation score of 16) and pulse rate, respiratory rate, non-invasive blood pressure, and percutaneous oxygen-hemoglobin saturation were measured before and after IM alfaxalone. Loss of righting reflex (LRR) was achieved in all rabbits after IM2.5 and IM5 treatments but in only three rabbits after IM1 treatment. Median (interquartile range) times to LRR were 16 min (15–17), 6 min (6–6), and 4 min (4–4), and median durations of LRR were 0.5 min (0–7), 22.5 min (19–27), and 53 min (48–58) after IM1, IM2.5, and IM5 treatments, respectively. The duration of LRR after IM5 treatment was significantly longer than those after IM1 and IM2.5 treatments ($P < 0.01$). Median value of total sedation scores peaked at 10 min [score 3.5 (3–4)], from 10 min [score 13.5 (12–14)] to 15 min [score 13.5 (12–14)], and from 10 min [score 15 (12–15)] to 15 min [score 15 (14–15)] after IM1, IM2.5, and IM5 treatments, respectively. No rabbit showed circulatory depression and apnea although respiratory rate decreased after IM 2.5 and IM5 treatments. In conclusion, alfaxalone produced a dose-dependent sedative effect and a deep sedation was achieved by alfaxalone at 2.5 mg/kg IM in rabbits.

KEY WORDS: alfaxalone, intramuscular administration, rabbit, sedation

J. Vet. Med. Sci.
81(6): 851–856, 2019
doi: 10.1292/jvms.18-0618

Received: 22 October 2018
Accepted: 4 April 2019
Published online in J-STAGE:
2 May 2019

出典 doi: 10.1292/jvms.18-0479.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6612508/>

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FULL PAPER

Surgery

Effect of sevoflurane anesthesia on neuromuscular blockade produced by rocuronium infusion in dogs

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ABSTRACT. This study evaluated the effect of sevoflurane anesthesia on neuromuscular blockade with rocuronium in dogs. Six healthy beagle dogs were anesthetized four times with a minimum 14-day washout period. On each occasion, the dogs were administered 1.25-, 1.5-, 1.75-, or 2.0-fold of the individualized minimum alveolar concentration (MAC) of sevoflurane and received an infusion of rocuronium (0.5 mg/kg followed by 0.2 mg/kg/hr) for 120 min. Neuromuscular function was monitored with acceleromyography and train-of-four (TOF) stimulation of the left hind limb. Time to achieve TOF count 0 (onset time), time from the onset of neuromuscular blockade to the reappearance of TOF count 4 (blockade period), and time from the onset of rocuronium infusion to attaining a 70 or 90% TOF ratio (TOFR₇₀ or TOFR₉₀) were recorded. There were no significant differences in the onset time, blockade period, and plasma rocuronium concentration between the sevoflurane MAC multiples. The TOFR₇₀ and TOFR₉₀ were dose-dependently prolonged with the sevoflurane MAC multiples. There were significant differences in the TOFR₇₀ and TOFR₉₀ between the 1.25 sevoflurane MAC (median: 55 and 77.5 min, respectively) and 1.75 sevoflurane MAC (122.0 and 122.6 min; $P=0.020$ and $P=0.020$, respectively), 1.25 sevoflurane MAC and 2.0 sevoflurane MAC (126.0 and 131.4 min; $P=0.020$ and $P=0.020$), and 1.5 sevoflurane MAC (97.5 and 121.3 min) and 2.0 sevoflurane MAC ($P=0.033$ and $P=0.032$). In dogs, sevoflurane anesthesia produced dose-dependent prolongation of recovery from neuromuscular blockade produced by rocuronium.

KEY WORDS: dog, interaction, neuromuscular blockade, rocuronium, sevoflurane

J. Vet. Med. Sci.
81(3): 425–433, 2019
doi: 10.1292/jvms.18-0479

Received: 13 August 2018
Accepted: 2 January 2019
Published online in J-STAGE:
30 January 2019

出典 doi: 10.1292/jvms.18-0479.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6451902/>

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New criteria of burst suppression on electroencephalogram in dogs anesthetized with sevoflurane.Koyama C¹, Haruna T², Hagihira S³, Yamashita K⁴.**Author information**

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Abstract

Burst suppression on electroencephalogram (EEG) is defined as suppression periods longer than 0.5 s during which the amplitude does not exceed 5 μ V in human. The aims of this study were; 1) an attempt of creating new criteria of burst suppression in dogs; and 2) a survey on accuracy of sub-parameter of Bispectral index (BIS). Using a BIS monitor, suppression ratio (SR_{BIS}) and raw-EEG data were recorded at 2.0%, 2.5%, 3.0%, 3.5%, 4.0%, and 5.0% end-tidal sevoflurane concentration (ETSEV) in 6 beagle dogs. The minimum ETSEV at which burst suppression was visually confirmed ($ETSEV_{BS}$) was determined. By applying various duration and voltage threshold to criteria, suppression ratio was calculated (SR). Using the minimum balanced error rate (BER), new criteria consisting of the minimum duration of 0.35 s and the maximum threshold of 2.25 μ V that provided $SR > 0$ above $ETSEV_{BS}$ was screened. SR was set by these criteria (SR_{BER}) and by manual inspection (SR_{TRUE}). The median detection rate of SR_{BER}/SR_{TRUE} was a statistically significant increase ($p < .01$) compared to that of SR_{BIS}/SR_{TRUE} (77% and 17% at 3.5% ETSEV, 89% and 19% at 4.0% ETSEV, and 86% and 84% at 5.0% ETSEV, respectively). In addition, between SR_{BER} and SR_{TRUE} evaluated by regression and Bland-Altman analyses, there was a strong correlation ($r = 0.967$, $p < .001$) and a moderate agreement (Limits of agreement: -7.14 ± 13.95). The method using BER may help to establish new criteria of burst suppression to grasp the excessive deep level of anesthesia.

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KEYWORDS: BIS; Balanced error rate; Burst suppression; Dog; EEG; New criteria; SR; Suppression ratio

PMID: 30677617 DOI: 10.1016/j.rvsc.2019.01.012

[Indexed for MEDLINE]



出典 doi: 10.1016/j.rvsc.2019.01.012.

<https://www.ncbi.nlm.nih.gov/pubmed/30677617>

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RESEARCH ARTICLE

Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study

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OPEN ACCESS

Citation: Itami T, Hanazono K, Oyama N, Sano T, Makita K, Yamashita K (2019) Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study. PLoS ONE 14(7): e0213414. <https://doi.org/10.1371/journal.pone.0213414>

Editor: Ferenc Gállyas, Jr., University of Pecs Medical School, HUNGARY

Received: February 18, 2019

Accepted: June 25, 2019

Published: July 10, 2019

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Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Funding: This work was supported by JSPS KAKENHI Grant Number JP 26861516. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing interests: The authors have declared that no competing interests exist.

Abstract

In acidosis, catecholamines are attenuated, and higher doses are often required to improve cardiovascular function. Colforsin activates adenylate cyclase in cardiomyocytes without beta-adrenoceptor. Here, six beagles were administered colforsin or dobutamine four times during eucapnia (partial pressure of arterial carbon dioxide 35–40 mm Hg; normal) and hypercapnia (ibid 90–110 mm Hg; acidosis) conditions. The latter was induced by CO₂ inhalation. Anesthesia was induced with propofol and maintained with isoflurane. Cardiovascular function was measured by thermodilution and a Swan-Ganz catheter at baseline and 60 min after 0.3 µg/kg/min (low), 0.6 µg/kg/min (middle), and 1.2 µg/kg/min (high) colforsin administration. The median pH was 7.38 [range 7.33–7.42] and 7.01 [range 6.96–7.08] at baseline in the Normal and Acidosis conditions, respectively. Endogenous adrenaline and noradrenaline levels at baseline were significantly ($P < 0.05$) higher in the Acidosis than in the Normal condition. Colforsin induced cardiovascular effects similar to those caused by dobutamine. Colforsin increased cardiac output in the Normal condition (baseline: 3.9 ± 0.2 L/kg/m² [mean \pm standard error], low: 5.2 ± 0.4 L/kg/min², middle: 7.0 ± 0.4 L/kg/m², high: 9.4 ± 0.2 L/kg/m²; $P < 0.001$) and Acidosis condition (baseline: 6.1 ± 0.3 L/kg/m², low: 6.2 ± 0.2 L/kg/m², middle: 7.2 ± 0.2 L/kg/m², high: 8.3 ± 0.2 L/kg/m²; $P < 0.001$). Colforsin significantly increased heart rate and decreased systemic vascular resistance compared to values at baseline. Both drugs increased pulmonary artery pressure, but colforsin (high: 13.3 ± 0.6 mmHg in Normal and 20.1 ± 0.2 mmHg in Acidosis) may have lower clinical impact on the pulmonary artery than dobutamine (high: 19.7 ± 0.6 in Normal and 26.7 ± 0.5 in Acidosis). Interaction between both drugs and experimental conditions was observed in terms of cardiovascular function, which were similarly attenuated with colforsin and dobutamine under acute respiratory acidosis.

出典 doi: 10.1371/journal.pone.0213414.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6619603/pdf/pone.0213414.pdf>

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FULL PAPER

Laboratory Animal Science

Anesthetic effect of a mixture of alfaxalone, medetomidine, and butorphanol for inducing surgical anesthesia in ICR, BALB/c, and C57BL/6 mouse strains

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ABSTRACT. The anesthetic effects of alfaxalone combined with medetomidine and butorphanol were investigated for ICR, BALB/c, and C57BL/6 mice. Mice were administered a combination of 0.5 or 0.75 mg/kg medetomidine and 5 mg/kg butorphanol with 30 or 40 mg/kg alfaxalone (0.5MBA30, 0.75MBA30 and 0.75MBA40, respectively). The drug combinations were administered subcutaneously and were compared with a widely used combination of 0.3 mg/kg medetomidine, 4 mg/kg midazolam, and 5 mg/kg butorphanol (MMB). All three MBA combinations achieved surgical anesthesia, although the recovery time was longer with 0.75MBA30 and 0.75MBA40 compared with 0.5MBA30. Furthermore, several mice exhibited a considerable jumping reaction immediately after injection with 0.75MBA30 and 0.75MBA40. Therefore, 0.5MBA30 may be suitable for inducing surgical anesthesia in the mouse strains tested. The anesthetic scores for 0.5MBA30 were improved compared with those of MMB in all three mouse strains; however, the body temperature drop in C57BL/6 mice was greater with 0.5MBA30. Our results show that the alfaxalone combination, 0.5MBA30, should allow surgical operations that are more stable in more strains of mice than MMB, although the combination may cause hypothermia, especially in C57BL/6 mice.

KEY WORDS: alfaxalone, anesthesia, butorphanol, medetomidine, mice

J. Vet. Med. Sci.
81(6): 937–945, 2019
doi: 10.1292/jvms.18-0712

Received: 27 November 2018
Accepted: 23 April 2019
Published online in J-STAGE:
10 May 2019

出典 doi: 10.1292/jvms.18-0712.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6612492/>

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- 1) Inhibition effect of flavophospholipol on conjugative transfer of the Extended-Spectrum β -lactamase and *vanA* genes.
Kudo H, **Usui M**, Nagafuji W, Oka K, Takahashi M, Yamaguchi H, Tamura Y.
J. Antibiotics. 72: 79-85. 2019. doi: 10.1038/s41429-018-0113-4.
- 2) Quantitative analysis of houseflies-mediated food contamination with bacteria.
Fukuda A, **Usui M**, Masui C, Tamura Y.
Food Safety. 7, 11-14. 2019. doi: 10.14252/foodsafetyfscj.2018013
- 3) Zinc acetate potentiates the action of tosufloxacin against *Escherichia coli* biofilm persisters.
Usui M, Yokoo H, Tamura Y, Nakajima C, Suzuki Y, Ghigo J. M, Beloin C.
Antimicrob. Agents. Chemoter. 24, e00069-19. 2019.
doi: 10.1128/AAC.00069-19.
- 4) Prevalence of 16S rRNA methylases in Gram-negative bacteria derived from companion animals and livestock in Japan
Usui M, Kajino A, Kon M, Fukuda A, Sato T, Shirakawa T, Kawanishi M, Harada K, Nakajima C, Suzuki Y, Tamura Y.
J. Vet. Med. Sci. 81, 874-878. 2019. doi: 10.1292/jvms.19-0144.
- 5) Prevalence of extended-spectrum beta-lactamases-producing bacteria on fresh vegetables in Japan
Usui M, Ozeki K, Komatsu T, Fukuda A, Tamura Y.
J. Food. Prot. 82, 1663-1666. 2019. doi: 10.4315/0362-028X.JFP-19-138.

II. その他＜Others＞

- 1) The role of flies in the maintainance of antimicrobial resistance in farm environments.
Fukuda A, **Usui M**, Okamura M, Dong-Liang Hu, Tamura Y.
Microb. Drug Resistance. 25, 127-132. 2019. doi: 10.1089/mdr.2017.0371.
- 2) Detection of the sul2-strA-strB gene cluster in an ice core from Dome Fuji Station, East Antarctica.
Okubo T, Ae R, Noda J, Iizuka Y, **Usui M**, Tamura Y.
J. Glob. Antimicrob. Resist. 17, 72-78. 2019. doi: 10.1016/j.jgar.2018.11.005.
- 3) Analysis host-recognition mechanism of staphylococcal kayvirus ϕ SA039 reveals a novel strategy that protects *Staphylococcus aureus* against infection by *Staphylococcus pseudintermedius* Siphoviridae phages.
Azam A, Kadoi K, Miyanaga K, **Usui M**, Tamura Y, Cui L, Tanji Y.
Appl. Microbiol. Biotech. 103, 6809-6823. 2019. doi: 10.1007/s00253-019-09940-7.
- 4) Screening of hospital-manhole sewages using MacConkey agar with cefotaxime reveals extended-spectrum β -lactamase-producing *Escherichia coli*.
Okubo T, Hasegawa T, Fukuda A, Thapa J, **Usui M**, Tamura Y, Yamaguchi H.
Int. J. Antimicrob. Agents. 54, 831-833. 2019.
doi: 10.1016/j.ijantimicag.2019.08.004.



Inhibition effect of flavophospholipol on conjugative transfer of the extended-spectrum β -lactamase and *vanA* genes

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Received: 21 June 2018 / Revised: 2 October 2018 / Accepted: 8 October 2018
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Abstract

Flavophospholipol (FPL) is an antimicrobial feed additive that has been approved for use in livestock animals and has the potential to decrease horizontal dissemination of antimicrobial resistance genes. Since previous studies showed that FPL has an inhibitory effect on plasmid transfer, in vitro experiments have proven the efficacy of FPL in reducing the conjugative transfer of plasmids encoding the extended-spectrum β -lactamase (ESBL) and *vanA* genes. These are among the most important antimicrobial resistance loci known. ESBL-producing *Escherichia coli* and vancomycin-resistant *Enterococcus faecalis* (VRE) were exposed to several concentrations of FPL, and transfer frequency and plasmid curing activity were determined. FPL inhibited the conjugative transfer of plasmids harboring ESBL and *vanA* genes in a concentration-dependent manner in all strains. Further transfer experiments revealed that FPL could decrease or increase transfer frequency depending on plasmid type when transfer frequency was at low levels. The plasmid curing activity of FPL was also observed in ESBL-producing *E. coli* in a concentration-dependent manner, suggesting that they partially contribute to the inhibition of conjugative transfer. These results suggest that the use of FPL as a feed additive might decrease the dissemination of ESBL and *vanA* genes among livestock animals.

出典 doi: 10.1038/s41429-018-0113-4.

<https://www.nature.com/articles/s41429-018-0113-4>

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Quantitative Analysis of Houseflies-mediated Food Contamination with Bacteria

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Flies play a key role as vectors in transmitting various bacteria and pose bacterial contamination risk to food. To evaluate the time- and concentration-related bacterial contamination of food by houseflies based on their attraction to the food, we determined the number of fed antimicrobial-resistant *Escherichia coli* transferred from houseflies to foods, sugar and milk mixture, apple, and castella (such as sponge cake). Houseflies contaminated the foods with the fed *E. coli* within 5 min, and the bacteria were present in high numbers on apple and castella (3.3×10^3 and 3.5×10^4 CFU/g of food, respectively). Furthermore, the number of fed *E. coli* on the foods increased with time, rising to 3.6×10^4 – 1.7×10^5 CFU/g. We show that the food contamination level caused by houseflies depends on the concentration of bacteria that the houseflies carry, the contact time with the food, and the attraction of the flies to the food.

Key words: food contamination, food safety, housefly, vector

出典 doi: 10.14252/foodsafetyfscj.2018013

https://www.jstage.jst.go.jp/article/foodsafetyfscj/7/1/7_2018013/_pdf/-char/en

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Zinc Acetate Potentiates the Action of Tosufloxacin against *Escherichia coli* Biofilm Persisters

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ABSTRACT Formation of bacterial biofilms is a major health threat due to their high levels of tolerance to multiple antibiotics and the presence of persisters responsible for infection relapses. We previously showed that a combination of starvation and induction of SOS response in biofilm led to increased levels of persisters and biofilm tolerance to fluoroquinolones. In this study, we hypothesized that inhibition of the SOS response may be an effective strategy to target biofilms and fluoroquinolone persister cells. We tested the survival of *Escherichia coli* biofilms to different classes of antibiotics in starved and nonstarved conditions and in the presence of zinc acetate, a SOS response inhibitor. We showed that zinc acetate potentiates, albeit moderately, the activity of fluoroquinolones against *E. coli* persisters in starved biofilms. The efficacy of zinc acetate to increase fluoroquinolone activity, particularly that of tosufloxacin, suggests that such a combination may be a potential strategy for treating biofilm-related bacterial infections.

出典 doi: 10.1128/AAC.00069-19

<https://aac.asm.org/content/63/6/e00069-19>

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NOTE

Bacteriology

Prevalence of 16S rRNA methylases in Gram-negative bacteria derived from companion animals and livestock in Japan

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J. Vet. Med. Sci.
81(6): 874–878, 2019
doi: 10.1292/jvms.19-0144

Received: 13 March 2019
Accepted: 24 April 2019
Published online in J-STAGE:
2 May 2019

ABSTRACT. The emergence and spread of aminoglycoside-resistant bacteria are a public health concern. The acquisition of the genes encoding 16S rRNA methylases, such as *armA*, *rmfA*, and *rmtB*, confers high-level resistance to aminoglycosides. However, the prevalence has not been well investigated in Japanese veterinary fields. To determine the prevalence of 16S rRNA methylases in animals, we detected 16S rRNA methylases genes in Gram-negative bacteria from animals. Here, we report the isolation of *rmtB* and *armA* from two of the 446 *Escherichia coli* (0.5%) and one of the 103 *Klebsiella* spp. isolates (1.0%) from companion animals, respectively. However, none of the isolations were observed from 2445 *E. coli* isolates derived from livestock in Japan. The prevalence of 16S rRNA methylases in animals, especially in companion animals, should be carefully monitored in Japanese veterinary fields to avoid the spreading of the genes.

KEY WORDS: aminoglycoside resistance, companion animals, livestock, 16S rRNA methylases

出典 doi: 10.1292/jvms.19-0144

https://www.jstage.jst.go.jp/article/jvms/81/6/81_19-0144/_pdf/-char/en

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Research Note

Prevalence of Extended-Spectrum β -Lactamase–Producing Bacteria on Fresh Vegetables in Japan

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MS 19-138: Received 26 March 2019/Accepted 31 May 2019/Published Online 18 September 2019

ABSTRACT

Extended-spectrum β -lactamase (ESBL)–producing bacteria are spreading rapidly, posing a threat to human and animal health. Contamination of vegetables with antimicrobial-resistant bacteria or those harboring antimicrobial resistance genes or a combination of both presents a potential route of transmission to humans. Therefore, the aim of this study was to determine the prevalence of these bacteria in fresh vegetables in Japan. A total of 130 samples of fresh vegetables were collected from seven supermarkets in Japan. The predominant genus detected was *Pseudomonas* spp., including 10 ESBL-producing strains, isolated from 10 (7.7%) of the vegetable samples. Two ESBL genes were detected, *bla*_{TEM-116} ($n = 7$) and *bla*_{SHV-12} ($n = 3$), and some of these strains were resistant to multiple antibiotics. Because vegetables are often consumed raw, those contaminated with ESBL producers could represent an important route of transmission to humans in Japan. Thus, more stringent hygiene measures and monitoring are required to prevent transmission via this source.

出典 doi.org/10.4315/0362-028X.JFP-19-138

<https://jfoodprotection.org/doi/abs/10.4315/0362-028X.JFP-19-138>

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Role of Flies in the Maintenance of Antimicrobial Resistance in Farm Environments

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Flies play an important role as vectors in the transmission of antimicrobial-resistant bacteria (ARB) and are hypothesized to transfer ARB between internal and external livestock housing areas. The aim of this study was to understand the role that flies may play in the maintenance of ARB in the farm environment. We first evaluated the fate of ingested antimicrobial-resistant *Escherichia coli* harboring a plasmid containing antimicrobial-resistance genes (ARGs) throughout the housefly (*Musca domestica*) life cycle, from adult to the subsequent F1 generation. Antimicrobial-resistant *E. coli* was isolated from different life cycle stages and ARG carriage quantified. The ingested *E. coli* persisted throughout the fly life cycle, and ARG carriage was maintained at a constant level in the housefly microbiota. To clarify the transmission of ARB from flies to livestock, 30-day-old chickens were inoculated with maggots containing antimicrobial-resistant *E. coli*. Based on the quantification of bacteria isolated from cecal samples, antimicrobial-resistant *E. coli* persisted in these chickens for at least 16 days. These results suggest that flies act as a reservoir of ARB throughout their life cycle and may therefore be involved in the maintenance and circulation of ARB in the farm environment.

Keywords: antimicrobial resistance, flies, farm environment

出典 doi: 10.1089/mdr.2017.0371

https://www.liebertpub.com/doi/abs/10.1089/mdr.2017.0371?rfr_dat=cr_pub%3Dpubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&journalCode=mdr

最終責任者 Yutaka Tamura (Corresponding Author)



Contents lists available at ScienceDirect

Journal of Global Antimicrobial Resistance

journal homepage: www.elsevier.com/locate/jgar



Detection of the *sul2-strA-strB* gene cluster in an ice core from Dome Fuji Station, East Antarctica



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ARTICLE INFO

Article history:

Received 30 May 2018

Received in revised form 26 October 2018

Accepted 3 November 2018

Available online 20 November 2018

Keywords:

Antimicrobial resistance

Antarctica

Firn

Ice core

ABSTRACT

Objectives: Bacteria harbouring antimicrobial resistance genes (ARGs) have been isolated from various locations, including ancient microbiomes, indicating that these genes pre-date the discovery of antibiotics. To gain further information regarding ARGs in the pre-antibiotic era, ice samples derived from Dome Fuji Station, Eastern Antarctica, were examined.

Methods: DNA was extracted from firn or ice core samples ($n = 3$; 1200–1400 ybp, 1700–2100 ybp and 2200–2800 ybp, respectively) under sterile conditions. Whole-genome amplification and PCR analyses were utilised to detect ARGs.

Results: A 2764-bp gene cluster containing the type II dihydropteroate synthase gene *sul2* and the aminoglycoside phosphotransferase genes *strA* and *strB* was detected in the 1200–1400-year-old Antarctic ice core (DF-63.5). The *sul2-strA-strB* gene cluster is frequently associated with plasmid RSF1010 and transposon Tn5393; however, these elements were not detected in sample DF-63.5. The gene cluster exhibited a high level of sequence identity to sequences harboured in present-day bacteria, although there were sequence polymorphisms in the *strA* gene. Furthermore, expression of this gene cluster in *Escherichia coli* resulted in reduced susceptibility to dihydrostreptomycin and sulfamethoxazole.

Conclusion: The results of this study provide further evidence that certain ARGs existed in the pre-antibiotic era. Because the *sul2* gene confers resistance to the synthetic compound sulfamethoxazole, these findings suggest that ARGs against synthetic antimicrobials emerged in bacteria during the pre-antibiotic era.

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出典 doi.org/10.1016/j.jgar.2018.11.005

<https://reader.elsevier.com/reader/sd/pii/S2213716518302212?token=5839F4362320EF3E423272F5F689E268034CE4EE53FB3814E3CF399C730D3B7C48FD92B7C8F7E2CFDE9D9717203B31A7>

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Analysis host-recognition mechanism of staphylococcal kayvirus ϕ SA039 reveals a novel strategy that protects *Staphylococcus aureus* against infection by *Staphylococcus pseudintermedius* Siphoviridae phages

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Received: 1 May 2019 / Revised: 13 May 2019 / Accepted: 18 May 2019
Springer-Verlag GmbH Germany, part of Springer Nature 2019

Abstract

Following the emergence of antibiotic-resistant bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) and methicillin-resistant *Staphylococcus pseudintermedius* (MRSP), phage therapy has attracted significant attention as an alternative to antibiotic treatment. Bacteriophages belonging to kayvirus (previously known as Twort-like phages) have broad host range and are strictly lytic in *Staphylococcus* spp. Previous work revealed that kayvirus ϕ SA039 has a host-recognition mechanism distinct from those of other known kayviruses: most of kayviruses use the backbone of wall teichoic acid (WTA) as their receptor; by contrast, ϕ SA039 uses the β -N-acetylglucosamine (β -GlcNAc) residue in WTA. In this study, we found that ϕ SA039 could switch its receptor to be able to infect *S. aureus* lacking the β -GlcNAc residue by acquiring a spontaneous mutation in open reading frame (ORF) 100 and ORF102. Moreover, ϕ SA039 could infect *S. pseudintermedius*, which has a different WTA structure than *S. aureus*. By comparison, with newly isolated *S. pseudintermedius*-specific phage (SP phages), we determined that glycosylation in WTA of *S. pseudintermedius* is essential for adsorption of SP phages, but not ϕ SA039. Finally, we describe a novel strategy of *S. aureus* which protects the bacteria from infection of SP phages. Notably, glycosylation of ribitol phosphate (RboP) WTA by TarM or/and TarS prevents infection of *S. aureus* by SP phages. These findings could help to establish a new strategy for the treatment of *S. aureus* and *S. pseudintermedius* infection, as well as provide valuable insights into the biology of phage-host interactions.

出典 doi.org/10.1007/s00253-019-09940-7

<https://link.springer.com/content/pdf/10.1007%2Fs00253-019-09940-7.pdf>

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Contents lists available at ScienceDirect

International Journal of Antimicrobial Agents

journal homepage: www.elsevier.com/locate/ijantimicag



Letter to the Editor

Screening of hospital-manhole sewage using MacConkey agar with cefotaxime reveals extended-spectrum β -lactamase (ESBL)-producing *Escherichia coli*



to Clinical and Laboratory Standards Institute (CLSI) guidelines [3]. PCR was performed to detect ten different antimicrobial resistance genes (*bla*_{TEM}, *bla*_{SHV}, *bla*_{OXA}, *bla*_{CTX-M}, *tetA*, *tetB*, *tetC*, *tetD*, *tetE* and *tetG*) [4]. In addition, PCR-based phylogenetic typing for *Escherichia coli* was performed and the isolates were classified into seven phylogenetic groups/subgroups (A₀, A₁, B₁, B₂, B₂₃, D₁

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出典 doi.org/10.1016/j.ijantimicag.2019.08.004

<https://reader.elsevier.com/reader/sd/pii/S0924857919302158?token=8C655593EABF99CEF64012D122FADC7617E14703576A98A623A3718C334AC26DCAF32212B875A9E7B2D41CC4F668BBC6>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) **Ohtsuka, H.**, Hirose, H., Murakami K., Murata R., Kato T., Tajima, M. 2019. Relationship between mRNA of immune factors expressed by milk somatic cells and bacteria present in lactating healthy Holstein cows. *J. Vet. Res.* 63, 369-373. doi: 10.2478/jvetres-2019-0042.
- 2) **Ohtsuka, H.**, Nakazono, M., Hondoh, T., Higuchi, H., Tajima, M. and Koiwa, M. 2020. Cytokine levels of peripheral blood mononuclear cells in the clinical cases of Holstein calves infected with *Mycoplasma bovis*. *J. Vet. Med. Sci.* (accepted) doi: 10.1292/jvms.19-0161

II. その他<Others>

- 1) Tanabe, T., Fukuzawa, H., Amatatsu, Y., Matsui, K., **Ohtsuka, H.**, Maeda, Y., Sata, H. 2019. Identification of an antilymphocyte transformation substance from *Pasteurella multocida*. *Microbiol. Immunol.* 63, 261-268. doi: 10.1111/1348-0421.12720.
- 2) Aung, M., **Ohtsuka, H.**, Izumi, K. 2019. Effect of yeast cell wall supplementation on production performances and blood biochemical indices of dairy cows in two lactation periods. *Vet. World.* 12, 796-801. doi: 10.14202/vetworld.2019.796-801.
- 3) Nishi, K., Gondaira, S., Okamoto, M., Nebu, T., Koiwa, M., **Ohtsuka, H.**, Murai, K., Matsuda, K., Fujiki, J., Iwano, H., Nagahata, H., Higuchi, H. 2019. Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells. *Vet. Immunol. Immunopathol.* 216:109920. doi: 10.1016/j.vetimm.2019.109920.

Relationship between mRNA of immune factors expressed by milk somatic cells and bacteria present in healthy lactating Holstein cows

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Received: January 9, 2019

Accepted: July 2, 2019

Abstract

Introduction: The characteristics of immune factors in somatic cells from lactating dairy cows and their association with commensal bacteria in normal milk have not been clarified. This study investigated the relationship between the pathogenic bacteria in milk and somatic cell immune factors in healthy lactating cows. **Material and Methods:** In total 44 healthy Holstein cows were studied on one farm. Milk samples were collected aseptically using a cannula and these samples were cultured for detection of bacteria and analysis of mRNA of immune factors expressed by somatic cells. Cows were divided into two groups based on the microbial status of their milk samples: 12 cows showed bacteria in cultures (positive group), and the other 32 cows did not (negative group). **Results:** The mRNA levels of IL-6, lactotransferrin, and cathelicidin expressed by somatic cells after milking decreased significantly compared to those before milking in both groups ($P < 0.05$). There were significantly lower mRNA levels of IL-6 and cathelicidin in the positive group compared to those in the negative group before milking. **Conclusion:** These results suggest that mRNA levels of IL-6 and cathelicidin expressed by the somatic cells may be affected by the presence of bacteria in healthy lactating dairy cows.

Keywords: cows, milk, bacteria, immune factor, somatic cells.

出典 doi: 10.2478/jvetres-2019-0042.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6749727/pdf/jvetres-63-369.pdf>

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NOTE

Internal Medicine

Cytokine levels of peripheral blood mononuclear cells in the clinical cases of Holstein calves infected with *Mycoplasma bovis*

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J. Vet. Med. Sci.
82(1): **–**, 2020
doi: 10.1292/jvms.19-0161

Received: 9 August 2019
Accepted: 29 October 2019
Advanced Epub:
8 November 2019

ABSTRACT. The immune related factors of peripheral blood mononuclear cells (PBMC) were analyzed in the clinical cases with *Mycoplasma (M.) bovis* infection. Seventy-eight Holstein calves in one farm were used. These calves were divided into three groups; the calves with *M. bovis* infection of poor outcome after treatment (Non-Recovery Group), the calves with *M. bovis* infection recovered (Recovery Group) and clinically healthy calves (Control Group). Blood samples were collected at days of the first medical treatment and the final treatment or euthanasia. IL-17A levels in the Non-Recovery Group were higher than those in the Recovery Group on both days. Our result suggested that the IL-17A of PBMC is an important factor to affect outcome of the calves with *M. bovis* infection.


KEY WORDS: calf, clinical case, immune factor, *Mycoplasma bovis*, peripheral blood mononuclear cell

出典 doi: 10.1292/jvms.19-0161

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_19-0161/_pdf/-char/en

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Identification of an antilymphocyte transformation substance from *Pasteurella multocida*

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Abstract

Pasteurella multocida is one of the most important bacteria responsible for diseases of animals. Crude extracts from sonicated *P. multocida* strain Dainai-1, which is serotype A isolated from bovine pneumonia, were found to inhibit proliferation of mouse spleen cells stimulated with Con A. The crude extract was purified by cation and anion exchange chromatography and hydroxyapatite chromatography. Its molecular weight was 27 kDa by SDS-PAGE and it was named PM27. PM27 was found to inhibit proliferation of mouse spleen cells stimulated with Con A as effectively as did the crude extract; however, its activity was lost after heating to 100°C for 20 min. PM27 did not directly inhibit proliferation of HT-2 cells, which are an IL-2-dependent T cell line, nor did it modify IL-2 production by Con A-stimulated mouse spleen cells. The N-terminal amino acid sequence of PM27 was determined and BLAST analysis revealed its identity to uridine phosphorylase (UPase) from *P. multocida*. UPase gene from *P. multocida* Dainai-1 was cloned into expression vector pQE-60 in *Escherichia coli* XL-1 Blue. Recombinant UPase (rUPase) tagged with His at the C-terminal amino acid was purified with Ni affinity chromatography. rUPase was found to inhibit proliferation of mouse spleen cells stimulated with Con A; however, as was true for PM27, its activity was lost after heating to 100°C for 20 min. Thus, PM27/UPase purified from *P. multocida* has significant antiproliferative activity against Con A-stimulated mouse spleen cells and may be a virulence factor.

KEYWORDS

bovine respiratory disease, *Pasteurella*, pathogenicity factor, uridine phosphorylase

出典 doi: 10.1111/1348-0421.12720.

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/1348-0421.12720>

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Effect of yeast cell wall supplementation on production performances and blood biochemical indices of dairy cows in different lactation periods

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Received: 06-02-2019, **Accepted:** 23-04-2019, **Published online:** 13-06-2019

doi: 10.14202/vetworld.2019.796-801 **How to cite this article:** Aung M, Ohtsuka H, Izumi K (2019) Effect of yeast cell wall supplementation on production performances and blood biochemical indices of dairy cows in different lactation periods, *Veterinary World*, 12(6): 796-801.

Abstract

Aim: This experiment was conducted to determine the effect of yeast cell wall (YCW) supplementation on production performances and blood biochemical indices such as liver enzyme activities, energy metabolites, and electrolyte concentrations of dairy cows in different lactation periods (LP).

Materials and Methods: Thirty-two lactating Holstein cows were assigned into 2×2 factorial arrangement, in which the factors were the treatment (TM) (control [n=16] vs. YCW [n=16]) and the LP (early lactation [n=14] vs. mid-lactation [n=18]). The cows with day in milk (DIM) <120 (81±7 DIM) were defined as early lactating cows, whereas the cows with DIM >120 (179±5 DIM) were assumed as mid-lactating cows. The YCW (SafMannan; Phileo, Lesaffre Animal Care, France) was used as the dietary supplement (10 g/cow/day) in this experiment. The statistical analysis of the data was performed by the two-way analysis of variance using the general linear model procedure to determine the main effects (TM and LP) and their interaction (TM×LP) on production performances and blood biochemical parameters of experimental cows.

Results: No significant effects ($p>0.05$) of YCW supplementation on production performances and blood biochemical indices of cows in TM groups (control vs. YCW) were observed; however, some obvious effects were detected in LP (early- and mid-lactation). Milk and milk component yield of cows in early lactation were significantly higher ($p<0.05$) than in mid-lactation, whereas somatic cell count and milk urea nitrogen were not different ($p>0.05$) with the YCW supplementation. The higher level ($p<0.05$) of serum albumin was found in mid-lactating cows after YCW supplementation. Before the experiment, the higher ($p<0.05$) non-esterified fatty acid (NEFA) and NEFA/total cholesterol (T-Cho) ratio, and the lower ($p<0.05$) calcium (Ca) concentration were observed in early lactating cows comparison with mid-lactating cows; however, there were not different after YCW supplementation.

Conclusion: The positive effects of YCW supplementation on milk and milk component yields, energy metabolite, especially NEFA and NEFA/T-Cho ratio and Ca concentration were observed in early lactating cows rather than mid-lactating cows.

Keywords: dairy cows, electrolyte indices, energy metabolites, liver enzyme activity, milk yield, yeast cell wall.

出典 doi: 10.14202/vetworld.2019.796-801.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6661497/pdf/Vetworld-12-796.pdf>

最終責任者 Kenichi Izumi (Corresponding Author)



Contents lists available at ScienceDirect

Veterinary Immunology and Immunopathology

journal homepage: www.elsevier.com/locate/vetimm



Research paper

Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells



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ARTICLE INFO

Keywords:

Mycoplasma bovis
Mycoplasma arthritis
Synovial cells
Inflammatory cytokines
Matrix metalloproteinases

ABSTRACT

Mycoplasma bovis causes chronic arthritis in calves. Mycoplasma arthritis shows severe inflammatory reactions in joints that is commonly treated with antibiotics and results in significant economic losses in the calf industry. A previous study showed that inflammatory cytokines and matrix metalloproteinases (MMPs) produced by synovial cells promote progression of the pathophysiology of bacterial arthritis. However, the mechanism underlying the pathogenesis of bovine Mycoplasma arthritis has not been fully clarified. In this study, we examined the immunologic response of bovine synovial tissue to *M. bovis*. We observed significant increases in expression of interleukin (IL)-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial tissue from Mycoplasma arthritis calves compared with tissues from normal calves. Expression of IL-6, IL-8, and MMP-1 mRNA was also induced in cultured synovial cells stimulated with *M. bovis*, but not expression of IL-1 β and MMP-3 mRNA. In contrast, the culture supernatant of peripheral blood mononuclear cells stimulated with *M. bovis* induced marked increases in the expression of IL-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial cells. Our results indicate that inflammatory cytokines and MMPs produced by synovial cells play a key role in the pathogenesis of Mycoplasma arthritis. We suggest that interactions between synovial cells and mononuclear cells in the presence of *M. bovis* induce expression of these cytokines and MMPs in synovial cells, resulting in severe inflammatory reactions in the joints.

出典 doi: 10.1016/j.vetimm.2019.109920.

<https://www.sciencedirect.com/science/article/pii/S0165242719300777>

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- 1) Distribution of regulatory T cells in inflammatory colorectal polyps of miniature dachshunds.

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Vet. Immunol. Immunopathol. in press, 2019.

doi: 10.1016/j.vetimm.2019.109938.



Contents lists available at ScienceDirect

Veterinary Immunology and Immunopathology

journal homepage: www.elsevier.com/locate/vetimm

Distribution of regulatory T cells in inflammatory colorectal polyps of miniature dachshunds



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ARTICLE INFO

Keywords:

Inflammatory colorectal polyp
Miniature dachshund
Regulatory T cells
Anti-inflammatory cytokine

ABSTRACT

Inflammatory colorectal polyp (ICRP) is an emerging disease in Miniature Dachshunds (MDs). Animals with this disease exhibit multiple polyps with severe neutrophil infiltration that respond to immunosuppressive therapy. Macrophages in polypoid lesions have been described to play an important role in neutrophil infiltration in the lesion by producing IL-8. In contrast, IL-10, an anti-inflammatory cytokine, was also reported to be upregulated in polypoid lesions, but its significance in the pathogenesis of ICRP has not been clarified. Regulatory T cells (Tregs) are the main source of IL-10 production and contribute to the maintenance of intestinal homeostasis. Therefore, the objective of this research was to compare the distribution of Tregs in polypoid lesions of ICRPs and the association between the distribution and expression of pro- or anti-inflammatory cytokines. Tissue biopsy specimens of polypoid lesions were collected from 28 MDs with ICRP. Those of macroscopically non-polypoid colonic mucosa from 24 MDs with ICRPs and 21 control dogs were further included as controls. Real-time quantitative polymerase chain reaction was used to quantify gene expression of *IL-1β*, *IL-4*, *IL-6*, *IL-8*, *IL-10*, *IL-17*, *IL-22*, *IFN-γ*, *TNF-α*, *TGF-β*, and *forkhead box protein P3 (Foxp3)* in each tissue sample. The numbers of Foxp3-positive cells (Tregs) and ionized calcium binding adapter molecule 1 (Iba-1)-positive cells (macrophages) were determined by immunohistochemistry. The gene expression of *IL-1β*, *IL-6*, *IL-8*, *TNF-α*, *IFN-γ*, *IL-17*, *IL-10*, *TGF-β*, and *Foxp3* was significantly upregulated in polypoid lesions relative to control levels. The numbers of Foxp3-positive Tregs and Iba-1-positive macrophages were significantly increased in polypoid lesions compared to those in the non-polypoid colonic mucosa of MDs with ICRPs and control dogs. The upregulation of *IL-10* was moderately correlated with the distribution of Tregs in polypoid lesions from MDs with ICRPs. In addition, the relative upregulation of *IL-1β*, *IL-6*, and *IL-8* in polypoid lesions, compared to expression in non-polypoid colonic mucosa of MDs with ICRPs, was significantly greater than that of *IL-10*. These results indicate that increases in Treg numbers and anti-inflammatory cytokines in polypoid lesions comprise reactive changes in response to the inflammation, which warrants further investigation.

出典 doi:10.1016/j.vetimm.2019.109938

<https://doi.org/10.1016/j.vetimm.2019.109938>

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- 1) Atmospheric dust as a possible survival factor for bioaerosols.

Noda J., Tomizawa S, Hoshino B, Munkhjargal E, Kawai K, and Kai K.

E3S Web of Conferences, 99, 04007, 2019. doi: 10.1051/e3sconf/20199904007.

- 2) Aerosol from biomass combustion in northern Europe: influence of meteorological conditions and air mass history.

Noda J., Bergström R, Kong X, Gustafsson T.L, Kovacevik B, Svane M, and Pettersson J.B.C.

Atmosphere, 10, 789, 2019. doi: 10.3390/atmos10120789..

II. その他<Others>

- 1) Ceilometer observation of a dust event in the Gobi desert on 29–30 April 2015: sudden arrival of a developed dust storm and trapping of dust within an inversion layer.

Kawai, K., Nishio, Y., Kai, K., **Noda, J.**, Munkhjargal, E., Shinoda, M., Sugimoto, N., Shimizu, A., Davaanyam, E., and Batdorj, E.

SOLA, vol 15. 52-56, 2019. doi: 10.2151/sola.2019-011.

- 2) Comparison of green turtle *Chelonia mydas* sex ratios at two time-points over 20 years at a foraging ground in Yaeyama Islands, Ryukyu Archipelago, Japan.

Kameda K, Suzuki K, Kuroyanagi K, Takase M, Matsuda K, and **Noda J.** *Endangered Species Research*, 38, 127-134, 2019. doi: 10.3354/ESR00944.

- 3) Northeast Asian dust transport: a case study of a dust storm event from 28 March to 2 April 2012.

Tsedendamba P, Dulam J, Baba K, Hagiwara K, **Noda J**, Kawai K, Sumiya G, McCarthy C, Kai K, and Hoshino B.

Atmosphere, 10(2):69, 2019. doi: 10.3390/atmos10020069.

- 4) Large-scale dust event in East Asia, as revealed by the Himawari-8 DUST RGB, lidar network observations, and field survey.

Kai K, Minamoto Y, Nakamura K, Wang M, Kawai K, Ohara K, **Noda J**, Maki T, Davaanyam, E, and Sugimoto N.

E3S Web of Conferences, 99, 01004, 2019. doi: 10.1051/e3sconf/20199901004.

- 5) Evaluation of probiotic therapy for calf diarrhea with serum diamine oxidase activity as an indicator.

Fukuda T, Otsuka M, Nishi K, Nishi Y, Tsukano K, **Noda J**, Higuchi H, and Suzuki K.

Japanese Journal of Veterinary Research 67(4), 305-311, 2019. doi: 10.14943/jjvr.67.4.305.

- 6) Vertical distributions of airborne microorganisms over Asian dust source region of Taklimakan and Gobi Desert.

Maki T, Bin C, Kai K, Kawai K, Fujita K, Ohara K, Kobayashi F, Davaanyan E, **Noda J**, Minamoto Y, Shi G, Hasegawa H, and Iwasaka Y.

Atmospheric Environment, 214, 2019, 116848. doi: 10.1016/j.atmosenv.2019.116848.

Atmospheric dust as a possible survival factor for bioaerosols

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Abstract. In this study, we present some of the laboratory measurements of the viability of bioaerosols together with different environmental dust to understand the interaction among those components. Model airborne bacteria, DH5 α *Escherichia coli*, was used to assess the dust affecting a viability reduction rate of the DH5 α bacteria in a Teflon reaction chamber. The viability reduction rate of the DH5 α model airborne bacteria was measured with a culture method. The DH5 α bacteria were nebulized into the chamber and airborne dust materials 1) Phosphate Buffer Solution (PBS) as a control, 2) desert sand from Mongolia and 3) sludge dust from the coastal area of Japan. The result indicated that the co-existence of DH5 α with desert dust from Mongolia significantly decreased the viability and with the sludge dust from Japan significantly increased the viability of the airborne DH5 α compare to the control PBS dust ($p < 0.05$). Furthermore, soot as a model air pollutant was generated by a candle and mixed with a model airborne bacteria *Mycobacterium smegmatis*. The results indicated that the different types of airborne environmental dust influenced the viability of airborne bacteria with the DH5 α experiments. Furthermore, the presence of soot indicated a possible protective effect of increasing the survival rate of *Mycobacterium smegmatis*.

1 Introduction

Desert regions continue to discharge a large amount of, and they circulate around the globe [1]. These desert dust bring the important minerals to a distant area and supply essential elements as nutrients for various trophic levels. In other cases, the dust from the Saharan desert was suspected to act as the carrier for biological components such as fungus across the Atlantic Sea to the Caribbean sea to cause coral leaf damage [2]. Furthermore, Iwasaka et al.[3] reported the presence of nucleic acid on the surface of the dust in China, indicated an abundance of some biological components as a part of the dust from the desert atmosphere. The aerosols with biological components as bioaerosols can be transported a long distance which may reach downwind and/or surrounding regions to cause possible health effects to human and livestock.

For example in human, the number of patients with tuberculosis has been decreasing; however, the number of patients diagnosed with Non-tuberculous mycobacteriosis (NTM) tend to be increasing mainly in middle-aged women in Japan. There are also some regional differences with a type of bacteria, which may be caused by the environmental factor associated with atmospheric dust and pollutants. Since the NTM cases are almost always found in the respiratory system, an infection via airborne pathway is the most plausible one to spread among the human population and possibly livestock animals. Also, in the highly polluted industrial region, the number of patients infected by

Mycobacterium kansasii tends to be higher [4, 5]. Although the detailed mechanisms are not fully understood yet, environmental dust including pollutants may play an important role to determine the survival of bioaerosols. In this study, we try to understand how the co-existence of different dust or pollutants may act the survival of bioaerosols in laboratory studies.

2 Material and Method

2.1 Chamber system

For the examination of the survival of bacterial bioaerosols, two chamber systems were employed. Figure 1 indicates a 128 L Teflon chamber system, which has an internal separator to divide two equal size compartments for the preparation of two different aerosolized materials before mixing them together.






Figure 1. The Teflon chamber system with 128L (64 L \times 2 compartments).

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Article

Aerosol from Biomass Combustion in Northern Europe: Influence of Meteorological Conditions and Air Mass History

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Received: 11 November 2019; Accepted: 3 December 2019; Published: 6 December 2019



Abstract: Alkali-containing submicron particles were measured continuously during three months, including late winter and spring seasons in Gothenburg, Sweden. The overall aims were to characterize the ambient concentrations of combustion-related aerosol particles and to address the importance of local emissions and long-range transport for atmospheric concentrations in the urban background environment. K and Na concentrations in the particulate matter PM₁ size range were measured by an Alkali aerosol mass spectrometer (Alkali-AMS) and a cluster analysis was conducted. Local meteorological conditions and trace gas and PM concentrations were also obtained for a nearby location. In addition, back trajectory analyses and chemical transport model (CTM) simulations were included for the evaluation. The Alkali-AMS cluster analysis indicated three major clusters: (1) biomass burning origin, (2) mixture of other combustion sources, and (3) marine origin. Low temperatures and low wind speed conditions correlated with high concentrations of K-containing particles, mainly owing to local and regional emissions from residential biomass combustion; transport of air masses from continental Europe also contribute to Cluster 1. The CTM results indicate that open biomass burning in the eastern parts of Europe may have contributed substantially to high PM_{2.5} concentrations (and to Cluster 1) during an episode in late March. According to the CTM results, the mixed cluster (2) is likely to include particles emitted from different source types and no single geographical source region seems to dominate for this cluster. The back trajectory analysis and meteorological conditions indicated that the marine origin cluster was correlated with westerly winds and high wind speed; this cluster had high concentrations of Na-containing particles, as expected for sea salt particles.

Keywords: biomass burning; residential wood combustion; aerosol mass spectrometry; potassium; chemical transport model

Ceilmeter Observation of a Dust Event in the Gobi Desert on 29–30 April 2015: Sudden Arrival of a Developed Dust Storm and Trapping of Dust Within an Inversion Layer

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Abstract

Asian dust is transported over a long range via the mid-latitude westerlies when dust is lifted to the free troposphere over the source regions, whereas dust remaining in the atmospheric boundary layer is not transported far. In the Gobi Desert, a major source region of Asian dust, a ceilometer (compact lidar) monitors the vertical distribution of dust at Dalanzadgad, Mongolia. On 29–30 April 2015, the ceilometer observed a developed dust storm over the ground, followed by a dust layer within a height of 1.2–1.8 km. The dust storm had already developed in the upwind region before reaching Dalanzadgad. This feature was also shown in the ceilometer observation data. The dust layer remained at almost the same height for 12 h, because the dust became trapped within an inversion layer at a height of 1.2–1.5 km over cold air. This result suggests that the inversion layer prevented the dust from reaching the free troposphere, thereby restraining the long-range transport of the dust via the westerlies. This is the first paper that reports this type of vertical distribution of dust in the source region based on observation data.

(Citation: Kawai, K., Y. Nishio, K. Kai, J. Noda, E. Munkhjargal, M. Shinoda, N. Sugimoto, A. Shimizu, E. Davaanyam, and D. Batdorj, 2019: Ceilometer observation of a dust event in the Gobi Desert on 29–30 April 2015: Sudden arrival of a developed dust storm and trapping of dust within an inversion layer. *SOLA*, 15, 52–56, doi:10.2151/sola.2019-011.)

1. Introduction

Asian dust, a type of mineral aerosol, has impacts on climate (Huang et al. 2014) and human health (Higashi et al. 2014). Asian dust is blown from the ground surface into the atmospheric boundary layer (ABL) in arid and semi-arid regions of East Asia, such as the Gobi Desert, Taklimakan Desert, and Loess Plateau (Sun et al. 2001; Kurosaki and Mikami 2005; Wu et al. 2016). If dust is lifted to the free troposphere (FT), it is transported over a long range toward the North Pacific via the mid-latitude westerlies (Kai et al. 1988; Husar et al. 2001; Uno et al. 2009; Yumimoto et al. 2009). Conversely, dust that remains within the ABL is not transported far (Hara et al. 2009). Thus, the long-range transport of dust is strongly related to its vertical distribution in the source region.

The vertical distribution of dust is most effectively observed using lidar (light detection and ranging), which is an active

remote-sensing instrument that uses pulsed laser beams with high spatiotemporal resolutions. As an international collaborative research between Japan and Mongolia, we installed a ceilometer (i.e., compact lidar) in the Gobi Desert (Dalanzadgad, Mongolia) at the end of April 2013. The resulting ceilometer observation data were used to analyze dust events in May 2013 (Kawai et al. 2015; Kawai et al. 2018) and May 2017 (Minamoto et al. 2018).

In the Gobi Desert, most dust events are caused by low pressures or cold fronts (Shao and Wang 2003; Takemi and Seino 2005). For instance, in our previous studies (Kawai et al. 2015; Kawai et al. 2018), we showed that a cold frontal system transported dust from the ground surface through the ABL to the FT over the Gobi Desert. However, information on the vertical distribution of dust in the source region is still lacking. Therefore, additional dust events should be analyzed using observation data, and the findings should be synthesized with existing knowledge.

On 29–30 April 2015, the ceilometer observed a dust storm over the ground, followed by a dust layer floating within a height of 1.2–1.8 km for 12 h. The dust did not appear to reach the FT. In this paper, we describe the characteristics of the dust storm and the floating dust layer to determine the atmospheric condition that prevented the dust from reaching the FT. This paper presents the first description of this type of vertical distribution of dust in the source region based on observation data.

2. Observations and data

A ceilometer observation has been conducted at Dalanzadgad, Mongolia, located in the central part of the Gobi Desert (43.58°N, 104.42°E, 1470 m a.s.l.; Fig. 1). The ceilometer (CL51; Vaisala, Vantaa, Finland) uses a diode laser at a wavelength of 910 nm. A profile of attenuated backscatter coefficients below a height of 15.4 km with a height resolution of 10 m is outputted to a laptop computer every 6 s. In this study, we used the 1-min-averaged profiles. The observational capability of the ceilometer for dust was confirmed by Jin et al. (2015).

PM₁₀ and PM_{2.5} mass concentrations are measured at a height of 4 m at Dalanzadgad (Jugder et al. 2014). We used these concentrations averaged over 1 h. We measured the size-resolved number concentrations of aerosol particles with an optical particle counter (OPC; AeroTrak 9306-V2; TSI, Shoreview, MN, USA) with six channels (0.3, 0.5, 1, 3, 5, and 10 μm) at Dalanzadgad.

To determine the weather conditions, we used SYNOP data, including temperature, dew point temperature, wind speed and direction, and present weather (WMO 2011). The present weather codes were used to identify dust phenomena (06: floating dust; 07, 08: blowing dust; 09, 30–35, 98: dust storm). We also analyzed

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出典 doi: 10.2151/sola.2019-011

https://www.jstage.jst.go.jp/article/sola/15/0/15_2019-011/_article

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Comparison of green turtle *Chelonia mydas* sex ratios at two time-points over 20 years at a foraging ground in Yaeyama Islands, Ryukyu Archipelago, Japan

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ABSTRACT: Sex ratio is an important factor in population dynamics as it influences the production of offspring; understanding the sex ratio of a given population is vital for the conservation of endangered species. In sea turtles, the sex of hatchlings is temperature dependent, with warmer incubation temperatures producing more female hatchlings. The rise in temperatures due to global warming may skew the sex ratios towards females. We studied the sex ratio of immature green turtles at a foraging ground in the Yaeyama Islands from 1997–1999 and from 2016–2017, using laparoscopy. The overall proportion of females was 68.2% (N = 314), and proportions were not significantly different between 1997–1999 (69.9%; N = 183) and 2016–2017 (65.6%; N = 131). Thus, sex ratios have not changed at this site over the last 20 years, suggesting minor or no effect of global warming/environmental influences on this population. The small size class (<55 cm straight carapace length [SCL]) was more female biased than the large size class (≥55 cm SCL) during both periods, which suggests the possibility of movement into or out of the foraging aggregation. Therefore, future research must clarify how the initial recruitment into the foraging aggregations, and the subsequent migrations affect sex ratios.

KEY WORDS: Green turtle · Sex ratio · Migration · Recruitment · Global warming

1. INTRODUCTION

The sex determination of sea turtles is temperature dependent. Previous studies have proposed 29–30°C as the pivotal temperatures for sex determination in sea turtles, within a general range of 27 to 31°C (review by Wibbels 2003). Exposure of embryos to higher temperatures within this range results in a higher ratio of female offspring, while exposure to lower temperatures within the range results in a higher ratio of males. An extreme bias towards one sex, e.g. complete feminization, could be a major

threat to the survival of species with temperature-dependent sex determination (Jensen et al. 2018). For example, one reason for the decline in the leatherback turtle population in Teregganu, Malaysia, was considered to be hatchery practices which led to high female hatchling production and reduced hatch success rates (Chan & Liew 1996). Furthermore, population structure, mortality rate, and sex ratio are fundamental demographic parameters. Sex ratios provide information about the reproductive potential of a population (Tarsi & Tuff 2012) and thus represent an important basis for estimating the size and pro-

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Publisher: Inter-Research · www.int-res.com

Article

Northeast Asian Dust Transport: A Case Study of a Dust Storm Event from 28 March to 2 April 2012

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Received: 14 January 2019; Accepted: 2 February 2019; Published: 6 February 2019



Abstract: The distribution and transport of windblown dust that occurred in Northeast Asia from 28 March to 2 April 2012 was investigated. Data of particulate matter less than 10 micrometers (PM₁₀) near the surface and light detection and ranging (LIDAR) measurements from the ground up to 18 km were used in the study. A severe dust event originated over southern Mongolia and northern China on 28 March 2012, and the widespread dust moved from the source area southeastward toward Japan over several days. Windblown dust reached Japan after two days from the originating area. LIDAR measurements of the vertical distribution of the dust were one to two km thick in the lower layer of the atmosphere, and increased with the increasing distance from the source area.

Keywords: LIDAR; dust storm; PM₁₀; Northeast Asia; Gobi desert

1. Introduction

Dust storms are a common phenomenon in the desert regions of Northeast Asia, especially in the Gobi desert in southern Mongolia, northern China, and Taklamakan desert in northwest China [1–8]. Eastward and southeastward moving cyclones and the northwesterly wind often transport large amounts of fine dust particles to the eastern parts of China, the Korean Peninsula, and Japan [8]. Frequent Asian Dust vents in Japan during 2000–2002 followed severe dust outbreaks in East Asia [7].

Dust concentrations of PM₁₀ increase by at least double during severe dust events in comparison with normal atmospheric conditions [9,10]. PM₁₀ dust particles are the primary source of the yellow dust phenomenon that spreads across Northeast Asia [11]. Research has shown that Asian dust often reaches Korea [12–15], Taiwan [16–18], and Japan [7,8].

The transport of desert dust from Asia to the North Pacific atmosphere has been well documented [19–25]. The peak frequencies of dust storms occur from March to June and September [1]. Dust storms are classified as a type of natural disaster, which can affect ecosystems, human life,

Large-scale dust event in East Asia, as revealed by the Himawari-8 DUST RGB, lidar network observations, and field survey

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Abstract. A large-scale dust event occurred in East Asia during early May 2017, and transported dust was measured all over Japan. We performed an analysis of the entire dust event using multiple sources: a local ceilometer measurement, measurements from an optical particle counter in the Gobi Desert (Dalanzzadgad, Mongolia), a study of Dust RGB imagery obtained from Himawari-8, lidar measurements from Japan, and meteorological data. Our results show that three extratropical low pressure systems occurred consecutively in Mongolia and generated dust storms in the Gobi Desert. Remarkably, the Dust RGB imagery shows both the occurrence and the transportation of the dust, and was able to detect two dust outbreaks in the Horqin Sandy Land of Northern China and their transportation to eastern Japan; this shows that the Horqin Sandy Land was one of the source regions of this dust event.

1 Introduction

Dust events that mainly occur in arid and semiarid areas in East Asia during spring, and are subsequently transported to eastern China, and Japan are generally called "Asian dust" [1-3]. The main arid and semiarid regions in East Asia are shown in Fig. 1. Among them, the Gobi Desert, the Taklimakan Desert, and the Loess Plateau have been focused on and studied as the main source regions of Asian dust in recent years [4-6]. In addition, the Horqin Sandy Land, which is located between the Inner Mongolia Plateau and the Northeast China Plain, has suffered rapid desertification due to human activity, and the arid areas (considered to be the source regions of dust events) have expanded during recent decades [7-9].

The dust outbreak frequency in the Gobi Desert was high before 2006, but slowed after 2008 [10]. The number of days in which dust events were detected in Japan also decreased significantly after 2011, when compared with the number detected in the years before 2010 [11]. Nevertheless, 46 of 59 dust observation stations in Japan reported the presence of transported dust on 7 May 2017. This was the largest dust event that occurred in Japan since the event on 21 May 2010.

Furthermore, it was the only dust transport event in recent years that affected all of the Japanese islands.

Coincidentally and fortunately, the dust event took place during our field work to measure the dust outbreak in Dalanzadgad, Mongolia [12], which is located in the Gobi Desert (Fig. 1). This allowed us to do an overall analysis of the event, from the beginning of the dust outbreak in the Gobi Desert and its surrounding areas to the end of the transportation of the dust in Japan. Our work contains a ceilometer observation in Dalanzadgad.

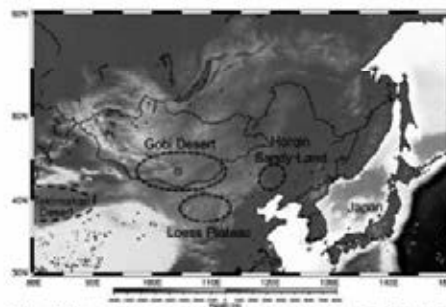


Fig. 1. Map of the main arid and semiarid regions in East Asia. The red circle represents the location of Dalanzadgad [12].

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Evaluation of probiotic therapy for calf diarrhea with serum diamine oxidase activity as an indicator

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Received for publication, April 23, 2019; accepted, July 21, 2019

Abstract

The objectives of study were to examine whether probiotic therapy is alternative to antibiotic therapy in diarrheic calves, and to examine whether the serum diamine oxidase (DAO) activity in calves are related to diarrhea. Twenty-two diarrheic Japanese black calves were received probiotics (n=11) or antibiotics (n=11) therapy for up to 8 days from the initial examination, respectively. There was no significant difference between treatments in the variations of fecal score and serum biochemical value. Serum DAO activity increased significantly in only probiotic treatment, from 64.4 ± 7.2 on day 1 to 76.3 ± 5.1 IU/ml on day 8. Our results suggested that probiotics therapy could be alternative to antibiotic therapy, and could be affecting serum DAO activity in diarrheic calves.

Key Words: calf, diamine oxidase, probiotics

Calf diarrhea remains the most common cause of death in beef and dairy calves, and continues to be a major cause of economic loss for the cattle industry. The long-term utilization of broad-spectrum antibiotic therapy is employed as a strategy to control this disease. Constable⁶⁾ noted that use of antibiotics is justified even in nonbacterial diarrhea as the possibility of overgrowth of *Escherichia coli* in the small intestine may occur. Walker et al.²¹⁾ also reported antibiotic therapy is commonly recommended regardless of the aetiological agent. However, if the cause of diarrhea is not bacteria, the antibiotic

is not sensitive. Furthermore, because of concerns that antibiotic use in food animal production has the potential to increase antibiotic resistance in human pathogens, it has been demanded strategies to reduce antibiotic use are needed. In this way, the efficacy of antibiotic agents in treating calf diarrhea is controversial.

This situation is has prompted increasing interest in the development of veterinary probiotics⁸⁾. Rolf¹⁶⁾ suggested that there are many potential advantages to probiotics over conventional therapy, including relatively low cost, the fact that probiotics are unlikely to

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doi: 10.14943/jjvr.67.4.305

出典 doi: 10.14943/jjvr.67.4.305

<https://eprints.lib.hokudai.ac.jp/dspace/handle/2115/76208>

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Contents lists available at ScienceDirect

Atmospheric Environment

journal homepage: www.elsevier.com/locate/atmosenv

Vertical distributions of airborne microorganisms over Asian dust source region of Taklimakan and Gobi Desert

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ARTICLE INFO

Keywords:

Airborne bacteria
Airborne fungi
Asian dust
Bioaerosol
Dust source region
High altitude

ABSTRACT

Airborne microorganisms transported by dust events from Asian Deserts influence climate changes, ecosystem dynamics and human health in the westerly-wind blowing areas of East Asia. However, the vertical transport of airborne microorganisms was not understood in detail. We collected aerosols at high altitudes (800 m and 500 m) and ground levels (5 m and 10 m) at Asian dust-source area, such as the Taklimakan and Gobi Deserts, for analyzing compositions and abundances of the airborne microorganisms that are distributed vertically over desert area. Assessment of the dust particles using an optical particle counter and microscopic observation counts demonstrated that the mineral and microbial particles remained suspended at altitudes of over 300 m and decreased to half to one-tenth of concentrations compared to those at the ground level. High-throughput sequencing of 16S rRNA genes (bacterial taxonomic marker) revealed that the airborne bacterial communities were mixed vertically at the altitudes of some hundreds of meters over both the sites and were predominantly composed of the phyla Actinobacteria, Firmicutes, Bacteroidetes, and Proteobacteria. In contrast, using sequencing analysis of internally transcribed spacer regions (fungal taxonomic markers), the fungal community structures over both the sites were different at high altitudes and ground levels. Sequences belonging to the phylum Ascomycota increased at high altitudes and comprised those of a commonly detected mold that includes the genera *Cladosporium* and *Alternaria* and is thought to be resistant to atmospheric stressors. Our results indicate that airborne bacterial communities are easily mixed vertically over dust-source desert, while stressor-tolerant fungi of airborne Ascomycota remain at high altitudes of desert atmosphere.

1. Introduction

Mineral-dust particles blown up over the deserts of the Central Asian continent, including the Gobi and Taklimakan Deserts, disperse through atmosphere at high altitudes because of the westerly wind and cause Asian dust events over the East Asian area (Duce et al., 1980; Iwasaka et al., 1983). Airborne microorganisms associated with Asian dust events are known to suddenly change the microbial communities in the downwind atmosphere (Hara and Zhang, 2012; Smith et al., 2013; Maki et al., 2014, 2019; Tang et al., 2018), influencing human

health (Iwasaka et al., 2009; Ma et al., 2017) and are related to climatic changes by the formation of ice-cloud nuclei (Maki et al., 2018).

The bacterial and fungal cells associated with Asian-dust particles are reported to increase allergenic burden, consequently enhancing the incidence of asthma (Ichinose et al., 2005) due to fungal beta-glucan and bacterial polysaccharides (Rylander, 1998). Some fungal isolates obtained from Asian-dust particles at high altitude showed the increase of allergy levels of sole mineral particles (Liu et al., 2014). Furthermore, the dust-event dispersion of fungal populations is thought to cause human diseases (Kawasaki Disease; Rodó et al., 2011), death caused by

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<https://doi.org/10.1016/j.atmosenv.2019.116848>

Received 12 February 2019; Received in revised form 16 July 2019; Accepted 18 July 2019

Available online 26 July 2019

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出典 doi: 10.1016/j.atmosenv.2019.11684

<https://www.sciencedirect.com/science/article/pii/S1352231019304789>

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1) Role of neurotensin in the regulation of gastric motility in healthy conscious sheep.

Onaga T, Shimoda T, Ohishi T, Yasui Y, **Hayashi H.**

Small Ruminant Research 172: 31–41. 2019.

doi.org/10.1016/j.smallrumres.2019.01.012



Role of neurotensin in the regulation of gastric motility in healthy conscious sheep



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ARTICLE INFO

Keywords:

Neurotensin
Forestomach
Rumen
Contraction
Inhibition
Ileal-brake
Sheep

ABSTRACT

The goal of present study was to determine the effects of the intravenous (i.v.) administration of neurotensin (NT) on the ovine forestomach and abomasal motility in conscious sheep. NT injection at 0.3 nmol/kg slightly raised abomasal pressure, although the effect was not dose-dependent. A bolus i.v. injection of NT at 1 or 3 nmol/kg significantly inhibited the amplitude of cyclic ruminal contractions. NT injection did not alter omasal motility. Pre-injection of an NT receptor subtype-1 antagonist, SR 48692, at 60 nmol/kg immediately before NT injection did not block the inhibitory effect of NT. In an *in vitro* study using smooth muscle strips of the rumen dorsal sac, NT application at 0.3–10 μ mol/L did not inhibit the bethanechol (BCh, 10 μ mol/L)-induced tonic contractions of either the longitudinal and circular muscle strips, nor did NT inhibit the electrical field stimulation (EFS)-induced phasic contractions of the muscle strips. The results suggest that circulating NT selectively inhibits the amplitude of cyclic rumen contractions presumably by inhibiting the gastric center in the medulla oblongata and/or the vagus nerves, but not through its peripheral action. An elevation in the plasma concentration of NT appears able to exert the ileal brake-like effect on ruminal motility in sheep.

出典 doi.org/10.1016/j.smallrumres.2019.01.012

<https://www.sciencedirect.com/journal/small-ruminant-research/vol/172/suppl/C>

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- 1) Vision outcome with antiglaucoma therapy and prognostic factors in canine glaucoma: A 6-years retrospective study in Japan.
Kubo A, Ito Yosuke, Masuko A, **Maehara S**, Miyasho T, Nakade T.
Jpn. J. Vet. Res. 67: 93-102. doi: 10.14943/jjvr.67.1.93
- 2) Basal cell adenocarcinoma on bulbar conjunctiva of third eyelid in a dog.
Sano Y, Miyazaki M, Yaegashi R, Okamoto M, Masuko A, **Maehara S**, Matsuda K.
J. Vet. Med. Sci. 81: 30-34. doi: 10.1292/jvms.18-0369
- 3) Assessment of Meibomian gland morphology by noncontact infrared meibography in Shih Tzu with or without keratoconjunctivitis sicca.
Kitamura Y, **Maehara**, Nakade T, Miwa Y, Arita R, Iwashita H, Saito A.
Vet. Ophthalmol. 22: 744-750. doi: 10.1111/vop.12645

Vision outcome with antiglaucoma therapy and prognostic factors in canine glaucoma: A 6-years retrospective study in Japan

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Received for publication, June 6, 2018; accepted, September 17, 2018

Abstract

Vision outcome provides invaluable information in clinical decision making in the management of canine glaucoma. In the present study, data of glaucoma dogs were retrospectively evaluated for vision outcome by treatment modality (with or without surgical implantation of the Ahmed glaucoma valve, AGV) and by type of glaucoma, sex and breed in cases of medically treated glaucoma. Among 1990 dogs presented with eye diseases between 2011 and 2017, 224 dogs (11.3%) were diagnosed with glaucoma at initial presentation and 228 eyes of 207 dogs have follow-up records of at least 30 days were included in the analysis. At the time of first presentation, 62/228 eyes (27.2%) were visual. Visual preservation rates were constantly significantly higher in dogs that received AGV placement with a median time to vision loss of 76.4 weeks vs. 9.6 weeks in dogs that received medical treatment alone. Among dogs treated medically, vision outcome was comparable between two types of glaucoma (i.e., primary and secondary) and between sexes. Medically treated Shiba dogs showed significantly lower vision preservation rates and a shorter median time to vision loss compared to other breeds. These results suggest that AGV implants result in better vision outcome compared to medical therapy alone and should be considered in dogs that are visual at the time of presentation and suitable for surgery. And Shiba dogs are considered as the factor that indicate poor vision outcome of medical treatment alone in the present study.

Key Words: Antiglaucoma therapy, canine glaucoma, prognostic factors, vision outcome

出典 doi: 10.14943/jjvr.67.1.93

<http://hdl.handle.net/2115/72747>

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NOTE

Pathology

Basal cell adenocarcinoma on bulbar conjunctiva of third eyelid in a dog

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J. Vet. Med. Sci.
81(1): 30–34, 2019
doi: 10.1292/jvms.18-0369

Received: 30 June 2018
Accepted: 26 October 2018
Published online in J-STAGE:
6 November 2018

ABSTRACT. An 8-year-old castrated Toy poodle presented with swelling and proptosis of the right third eyelid caused by an exophytic mass on the bulbar surface. Histologically, the mass was composed of stratified neoplastic basaloid cells, arranged in nests and interconnecting islands, which were mixed with tubular structures. Immunohistochemically, the basaloid cells were positive for p63 and cytokeratin (CK) 14, and the inner epithelial cells of the tubular structures were positive for CK7, CK8, and CK19. According to these findings, the mass was diagnosed as a basal cell adenocarcinoma. Although basal cell adenocarcinoma is rare in animals, it should be included in the list of differential diagnoses for superficial tumors of bulbar conjunctiva of third eyelid in dogs.

KEY WORDS: basal cell adenocarcinoma, conjunctiva, dog, immunohistochemistry

出典 doi: 10.1292/jvms.18-0369

https://www.jstage.jst.go.jp/article/jvms/81/1/81_18-0369/_article

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Assessment of meibomian gland morphology by noncontact infrared meibography in Shih Tzu dogs with or without keratoconjunctivitis sicca

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Abstract

Objective: To investigate meibomian gland (MG) morphology by noncontact infrared meibography in Shih Tzu dogs with or without keratoconjunctivitis sicca (KCS).

Procedures: Fourteen eyes of 12 Shih Tzu dogs (mean age of 10.7 years, range of 7–13 years) presented to Yakumo Animal Hospital or Triangle Animal Eye Clinic from 2011 to 2017 with clinical signs and a Schirmer tear test (STT) result consistent with KCS (<10 mm/min) were examined. Twenty-eight eyes of 16 Shih Tzu dogs (mean age of 12.4 years, range of 8 to 15 years) with a STT > 15 mm/min served as healthy controls. Both groups of dogs underwent routine slitlamp biomicroscopy followed by noncontact infrared meibography of the upper eyelid with both desktop-type and mobile-type systems.

Results: Meibography revealed morphological abnormalities of MGs in 13 eyes of 11 dogs with KCS. The abnormalities included gland shortening in 64% and gland dropout in 64% of the 14 eyes in the KCS group. Morphological changes were also observed in MGs of 16 eyes of 10 dogs in the control group. These changes included shortening in 46% and dropout in 17.8% of the 28 eyes in the control group. Dropout was significantly more common in eyes with KCS than in control eyes ($P < 0.01$).

Conclusions: The frequency of MG abnormalities is increased in Shih Tzus with KCS compared with control animals. A reduced quality of the tear film associated with increased evaporation and reduced retention of tear fluid likely exacerbates the effects of a reduced tear volume in animals with aqueous deficiency.

KEYWORDS

dog, keratoconjunctivitis sicca, meibomian gland, morphology, noncontact infrared meibography, Shih Tzu

出典 doi: 10.1111/vop/12645

<https://onlinelibrary.wiley.com/doi/abs/10.1111/vop.12645>

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- 1) Matsuda K, Nakajima W, Togashi T, Sano Y.
Pulmonary adenofibroma in a sika deer.
J. Vet. Med. Sci. **81**: 486-490. 2019. doi: 10.1292/jvms.18-0691.
- 2) Matsuda K, Kogame S, Yaegashi R, Sano Y.
Peritoneal sarcomatoid mesothelioma in a sika deer.
J. Vet. Med. Sci. **81**: 1504-1508. 2019. doi: 10.1292/jvms.19-0345.

II. その他<Others>

- 1) Nishi K, Gondaira S, Okamoto M, Nebu T, Koiwa M, Ohtsuka H, Murai K, Matsuda K, Fujiki J, Iwano H, Nagahata H, Higuchi H.
Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells.
Vet. Immunol. Immunopathol. **216**: 109920. doi: 10.1016/j.vetimm. 2019. 109920.
- 2) Ohsugi T, Tanaka S, Iwasaki K, Nagano Y, Kozako T, Matsuda K, Hirose T, Takehana K.
A novel mouse model of adult T-cell leukemia cell invasion into the spinal cord.
Animal Models Exp. Med. **2**: 64-67. 2019. doi: 10.1002/ame2.12053.
- 3) Sano Y, Miyazaki M, Yaegashi R, Okamoto M, Masuko A, Maehara S, Matsuda K.
Basal cell adenocarcinoma on bulbar conjunctiva of third eyelid in a dog.

J. Vet. Med. Sci. **81**: 30-34. 2019. doi: 10.1292/jvms.18-0369.

- 4) Kameda K, Suzuki K, Kuroyanagi K, Takase M, Matsuda K, Noda J.
Comparison of green turtle, *Chelonia mydas*, sex ratio at two time-points over 20
years at a foraging ground in Yaeyama Islands, Ryukyu Archipelago, Japan.
Endang Species Res. **38**: 127-134. 2019. doi: 10.3354/esr00944.



NOTE

Pathology

Pulmonary adenofibroma in a sika deer

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J. Vet. Med. Sci.

81(3): 486–490, 2019

doi: 10.1292/jvms.18-0691

Received: 19 November 2018

Accepted: 24 January 2019

Published online in J-STAGE:
5 February 2019

ABSTRACT. A solitary firm nodule was found in the lung of a sika deer (*Cervus nippon yezoensis*). Histologically, it was a biphasic lesion composed of epithelial and stromal cell elements and exhibited a leaf-like growth pattern. The epithelial cells were immunohistochemically positive for pancytokeratin, cytokeratin 7, napsin A, and thyroid transcription factor-1, and the stromal cells were positive for vimentin and partially positive for desmin and α -smooth muscle actin. These observations were consistent with pulmonary adenofibroma, which is an extremely rare lesion in humans. To the best of our knowledge, this is the first reported case of pulmonary adenofibroma in an animal.

KEY WORDS: biphasic, *Cervus nippon yezoensis*, immunohistochemistry, pulmonary adenofibroma, sika deer

出典 doi: 10.1292/jvms.18-0691.

<https://doi.org/10.1292/jvms.18-0691>

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NOTE

Pathology

Peritoneal sarcomatoid mesothelioma in a sika deer

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J. Vet. Med. Sci.
81(10): 1504–1508, 2019
doi: 10.1292/jvms.19-0345

Received: 24 June 2019
Accepted: 8 August 2019
Advanced Epub:
15 August 2019

ABSTRACT. A slaughtered 2-year-old female sika deer (*Cervus nippon yesoensis*) had diffusely distributed multinodular lesions on the serosal surface of the peritoneal cavity and several nodules in the pleural cavity. Histologically, they were composed of proliferating spindle-shaped neoplastic cells, arranged in a fascicular fashion. The cells in the invasive foci transitioned from a sarcomatoid to an epithelioid appearance. Immunohistochemically, both the spindle-shaped and epithelioid cells were at least focally positive for pancytokeratin, vimentin, calretinin, α -SMA, and desmin. From these findings, the deer was diagnosed with peritoneal sarcomatoid mesothelioma with metastasis to the pleural cavity. To our knowledge, this is the first reported case of peritoneal mesothelioma in a cervid species and the first case of mesothelioma in a sika deer.

KEY WORDS: *Cervus nippon yesoensis*, neoplasm, peritoneal cavity, sarcomatoid mesothelioma, sika deer

出典 doi: 10.1292/jvms.19-0345.

<https://doi.org/10.1292/jvms.19-0345>

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Contents lists available at ScienceDirect

Veterinary Immunology and Immunopathology

journal homepage: www.elsevier.com/locate/vetimm



Research paper

Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells



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ARTICLE INFO

Keywords:

Mycoplasma bovis
Mycoplasma arthritis
Synovial cells
Inflammatory cytokines
Matrix metalloproteinases

ABSTRACT


Mycoplasma bovis causes chronic arthritis in calves. Mycoplasma arthritis shows severe inflammatory reactions in joints that is commonly treated with antibiotics and results in significant economic losses in the calf industry. A previous study showed that inflammatory cytokines and matrix metalloproteinases (MMPs) produced by synovial cells promote progression of the pathophysiology of bacterial arthritis. However, the mechanism underlying the pathogenesis of bovine Mycoplasma arthritis has not been fully clarified. In this study, we examined the immunologic response of bovine synovial tissue to *M. bovis*. We observed significant increases in expression of interleukin (IL)-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial tissue from Mycoplasma arthritis calves compared with tissues from normal calves. Expression of IL-6, IL-8, and MMP-1 mRNA was also induced in cultured synovial cells stimulated with *M. bovis*, but not expression of IL-1 β and MMP-3 mRNA. In contrast, the culture supernatant of peripheral blood mononuclear cells stimulated with *M. bovis* induced marked increases in the expression of IL-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial cells. Our results indicate that inflammatory cytokines and MMPs produced by synovial cells play a key role in the pathogenesis of Mycoplasma arthritis. We suggest that interactions between synovial cells and mononuclear cells in the presence of *M. bovis* induce expression of these cytokines and MMPs in synovial cells, resulting in severe inflammatory reactions in the joints.

出典 doi: 10.1016/j.vetimm.2019.109920.

<https://doi.org/10.1016/j.vetimm.2019.109920>

最終責任者 Hidetoshi Higuchi (Corresponding Author)

A novel mouse model of adult T-cell leukemia cell invasion into the spinal cord

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Funding information

Japan Leukemia Research Fund; Grant-in-Aid for Scientific Research from the Japan Society for the Promotion of Science, Grant/Award Number: No. 24500493

Abstract

Adult T-cell leukemia (ATL) is a mature T-cell malignancy caused by human T-cell leukemia virus type I infection, and 10%-25% of patients show central nervous system (CNS) involvement. CNS involvement significantly reduces survival and there are no effective treatments for CNS involvement. Therefore, an appropriate animal model is required to evaluate the inhibitory effects of novel drugs on the progression of ATL with CNS involvement. Here, we established a mouse model of ATL with CNS involvement using NOD.Cg-Prkdc^{scid}Il2rg^{tm1Wjl}/SzJ mice inoculated with ATL cells intramuscularly in the postauricular region, and these mice showed paraparesis. Of the 10 mice inoculated with ATL cells intramuscularly (I.M.) at 5 weeks of age, 8 (80%) showed paraparesis, whereas none of the 10 mice inoculated with ATL cells subcutaneously (S.C.) showed paraparesis. In the I.M. group, PCR detected HTLV-1-specific genes in the thoracic and lumbar vertebrae; however, in the S.C. group, the vertebrae were negative for HTLV-1 genes. Histological analysis revealed a particularly high incidence of tumors, characterized by accumulation of the injected cells, in the thoracic vertebrae of mice in the I.M. group. Tumor cell infiltration was relatively high in the bone marrow. Spinal cord compression caused by invasion of the tumor mass outside the pia mater was observed in the thoracic vertebrae of the spinal cord. In conclusion, we have reported a mouse model of tumor growth with paraparesis that may be used to assess novel therapeutic agents for ATL with CNS involvement.

KEYWORDS

adult T-cell leukemia (ATL), central nervous system (CNS), human T-cell leukemia virus type I (HTLV-1), mice, NOD.Cg-Prkdc^{scid}Il2rg^{tm1Wjl}/SzJ mice

出典 doi: 10.1002/ame2.12053.

<https://doi.org/10.1002/ame2.12053>

最終責任者 Takeo Ohsugi (First and Corresponding Author)



NOTE

Pathology

Basal cell adenocarcinoma on bulbar conjunctiva of third eyelid in a dog

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J. Vet. Med. Sci.
81(1): 30–34, 2019
doi: 10.1292/jvms.18-0369

Received: 30 June 2018
Accepted: 26 October 2018
Published online in J-STAGE:
6 November 2018

ABSTRACT. An 8-year-old castrated Toy poodle presented with swelling and proptosis of the right third eyelid caused by an exophytic mass on the bulbar surface. Histologically, the mass was composed of stratified neoplastic basaloid cells, arranged in nests and interconnecting islands, which were mixed with tubular structures. Immunohistochemically, the basaloid cells were positive for p63 and cytokeratin (CK) 14, and the inner epithelial cells of the tubular structures were positive for CK7, CK8, and CK19. According to these findings, the mass was diagnosed as a basal cell adenocarcinoma. Although basal cell adenocarcinoma is rare in animals, it should be included in the list of differential diagnoses for superficial tumors of bulbar conjunctiva of third eyelid in dogs.

KEY WORDS: basal cell adenocarcinoma, conjunctiva, dog, immunohistochemistry

出典 doi: 10.1292/jvms.18-0369.

<https://doi.org/10.1292/jvms.18-0369>

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Comparison of green turtle *Chelonia mydas* sex ratios at two time-points over 20 years at a foraging ground in Yaeyama Islands, Ryukyu Archipelago, Japan

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ABSTRACT: Sex ratio is an important factor in population dynamics as it influences the production of offspring; understanding the sex ratio of a given population is vital for the conservation of endangered species. In sea turtles, the sex of hatchlings is temperature dependent, with warmer incubation temperatures producing more female hatchlings. The rise in temperatures due to global warming may skew the sex ratios towards females. We studied the sex ratio of immature green turtles at a foraging ground in the Yaeyama Islands from 1997–1999 and from 2016–2017, using laparoscopy. The overall proportion of females was 68.2% (N = 314), and proportions were not significantly different between 1997–1999 (69.9%; N = 183) and 2016–2017 (65.6%; N = 131). Thus, sex ratios have not changed at this site over the last 20 years, suggesting minor or no effect of global warming/environmental influences on this population. The small size class (<55 cm straight carapace length [SCL]) was more female biased than the large size class (≥55 cm SCL) during both periods, which suggests the possibility of movement into or out of the foraging aggregation. Therefore, future research must clarify how the initial recruitment into the foraging aggregations, and the subsequent migrations affect sex ratios.

KEY WORDS: Green turtle · Sex ratio · Migration · Recruitment · Global warming

出典 doi: 10.3354/esr00944.

<https://doi.org/10.3354/esr00944>

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I. 筆頭または責任著者 <First or Corresponding Author>


II. その他<Others>

1) Rapid prolactin induction in adult male rats after treatment with diethylstilbestrol.

Maeda N, Okumura K, Yamaguchi K, Haeno S, **Yasui Y**, Kimura N, Ieko T, Miyasho T, Yokota H.

J. Neuroendocrinol. 2019 31(10):e12769. doi: 10.1111/jne.12769.

Rapid prolactin induction in adult male rats after treatment with diethylstilbestrol

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Funding information
Grant-in-aid and Support Project to Assist Private Universities in Developing Bases for Research; Ministry of Education, Science, Sports and Culture and Technology

Abstract

Diethylstilbestrol (DES) is a synthetic oestrogen known to disrupt the endocrine system and to cause reproductive toxicity mediated via the hypothalamic-pituitary-adrenal axis; however, its molecular mechanism of action is poorly understood. In the present study, we found that, after only 1 week of exposure to DES, blood testosterone dramatically decreased and that this decrease was associated with a strong induction of prolactin (PRL). Even with the increase in PRL, the luteinising hormone and follicle-stimulating hormone mRNAs slightly decreased. Our results show that, after 48 hours of a single dose of DES, there was a six-fold increase in PRL expression. After exploring the upstream mechanisms, we determined that dopamine, which inhibits PRL secretion in male rats, did not decrease in the pituitary gland of DES-treated rats, whereas vasoactive intestinal peptide (VIP), which mediates the acute release of PRL, was elevated. Serotonin (5-HT) increased in the brain of male rats 24 hours after a single DES treatment; however, PRL, VIP or 5-HT was not induced by DES in female rats. Our results indicate that DES induces the expression of pituitary PRL in male rats by stimulating VIP in the hypothalamus and 5-HT in the central nervous system.

KEYWORDS

diethylstilbestrol, endocrine disrupter, prolactin, serotonin, vasoactive intestinal peptide

出典 doi: 10.1111/jne.12769.

<https://www.ncbi.nlm.nih.gov/pubmed/31283846>

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准教授 渡邊 敬文

I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Structural alteration of glycosaminoglycan side chains and spatial disorganization of collagen networks in the skin of patients with mcEDS-CHST14.
Hirose T, Takahashi N, Prasarn T, Minaguchi J, Mizumoto S, Yamada S, Miyake N, Hatamochi A, Nakayama J, Yamaguchi T, Takehana K, Kosho T, **Watanabe T.**
Biochimica et Biophysica Acta General Subjects 1863 (3): 623-631. 2019.
doi: 10.1016/j.bbagen.2018.12.006.

II. その他<Others>

- 1) Adzuki bean (*Vigna angularis*) extract reduces amyloid- β aggregation and delays cognitive impairment in *Drosophila* models of Alzheimer's disease.
Miyazaki H, Okamoto Y, Motoi A, **Watanabe T.** Katayama S, Kawahara S, Makabe H, Fujii H, Yonekura S.
Nutrition Research and Practice 13(1): 64-69. 2019.
doi: 10.4162/nrp.2019.13.1.64.
- 2) Evidence for the involvement of FXR signaling in ovarian granulosa cell function.
Takae K, Nakata M, **Watanabe T.** Sasada H, Fujii H, Tomioka I.
Journal of Reproduction and Development 65(1): 47-55. 2019.
doi: 10.1262/jrd.2018-054.

- 3) Morphometric analysis of thoracic aorta in Slc39a13/Zip13-KO mice.
Hirose T, Shimazaki T, Takahashi N, Fukada T, **Watanabe T**, Tangkawattana P, Takehana K.
Cell and Tissue Research 376(1): 137-141. 2019.
doi: 10.1007/s00441-018-2977-9.
- 4) Basement membrane-like structures containing NTH α 1(IV) are formed around the endothelial cell network in a novel in vitro angiogenesis model.
Shin Y, Moriya A, Tohnishi Y, **Watanabe T**, Imamura Y.
American Journal of Physiology Cell Physiology 317(2): C314–C325. 2019.
doi: 10.1152/ajpcell.00353.2018.
- 5) IRE1-XBP1 pathway of the unfolded protein response is required during early differentiation of C2C12 myoblasts.
Tokutake Y, Yamada K, Hayashi S, Arai W, **Watanabe T**, Yonekura S.
International Journal of Molecular Sciences 21(1) pii: E182. 2019.
doi: 10.3390/ijms21.
- 6) Recent Advances in the Pathophysiology of Musculocontractural Ehlers-Danlos Syndrome.
Kosho T, Mizumoto S, **Watanabe T**, Yoshizawa T, Miyake N, Yamada S.
Genes 11(1) pii: E43. 2019.
doi: 10.3390/genes11.



Contents lists available at ScienceDirect

BBA - General Subjects

journal homepage: www.elsevier.com/locate/bbagen

Structural alteration of glycosaminoglycan side chains and spatial disorganization of collagen networks in the skin of patients with mcEDS-CHST14

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ARTICLE INFO

Keywords:

Ehlers-Danlos syndrome
Skin
Collagen
Decorin
Glycosaminoglycan
Dermatan sulfate
CHST14

ABSTRACT

Musculocontractural Ehlers-Danlos syndrome (mcEDS) due to CHST14/D4ST1 deficiency (mcEDS-CHST14) is a recently delineated type of EDS caused by biallelic loss-of-function mutations in *CHST14*, which results in the depletion of dermatan sulfate (DS). Clinical characteristics of mcEDS-CHST14 consist of multiple malformations and progressive fragility-related manifestations, including skin hyperextensibility and fragility. Skin fragility is suspected to result from the impaired assembly of collagen fibrils caused by alteration of the glycosaminoglycan (GAG) chain of decorin-proteoglycan (PG) from DS to chondroitin sulfate (CS). This systematic investigation of the skin pathology of patients with mcEDS-CHST14 comprised both immunostaining of decorin and transmission electron microscopy-based cupromeronic blue staining to visualize GAG chains. Collagen fibrils were dispersed in the affected papillary to reticular dermis; in contrast, they were regularly and tightly assembled in controls. Moreover, the fibrils exhibited a perpendicular arrangement to the affected epidermis, whereas fibrils were parallel to control epidermis. Affected GAG chains were linear, stretching from the outer surface of collagen fibrils to adjacent fibrils; in contrast, those of controls were curved, maintaining close contact with attached collagen fibrils. This is the first observation of compositional alteration, from DS to CS, of GAG side chains, which caused structural alteration of GAG side chains and resulted in spatial disorganization of collagen networks; this presumably disrupted the ring-mesh structure of GAG side chains surrounding collagen fibrils. McEDS-CHST14 provides a critical example of the importance of DS in GAG side chains of decorin-PG during assembly of collagen fibrils in maintenance of connective tissues.

出典 doi: 10.1016/j.bbagen.2018.12.006..

<https://doi.org/10.1016/j.bbagen.2018.12.006>

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Short Communication

Adzuki bean (*Vigna angularis*) extract reduces amyloid- β aggregation and delays cognitive impairment in *Drosophila* models of Alzheimer's disease

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BACKGROUND/OBJECTIVES: Alzheimer's disease is a neurodegenerative disease that induces symptoms such as a decrease in motor function and cognitive impairment. Increases in the aggregation and deposition of amyloid beta protein (A β) in the brain may be closely correlated with the development of Alzheimer's disease. In this study, the effects of an adzuki bean extract on the aggregation of A β were examined; moreover, the anti-Alzheimer's activity of the adzuki extract was examined.

MATERIALS/METHODS: First, we undertook thioflavin T (ThT) fluorescence analysis and transmission electron microscopy (TEM) to evaluate the effect of an adzuki bean extract on A β_{42} aggregation. To evaluate the effects of the adzuki extract on the symptoms of Alzheimer's disease *in vivo*, A β_{42} -overexpressing *Drosophila* were used. In these flies, overexpression of A β_{42} induced the formation of A β_{42} aggregates in the brain, decreased motor function, and resulted in cognitive impairment.

RESULTS: Based on the results obtained by ThT fluorescence assays and TEM, the adzuki bean extract inhibited the formation of A β_{42} aggregates in a concentration-dependent manner. When A β_{42} -overexpressing flies were fed regular medium containing adzuki extract, the A β_{42} level in the brain was significantly lower than that in the group fed regular medium only. Furthermore, suppression of the decrease in motor function, suppression of cognitive impairment, and improvement in lifespan were observed in A β_{42} -overexpressing flies fed regular medium with adzuki extract.

CONCLUSIONS: The results reveal the delaying effects of an adzuki bean extract on the progression of Alzheimer's disease and provide useful information for identifying novel prevention treatments for Alzheimer's disease.

Nutrition Research and Practice 2019;13(1):64-69; <https://doi.org/10.4162/nrp.2019.13.1.64>; pISSN 1976-1457 eISSN 2005-6168

Keywords: Adzuki bean, alzheimer disease, amyloid beta, drosophila

出典 doi: 10.4162/nrp.2019.13.1.64.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6369114/pdf/nrp-13-64.pdf>

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—Original Article—

Evidence for the involvement of FXR signaling in ovarian granulosa cell function

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Abstract. Farnesoid X receptor (FXR) is mainly present in enterohepatic tissues and regulates cholesterol, lipid, and glucose homeostasis in coordination with target genes such as *SHP* and *FABP6*. Although FXR has been revealed to be expressed in reproductive tissues, FXR function and expression levels in the ovary remain unknown. In this study, we investigated FXR expression in mouse ovaries and its target genes in ovarian granulosa cells. *In situ* hybridization and immunohistochemical staining showed that FXR was mainly distributed in secondary and tertiary follicles. The agonist-induced activation of FXR in cultured granulosa cells induced the expression of *SHP* and *FABP6*, while siRNA targeting of *FXR* decreased *CYP19a1* and *HSD17b1* expression. Upon examination of the roles of *SHP* and *FABP6* in granulosa cells, we found that *SHP* overexpression significantly decreased *Star*, *CYP11a1*, and *HSD3b* gene expression. In addition, siRNA targeting of *FABP6* decreased *CYP19a1* and *HSD17b1* expression, while *FABP6* overexpression increased *CYP19a1* expression. In conclusion, the present study demonstrates the presence of FXR signaling in the ovary and reveals that FXR signaling may have a role in function of granulosa cells.

Key words: Farnesoid X receptor (FXR), Granulosa cell, Ovary, Steroidogenesis

(J. Reprod. Dev. 65: 47–55, 2019)

出典 doi: 10.1262/jrd.2018-054. ^

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6379767/pdf/jrd-65-047.pdf>

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Morphometric analysis of thoracic aorta in *Slc39a13/Zip13*-KO mice

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Received: 18 July 2018 / Accepted: 13 October 2018 / Published online: 4 January 2019
© Springer-Verlag GmbH Germany, part of Springer Nature 2019

Abstract

Ehlers–Danlos syndrome (EDS) is a collection of inheritable diseases involving the musculoskeletal, integumentary and visual systems. Spondylodysplastic EDS-*ZIP13* (spEDS-*ZIP13*; OMIM 612350) was recently defined as a new form of EDS. Although vasculitis has been found in many spEDS-*ZIP13* patients, vascular pathology has not been included as a pathognomonic lesion of this type of EDS. We investigate the morphometry of the thoracic aorta in wild-type and *Zip13*-knockout (*Zip13*-KO) mice. Our assessment found abnormalities in the number and morphology of elastic and cellular components in the aortic wall, especially the tunica media, of *Zip13*-KO mice, indicating aortic fragility. Accordingly, our major findings (vascular smooth muscle cells with small nuclei, small percentage of elastic membrane area per tunica media, many large elastic flaps) should be considered vulnerable characteristics indicating fragility of the aorta in patients with spEDS-*ZIP13*.

Keywords Aorta · Elasticity · Elastic membrane · Morphometry · *Slc39a13/Zip13*-KO mouse

出典 doi: 10.1007/s00441-018-2977-9.

<https://link.springer.com/article/10.1007/s00441-018-2977-9>

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Am J Physiol Cell Physiol. 2019 Aug 1; 317(2): C314–C325.
Published online 2019 Jun 12. doi: [10.1152/ajpcell.00353.2018](https://doi.org/10.1152/ajpcell.00353.2018)
Making Cell Culture More Physiological

PMCID: PMC6732425
PMID: [31188837](https://pubmed.ncbi.nlm.nih.gov/31188837/)

Basement membrane-like structures containing NTH $\alpha 1(IV)$ are formed around the endothelial cell network in a novel in vitro angiogenesis model

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Abstract

Go to:

Angiogenesis is a process through which new blood vessels are formed by sprouting and elongating from existing blood vessels. Several methods have been used to replicate angiogenesis in vitro, including culturing vascular endothelial cells on Matrigel and coculturing with endothelial cells and fibroblasts. However, the angiogenesis elongation process has not been completely clarified in these models. We therefore propose a new in vitro model of angiogenesis, suitable for observing vascular elongation, by seeding a spheroid cocultured from endothelial cells and fibroblasts into a culture dish. In this model, endothelial cells formed tubular networks elongated from the spheroid with a lumen structure and were connected with tight junctions. A basement membrane (BM)-like structure was observed around the tubular network, similarly to blood vessels in vivo. These results suggested that blood vessel-like structure could be reconstituted in our model. Laminin and type IV collagen, main BM components, were highly localized around the network, along with nontriple helical form of type IV collagen $\alpha 1$ -chain [NTH $\alpha 1(IV)$]. In an ascorbic acid-depleted condition, laminin and NTH $\alpha 1(IV)$ were observed around the network but not the triple-helical form of type IV collagen and the network was unstable. These results suggest that laminin and NTH $\alpha 1(IV)$ are involved in the formation of tubular network and type IV collagen is necessary to stabilize the network.

Keywords: angiogenesis, ascorbic acid, basement membrane, coculture spheroid, nontriple helical polypeptide of type IV collagen $\alpha 1$ chain

出典 doi: [10.1152/ajpcell.00353.2018](https://doi.org/10.1152/ajpcell.00353.2018).

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6732425/>

最終責任者 Yasutada Imamura (Corresponding Author)



Article

IRE1-XBP1 Pathway of the Unfolded Protein Response Is Required during Early Differentiation of C2C12 Myoblasts

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Received: 18 November 2019; Accepted: 24 December 2019; Published: 26 December 2019



Abstract: In skeletal muscle, myoblast differentiation results in the formation of multinucleated myofibers. Although recent studies have shown that unfolded protein responses (UPRs) play an important role in intracellular remodeling and contribute to skeletal muscle differentiation, the involvement of IRE1–XBP1 signaling, a major UPR signaling pathway, remains unclear. This study aimed to investigate the effect of the IRE1–XBP1 pathway on skeletal muscle differentiation. In C2C12 cells, knockdown of IRE1 and XBP1 in cells remarkably suppressed differentiation. In addition, apoptosis and autophagy were dramatically enhanced in the XBP1-knockdown cells, highlighting the participation of IRE1–XBP1 in cell survival maintenance with differentiation stimuli during skeletal muscle differentiation. In myogenic cells, we demonstrated that the expression of CDK5 (cyclin-dependent kinase 5) is regulated by XBP1s, and we propose that XBP1 regulates the expression of MyoD family genes via the induction of CDK5. In conclusion, this study revealed that IRE1–XBP1 signaling plays critical roles in cell viability and the expression of differentiation-related genes in predifferentiated myoblasts and during the early differentiation phase.

Keywords: skeletal muscle differentiation; unfolded protein response (UPR); apoptosis; autophagy

出典 doi: 10.3390/ijms21.

<https://www.mdpi.com/1422-0067/21/1/182>

最終責任者 Tomoki Kosho (Corresponding Author)

Review

Recent Advances in the Pathophysiology of Musculocontractural Ehlers-Danlos Syndrome

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Received: 12 December 2019; Accepted: 23 December 2019; Published: 29 December 2019



Abstract: Musculocontractural Ehlers–Danlos Syndrome (mcEDS) is a type of EDS caused by biallelic pathogenic variants in the gene for carbohydrate sulfotransferase 14/dermatan 4-O-sulfotransferase 1 (*CHST14*/*D4ST1*, mcEDS-*CHST14*), or in the gene for dermatan sulfate epimerase (*DSE*, mcEDS-*DSE*). Thus far, 41 patients from 28 families with mcEDS-*CHST14* and five patients from four families with mcEDS-*DSE* have been described in the literature. Clinical features comprise multisystem congenital malformations and progressive connective tissue fragility-related manifestations. This review outlines recent advances in understanding the pathophysiology of mcEDS. Pathogenic variants in *CHST14* or *DSE* lead to reduced activities of relevant enzymes, resulting in a negligible amount of dermatan sulfate (DS) and an excessive amount of chondroitin sulfate. Connective tissue fragility is presumably attributable to a compositional change in the glycosaminoglycan chains of decorin, a major DS-proteoglycan in the skin that contributes to collagen fibril assembly. Collagen fibrils in affected skin are dispersed in the papillary to reticular dermis, whereas those in normal skin are regularly and tightly assembled. Glycosaminoglycan chains are linear in affected skin, stretching from the outer surface of collagen fibrils to adjacent fibrils; glycosaminoglycan chains are curved in normal skin, maintaining close contact with attached collagen fibrils. Homozygous (*Chst14*^{−/−}) mice have been shown perinatal lethality, shorter fetal length and vessel-related placental abnormalities. Milder phenotypes in mcEDS-*DSE* might be related to a smaller fraction of decorin DS, potentially through residual *DSE* activity or compensation by *DSE2* activity. These findings suggest critical roles of DS and DS-proteoglycans in the multisystem development and maintenance of connective tissues, and provide fundamental evidence to support future etiology-based therapies.

Keywords: musculocontractural Ehlers–Danlos Syndrome; carbohydrate sulfotransferase-14 (*CHST14*)/dermatan 4-O-sulfotransferase-1 (*D4ST1*); *CHST14*; dermatan sulfate epimerase (*DSE*); *DSE*; dermatan sulfate (DS); decorin; collagen

出典 doi: 10.3390/genes11010043.

<https://www.mdpi.com/2073-4425/11/1/43>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) FTA-Sodium hydroxide-based polymerase chain reaction (PCR): an efficient and cheaper option for *Theileria parva* detection in dairy cattle in Mbarara, Uganda.

Uchida L, Byaruhanga J, Okamura I, Miyama T, Muramatsu Y, Vudriko P, Makita K.

J. Vet. Med. Sci. [Epub ahead of print]. doi: 10.1292/jvms.19-0521.

II. その他<Others>

- 1) *Bergeyella zoohelcum* isolated from oral cavities of therapy dogs.
Muramatsu Y, Haraya N, Horie K, **Uchida L**, Kooriyama T, Suzuki A, Horiuchi M.

Zoonoses Public Health 66(8):936-942. 2019. doi: 10.1111/zph.12644.

FTA-Sodium hydroxide-based polymerase chain reaction (PCR): an efficient and cheaper option for *Theileria parva* detection in dairy cattle in Mbarara, Uganda

Leo UCHIDA, Joseph BYARUHANGA, Ikuo OKAMURA, Takeshi MIYAMA, Yasukazu MURAMATSU, Patrick VUDRIKO, Kohei MAKITA

[+ Author information](#)

Keywords: dairy cow, East Coast fever, FTA card, sodium hydroxide, *Theileria parva*

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Article ID: 19-0521

[DOI](#) <https://doi.org/10.1292/jvms.19-0521>

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Article overview

- Abstract
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Abstract

East Coast fever is caused by *Theileria parva* and poses serious concerns for dairy farmers owing to massive economic losses. In the current study, we compared three methods (DNA extraction kits, FTA-NaOH and FTA-TENT) of DNA extraction to identify the most economical and reliable method. A survey for *T. parva* prevalence was conducted in dairy cattle in Mbarara, Uganda. *Cytochrome C oxidase subunit I (COI)* and *T. parva-p104* genes were amplified to compare the methods. FTA-NaOH-based polymerase chain reaction (PCR) yielded the best detection rate for both *COI* gene and *p104* gene. Prevalence of *T. parva* was 45.0% and 83.3% at animal and farm-level respectively. FTA-NaOH based-PCR is simple, highly sensitive and cost-effective tool for *T. parva* diagnosis in resource constrained settings.

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出典 doi: 10.1292/jvms.19-0521.

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_19-0521/_article

最終責任者 Kohei Makita (Corresponding Author)

Bergeyella zoohelcum isolated from oral cavities of therapy dogs

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Funding information

Ministry of Health, Labour and Welfare, Grant/Award Number: 20330701; Japan Society for the Promotion of Science, Grant/Award Number: 17K09243; Rakuno Gakuen University, Grant/Award Number: Grant-in-Aid for Cooperative Research from Rakuno

Abstract

Bergeyella zoohelcum causes rare but severe human clinical diseases, which mostly arise from animal bites. Notably, *Bergeyella* infections can also occur in older people after prolonged exposure to dogs or cats without biting. We detected *B. zoohelcum* in oral cavities of therapy dogs in close contact with older people residing in nursing homes. Twenty-two bacterial isolates were identified as *B. zoohelcum* by using matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS) and 16S rRNA gene sequencing. Our results showed that MALDI-TOF MS is an effective tool for rapid identification of rarely isolated, difficult-to-identify microorganisms, such as *B. zoohelcum*, derived from not only human clinical samples but also animal samples. To our knowledge, this is the first report on detection of *B. zoohelcum* from therapy dogs. We have provided information on dog-assisted therapy to improve the relationship between humans and animals in ageing societies, particularly for preventive healthcare of older people living in nursing care facilities.

KEYWORDS

ageing society, *Bergeyella zoohelcum*, older people, oral cavity, therapy dog

出典 doi: 10.1111/zph.12644

<https://onlinelibrary.wiley.com/doi/abs/10.1111/zph.12644>

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I. 筆頭または責任著者 <First or Corresponding Author>

- 1) Basal cell adenocarcinoma on bulbar conjunctiva of third eyelid in a dog.

Sano Y., Miyazaki M, Yaegashi R, Okamoto M, Masuko A, Maehara S, Matsuda K.

J. Vet. Med. Sci. 81:30-34. 2019. doi: 10.1292/jvms.18-0369

II. その他<Others>

- 1) Pulmonary adenofibroma in a sika deer.

Matsuda K, Nakajima W, Togashi T, **Sano Y.**

J. Vet. Med. Sci. 81:486-490. 2019. doi: 10.1292/jvms.18-0691

- 2) Peritoneal sarcomatoid mesothelioma in a sika deer.

Matsuda K, Kogame S, Yaegashi R, **Sano Y.**

J. Vet. Med. Sci. 81:1504-1508. 2019. doi: 10.1292/jvms.19-0345



NOTE

Pathology

Basal cell adenocarcinoma on bulbar conjunctiva of third eyelid in a dog

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J. Vet. Med. Sci.
81(1): 30–34, 2019
doi: 10.1292/jvms.18-0369

Received: 30 June 2018
Accepted: 26 October 2018
Published online in J-STAGE:
6 November 2018

ABSTRACT. An 8-year-old castrated Toy poodle presented with swelling and proptosis of the right third eyelid caused by an exophytic mass on the bulbar surface. Histologically, the mass was composed of stratified neoplastic basaloid cells, arranged in nests and interconnecting islands, which were mixed with tubular structures. Immunohistochemically, the basaloid cells were positive for p63 and cytokeratin (CK) 14, and the inner epithelial cells of the tubular structures were positive for CK7, CK8, and CK19. According to these findings, the mass was diagnosed as a basal cell adenocarcinoma. Although basal cell adenocarcinoma is rare in animals, it should be included in the list of differential diagnoses for superficial tumors of bulbar conjunctiva of third eyelid in dogs.

KEY WORDS: basal cell adenocarcinoma, conjunctiva, dog, immunohistochemistry

出典 doi: 10.1292/jvms.18-0369

https://www.jstage.jst.go.jp/article/jvms/81/1/81_18-0369/_pdf/-char/en

最終責任者 Yuto Sano (First Author and Corresponding Author)



NOTE

Pathology

Pulmonary adenofibroma in a sika deer

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J. Vet. Med. Sci.
81(3): 486–490, 2019
doi: 10.1292/jvms.18-0691

Received: 19 November 2018
Accepted: 24 January 2019
Published online in J-STAGE:
5 February 2019

ABSTRACT. A solitary firm nodule was found in the lung of a sika deer (*Cervus nippon yezoensis*). Histologically, it was a biphasic lesion composed of epithelial and stromal cell elements and exhibited a leaf-like growth pattern. The epithelial cells were immunohistochemically positive for pancytokeratin, cytokeratin 7, napsin A, and thyroid transcription factor-1, and the stromal cells were positive for vimentin and partially positive for desmin and α -smooth muscle actin. These observations were consistent with pulmonary adenofibroma, which is an extremely rare lesion in humans. To the best of our knowledge, this is the first reported case of pulmonary adenofibroma in an animal.

KEY WORDS: biphasic, *Cervus nippon yezoensis*, immunohistochemistry, pulmonary adenofibroma, sika deer

出典 doi: 10.1292/jvms.18-0691

https://www.jstage.jst.go.jp/article/jvms/81/3/81_18-0691/_pdf/-char/en

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NOTE

Pathology

Peritoneal sarcomatoid mesothelioma in a sika deer

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J. Vet. Med. Sci.
81(10): 1504–1508, 2019
doi: 10.1292/jvms.19-0345

Received: 24 June 2019
Accepted: 8 August 2019
Advanced Epub:
15 August 2019

ABSTRACT. A slaughtered 2-year-old female sika deer (*Cervus nippon yesoensis*) had diffusely distributed multinodular lesions on the serosal surface of the peritoneal cavity and several nodules in the pleural cavity. Histologically, they were composed of proliferating spindle-shaped neoplastic cells, arranged in a fascicular fashion. The cells in the invasive foci transitioned from a sarcomatoid to an epithelioid appearance. Immunohistochemically, both the spindle-shaped and epithelioid cells were at least focally positive for pancytokeratin, vimentin, calretinin, α -SMA, and desmin. From these findings, the deer was diagnosed with peritoneal sarcomatoid mesothelioma with metastasis to the pleural cavity. To our knowledge, this is the first reported case of peritoneal mesothelioma in a cervid species and the first case of mesothelioma in a sika deer.

KEY WORDS: *Cervus nippon yesoensis*, neoplasm, peritoneal cavity, sarcomatoid mesothelioma, sika deer

出典 doi: 10.1292/jvms.19-0345

https://www.jstage.jst.go.jp/article/jvms/81/10/81_19-0345/_pdf/-char/en

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Senior lecture

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II. その他<Others>

- 1) Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study.
Itami T, **Hanazono K**, Oyama N, Sano T, Makita K, Yamashita K.
PLoS One. 2019. 14(7):e0213414. doi: 10.1371/journal.pone.0213414.
eCollection 2019.
- 2) Change in right ventricular function in an American cocker spaniel with acute pulmonary thromboembolism.
Morita T, Nakamura K, Osuga T, **Hanazono K**, Morishita K, Takiguchi M.
J. Vet. Med. Sci. 2019 Sep 3;81(9):1259-1265. doi: 10.1292/jvms.19-0082.
- 3) Distribution of regulatory T cells in inflammatory colorectal polyps of miniature dachshunds.
Konishi K, Igarashi H, Maeda S, Uchida E, **Hanazono K**, Tamamoto T, Uchida K, Endoh D, Ohno K.
Vet. Immunol. Immunopathol. 2019. 218:109938.
doi: 10.1016/j.vetimm.2019.109938.
- 4) Computed tomographic features for differentiating benign from malignant liver lesions in dogs. Leela-Arporn R, Ohta H, Shimbo G, **Hanazono K**, Osuga T, Morishita K, Sasaki N, Takiguchi M.
J. Vet. Med. Sci. 2019. 81(12):1697-1704.
doi: 10.1292/jvms.19-0278. Epub 2019 Oct 10.

RESEARCH ARTICLE

Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study

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OPEN ACCESS

Citation: Itami T, Hanazono K, Oyama N, Sano T, Makita K, Yamashita K (2019) Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study. PLoS ONE 14(7): e0213414. <https://doi.org/10.1371/journal.pone.0213414>

Editor: Ferenc Gallyas, Jr., University of PECS Medical School, HUNGARY

Received: February 18, 2019

Accepted: June 25, 2019

Published: July 10, 2019

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Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Funding: This work was supported by JSPS KAKENHI Grant Number JP 26861516. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing interests: The authors have declared that no competing interests exist.

Abstract

In acidosis, catecholamines are attenuated, and higher doses are often required to improve cardiovascular function. Colforsin activates adenylate cyclase in cardiomyocytes without beta-adrenoceptor. Here, six beagles were administered colforsin or dobutamine four times during eucapnia (partial pressure of arterial carbon dioxide 35–40 mm Hg; normal) and hypercapnia (ibid 90–110 mm Hg; acidosis) conditions. The latter was induced by CO₂ inhalation. Anesthesia was induced with propofol and maintained with isoflurane. Cardiovascular function was measured by thermodilution and a Swan-Ganz catheter at baseline and 60 min after 0.3 µg/kg/min (low), 0.6 µg/kg/min (middle), and 1.2 µg/kg/min (high) colforsin administration. The median pH was 7.38 [range 7.33–7.42] and 7.01 [range 6.96–7.08] at baseline in the Normal and Acidosis conditions, respectively. Endogenous adrenaline and noradrenaline levels at baseline were significantly ($P < 0.05$) higher in the Acidosis than in the Normal condition. Colforsin induced cardiovascular effects similar to those caused by dobutamine. Colforsin increased cardiac output in the Normal condition (baseline: 3.9 ± 0.2 L/kg/m² [mean \pm standard error], low: 5.2 ± 0.4 L/kg/min², middle: 7.0 ± 0.4 L/kg/m², high: 9.4 ± 0.2 L/kg/m²; $P < 0.001$) and Acidosis condition (baseline: 6.1 ± 0.3 L/kg/m², low: 6.2 ± 0.2 L/kg/m², middle: 7.2 ± 0.2 L/kg/m², high: 8.3 ± 0.2 L/kg/m²; $P < 0.001$). Colforsin significantly increased heart rate and decreased systemic vascular resistance compared to values at baseline. Both drugs increased pulmonary artery pressure, but colforsin (high: 13.3 ± 0.6 mmHg in Normal and 20.1 ± 0.2 mmHg in Acidosis) may have lower clinical impact on the pulmonary artery than dobutamine (high: 19.7 ± 0.6 in Normal and 26.7 ± 0.5 in Acidosis). Interaction between both drugs and experimental conditions was observed in terms of cardiovascular function, which were similarly attenuated with colforsin and dobutamine under acute respiratory acidosis.

出典 doi: 10.1371/journal.pone.0213414. eCollection 2019.

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0213414>

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NOTE

Internal Medicine

Change in right ventricular function in an American cocker spaniel with acute pulmonary thromboembolism

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J. Vet. Med. Sci.
81(9): 1259–1265, 2019
doi: 10.1292/jvms.19-0082

Received: 7 February 2019
Accepted: 27 June 2019
Advanced Epub: 9 July 2019

ABSTRACT. A 12-year-old neutered female American cocker spaniel weighing 9.9 kg was presented for evaluation with a 2-day history of dyspnea and anorexia. Echocardiography revealed severe pulmonary hypertension (estimated systolic pulmonary arterial pressure, 93.4 mmHg) with right heart enlargement, pulmonary arterial dilation, and right ventricular dysfunction. The dilation of left heart and congenital cardiac shunt were not observed. Pulmonary thromboembolism (PTE) was confirmed by computed tomographic angiography. After treatment with antiplatelet and anticoagulant, the clinical sign and the echocardiographic abnormality of right heart were improved. These echocardiographic findings are not specific for PTE, but it can be useful as a rule-in test for PTE when other causes of pulmonary hypertension are excluded and a monitor of therapeutic efficacy.

KEY WORDS: acute pulmonary thromboembolism, dog, echocardiography, myocardial hypokinesis

出典 doi: 10.1292/jvms.19-0082. Epub 2019 Jul 9.

<https://doi.org/10.1292/jvms.19-0082>

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Distribution of regulatory T cells in inflammatory colorectal polyps of miniature dachshunds

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ARTICLE INFO

Keywords:

Inflammatory colorectal polyp
Miniature dachshund
Regulatory T cells
Anti-inflammatory cytokine

ABSTRACT

Inflammatory colorectal polyp (ICRP) is an emerging disease in Miniature Dachshunds (MDs). Animals with this disease exhibit multiple polyps with severe neutrophil infiltration that respond to immunosuppressive therapy. Macrophages in polypoid lesions have been described to play an important role in neutrophil infiltration in the lesion by producing IL-8. In contrast, IL-10, an anti-inflammatory cytokine, was also reported to be upregulated in polypoid lesions, but its significance in the pathogenesis of ICRP has not been clarified. Regulatory T cells (Tregs) are the main source of IL-10 production and contribute to the maintenance of intestinal homeostasis. Therefore, the objective of this research was to compare the distribution of Tregs in polypoid lesions of ICRPs and the association between the distribution and expression of pro- or anti-inflammatory cytokines. Tissue biopsy specimens of polypoid lesions were collected from 28 MDs with ICRP. Those of macroscopically non-polypoid colonic mucosa from 24 MDs with ICRPs and 21 control dogs were further included as controls. Real-time quantitative polymerase chain reaction was used to quantify gene expression of *IL-1 β* , *IL-4*, *IL-6*, *IL-8*, *IL-10*, *IL-17*, *IL-22*, *IFN- γ* , *TNF- α* , *TGF- β* , and *forkhead box protein P3 (Foxp3)* in each tissue sample. The numbers of Foxp3-positive cells (Tregs) and ionized calcium binding adapter molecule 1 (Iba-1)-positive cells (macrophages) were determined by immunohistochemistry. The gene expression of *IL-1 β* , *IL-6*, *IL-8*, *TNF- α* , *IFN- γ* , *IL-17*, *IL-10*, *TGF- β* , and *Foxp3* was significantly upregulated in polypoid lesions relative to control levels. The numbers of Foxp3-positive Tregs and Iba-1-positive macrophages were significantly increased in polypoid lesions compared to those in the non-polypoid colonic mucosa of MDs with ICRPs and control dogs. The upregulation of *IL-10* was moderately correlated with the distribution of Tregs in polypoid lesions from MDs with ICRPs. In addition, the relative upregulation of *IL-1 β* , *IL-6*, and *IL-8* in polypoid lesions, compared to expression in non-polypoid colonic mucosa of MDs with ICRPs, was significantly greater than that of *IL-10*. These results indicate that increases in Treg numbers and anti-inflammatory cytokines in polypoid lesions comprise reactive changes in response to the inflammation, which warrants further investigation.

出典 doi: 10.1016/j.vetimm.2019.109938. Epub 2019 Sep 3

<https://www.sciencedirect.com/science/article/abs/pii/S0165242719300923?via%3Dihub>

最終責任者 Hirotaka Igarashi (Corresponding Author)



FULL PAPER

Internal Medicine

Computed tomographic features for differentiating benign from malignant liver lesions in dogs

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ABSTRACT. Thus far, there are few computed tomography (CT) characteristics that can distinguish benign and malignant etiologies. The criteria are complex, subjective, and difficult to use in clinical applications due to the high level of experience needed. This study aimed to identify practical CT variables and their clinical relevance for broadly classifying histopathological diagnoses as benign or malignant. In this prospective study, all dogs with liver nodules or masses that underwent CT examination and subsequent histopathological diagnosis were included. Signalments, CT findings and histopathological diagnoses were recorded. Seventy liver nodules or masses in 57 dogs were diagnosed, comprising 18 benign and 52 malignant lesions. Twenty-three qualitative and quantitative CT variables were evaluated using univariate and stepwise multivariate analyses, respectively. Two variables, namely, the postcontrast enhancement pattern of the lesion in the delayed phase (heterogeneous; odds ratio (OR): 14.7, 95% confidence interval (CI): 0.82–262.03, $P=0.0429$) and the maximal transverse diameter of the lesion (>4.5 cm; OR: 33.3, 95% CI: 2.29–484.18, $P=0.0006$), were significantly related to the differentiation of benign from malignant liver lesions, with an area under the curve of 0.8910, representing an accuracy of 88.6%. These findings indicate that features from triple-phase CT can provide information for distinguishing pathological varieties of focal liver lesions and for clinical decision making. Evaluations of the maximal transverse diameter and postcontrast enhancement pattern of the lesion included simple CT features for predicting liver malignancy with high accuracy in clinical settings.

KEY WORDS: canine, classification, computed tomography, liver, neoplasia

J. Vet. Med. Sci.

81(12): 1697–1704, 2019

doi: 10.1292/jvms.19-0278

Received: 20 May 2019

Accepted: 24 September 2019

Advanced Epub:

10 October 2019

Focal liver lesions that present as nodules or masses in dogs may be relatively common findings. Relevant clinical signs would be a reason for visiting an animal hospital. The lesion could reflect pathological varieties, including benign or malignant conditions, and appropriate management of the lesion depends on determining the diagnosis of the pathology. As the prognosis and specific treatment of each type of lesion can vary, it is important to tentatively diagnose the lesion to obtain information regarding the biological behavior of the lesion prior to treatment planning. However, liver biopsy, which is the gold standard for a definitive diagnosis of lesion type [14], is invasive and can cause life-threatening complications [2, 11]. Therefore, noninvasive diagnostic imaging could serve as a valuable method to distinguish benign liver lesions from malignant ones, although determining the nature of a nodule or mass via imaging diagnosis remains challenging.

Recently, technological advancements in computed tomography (CT) systems have improved the image quality and enabled quick scanning, which helps reduce the radiation dose and the need for prolonged sedation or anesthesia [3, 5]. Consequently, the number of dogs undergoing abdominal CT examination has increased, and increasing numbers of nodules or masses have been identified as incidental findings. In humans, CT has been used to examine various pathological hepatic conditions via an enhancement pattern following intravenous administration of contrast medium [1, 7, 8, 16, 17]. In dogs, previous studies have

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出典 doi: 10.1292/jvms.19-0278. Epub 2019 Oct 10.

<https://doi.org/10.1292/jvms.19-0278>

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- 1) Effects of supplementation with calcium salts of medium-chain fatty acids on the plasma metabolic hormone concentrations in weaning beef calves.

Masuda Y, **Fukumori R**, Yanai R, Takeuchi A, Sarentonglaga B, Sugino T, Nagao Y.

Animal Behavior and Management 55: 82-93. 2019. doi:10.20652/jabm.55.2_82

II. その他<Others>

- 1) Effects of a tunnel ventilation system within the tie-stall barn environment upon the productivity of dairy cattle during the winter season.

Sarentonglaga B, Sugiyama T, **Fukumori R**, Nagao Y.

Asian-Australasian Journal of Animal Science 32:748-756. 2019.

doi: <https://doi.org/10.5713/ajas.18.0436>

- 2) Effects of butyrate supplementation on the productivity of lactating dairy cows fed diets differing in starch content.

Izumi K, **Fukumori R**, Oikawa S, Oba M.

Journal of Dairy Science 102:11051-11056. 2019.

doi: <https://doi.org/10.3168/jds.2019-17113>

Effects of supplementation with calcium salts of medium-chain fatty acids on the plasma metabolic hormone concentrations in weaning beef calves

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Summary

This study aimed to investigate the effects of feeding calcium salts of medium-chain fatty acids (MCFA-Ca) on the growth and metabolism of weaning beef calves. Sixteen Holstein-Japanese Black crossbred bull calves were assigned randomly to two dietary treatments (MCFA-Ca and control). All the calves were completely weaned at the age of 121 days. From 10 days before weaning (Day - 10) to 84 days after weaning (Day 84), the MCFA-Ca calves were fed with concentrate and supplement including MCFA-Ca (27 g/day as MCFA-Ca), while the control calves were fed with concentrate and supplement without MCFA-Ca. Timothy hay was provided *ad libitum*. At Day - 10, 0, 13, 22, 50, and 84, the body weight was measured, and blood samples were withdrawn to analyze the plasma metabolite and hormone concentrations. The plasma insulin concentrations in the MCFA-Ca calves were significantly lower than those in the control calves after weaning. The plasma insulin-like growth factor-1 concentrations in the MCFA-Ca calves were significantly higher than those in the control calves. Our results suggest that feeding MCFA-Ca to weaning beef calves could change their metabolic hormone secretions.

Keywords: calves, medium chain fatty acids, IGF-1, insulin, weaning

Animal Behaviour and Management, 55 (2): 82-93, 2019

(Received 3 November 2018; Accepted for publication 30 November 2018)

出典 doi:10.20652/jabm.55.2_82

https://www.jstage.jst.go.jp/article/jabm/55/2/55_82/_pdf

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Open Access

Asian-Australas J Anim Sci
Vol. 32, No. 5:748-756 May 2019
<https://doi.org/10.5713/ajas.18.0436>
pISSN 1011-2367 eISSN 1976-5517

Effects of a tunnel ventilation system within the tie-stall barn environment upon the productivity of dairy cattle during the winter season

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Submitted Jun 10, 2018; Revised Jul 15, 2018;
Accepted Sept 3, 2018

Objective: The objective of this study was to examine the effect of using a tunnel ventilation system within the dairy barn environment upon the productivity of dairy cows during the winter season.

Methods: The study was performed at the University Farm, Faculty of Agriculture, Utsunomiya University. Twenty-one Holstein dairy cows (5 heifers and 16 multiparous) were enclosed in a stall barn. Unventilated (UV) and tunnel-ventilated (TV) was operated by turns every other week, and a number of key parameters were measured in the barn, including tunnel ventilation output, temperature, relative humidity, gas concentrations (oxygen [O₂], carbon dioxide [CO₂], and ammonia [NH₃]). Also, skin and rectal temperature, respiratory rate, blood gas concentrations, and bacterial count were measured from nipple attachments on ten cows. The amount of fodder left uneaten, and general components and somatic cell count of the milk were measured.

Results: As for our dairy barn environment, air temperature dropped significantly with the passage of time with TV. Humidity was significantly higher with TV at 0600 h compared to UV, while CO₂ and NH₃ concentrations with UV were significantly higher than with TV at 0000 h and 0600 h. Skin temperature was significantly lower with TV compared to UV at 0000 h and 0600 h. Respiratory rate was also significantly lower at 0600 h with TV than with UV. Bacterial count for the nipple attachments was significantly lower with TV than with UV at 0600 h. The amount of leftover fodder was significantly less with TV in comparison with UV.

Conclusion: Our results suggest that a TV system in the winter barn results in environmental improvements, such as reductions in unfavorable gas concentrations and bacterial growth. Consequently, it is expected that barns utilizing a TV system will be beneficial for both animal health and production.

Keywords: Winter Season; Tunnel Ventilation; Dairy Cows; Barn Environment

出典 doi: <https://doi.org/10.5713/ajas.18.0436>

<https://www.ajas.info/upload/pdf/ajas-18-0436.pdf>

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Short communication: Effects of butyrate supplementation on the productivity of lactating dairy cows fed diets differing in starch content

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ABSTRACT

The objective of this study was to evaluate the effects of butyrate supplementation on the dry matter intake (DMI), milk production, and blood metabolites of lactating dairy cows fed diets differing in starch content. Eight Holstein cows after peak lactation (58.6 ± 9.96 d in milk; mean \pm SD) were blocked by parity and assigned to 1 of 2 Latin squares (4×4) balanced for carryover effects with a 2×2 factorial arrangement of treatments. Treatments differed by dietary starch content (20.6 vs. 27.5%) and butyrate supplementation (butyrate vs. control) with 21-d periods. Experimental diets contained 36 and 30% corn silage, 18 and 15% grass silage, and 46 and 55% concentrates, respectively, for low starch and high starch diets, on a dry matter (DM) basis. Butyrate was provided as Gustor BP70 WS (Norel S.A., Madrid, Spain), containing 70% sodium butyrate and 30% fatty acid mixture, at 2% of dietary DM (providing butyrate at 1.1% of dietary DM), and control premix contained 70% wheat bran and 30% fatty acid mixture. Interaction effects between dietary starch content and butyrate supplementation were not observed for primary response variables, and milk yield was not affected by treatment. Butyrate supplementation increased serum β -hydroxybutyrate concentration compared with control (0.706 vs. 0.930 mM), but did not exceed 1.2 mM, a commonly accepted value for subclinical ketosis, and DMI was not affected. Cows fed butyrate had increased milk fat content (4.58 vs. 4.37%) and milk fat yield (1.51 vs. 1.42 kg/d), tended to have increased 4% fat-corrected milk yield (35.9 vs. 34.3 kg/d) and feed efficiency (1.56 vs. 1.50; 4% fat-corrected milk yield/DMI), and had decreased milk urea nitrogen (MUN) concentration (10.8 vs. 11.7 mg/

dL) compared with control. Cows fed high starch diets tended to have increased DMI (23.3 vs. 22.5 kg/d), increased milk protein yield (1.13 vs. 1.05 kg/d), and decreased MUN concentration (10.3 vs. 12.2 mg/dL). Inclusion of butyrate at 1.1% of dietary DM increased milk fat production and decreased MUN concentration without affecting DMI or increasing the risk of subclinical ketosis, regardless of dietary starch content.

Key words: butyrate, milk fat production, dietary starch content, milk urea nitrogen

Short Communication

Butyrate is one of the major VFA produced in the rumen and promotes development of rumen epithelial tissues (Sakata and Tamate, 1978; Simmons et al., 2009); many studies have evaluated the effect of butyrate administration on the development of the rumen and gastrointestinal tract in calves (Górka et al., 2011; Wanat et al., 2015; Górka et al., 2018). For lactating dairy cows, butyrate is used for de novo fatty acid synthesis in the mammary gland (Dils, 1986), and butyrate administration is expected to increase milk fat production. High starch diets, commonly fed to high-producing dairy cows, cause rapid acid accumulation in the rumen and decrease rumen pH, often leading to diet-induced milk fat depression (Harvatine et al., 2009; Kmicikewycz et al., 2015). Considering the effect of butyrate on promoting milk fat synthesis, adding butyrate to a high starch diet for high-yielding dairy cows may reduce the risk of milk fat depression. However, previous research is not consistent; some have reported that butyrate infusion or supplementation increased milk fat production (Rook et al., 1965; Huhtanen et al., 1993; Herrick et al., 2017) but others reported no effects (Herrick et al., 2018) or negative effects (Urrutia et al., 2019), and the discrepancy may be related to different dietary starch contents among the studies. The objective of the current study was to evaluate the

Received June 16, 2019.

Accepted July 18, 2019.

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11051

出典 doi: <https://doi.org/10.3168/jds.2019-17113>

<https://reader.elsevier.com/reader/sd/pii/S0022030219309270?token=4939160B2BF032B>

3E9FD69CFFB5CAC6395E69E9A1B4E39399D96242679DBD378F30B84430C6

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1)

II. その他<Others>

- 1) Low-field magnetic resonance imaging and computed tomography of a calf with aqueductal stenosis caused by web: comparison with normal calves.
Hori A, Suzuki K, Koiwa M, **Miyoshi K**, Nakade T.
J Vet Med Sci. 2019 Jan 8;81(1):42-47. doi: 10.1292/jvms.18-0020
- 2) Anesthetic effect of a mixture of alfaxalone, medetomidine, and butorphanol for inducing surgical anesthesia in ICR, BALB/c, and C57BL/6 mouse strains.
Tsukamoto Y, Yamada N, **Miyoshi K**, Yamashita K, Ohsugi T.
J Vet Med Sci. 2019 Jun 28;81(6):937-945. doi: 10.1292/jvms.18-0712



NOTE

Surgery

Low-field magnetic resonance imaging and computed tomography of a calf with aqueductal stenosis caused by web: comparison with normal calves

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J. Vet. Med. Sci.
81(1): 42–47, 2019
doi: 10.1292/jvms.18-0020

Received: 17 January 2018
Accepted: 31 October 2018
Published online in J-STAGE:
14 November 2018

ABSTRACT. A 6-day-old female Holstein displayed a dome-shaped skull and cardiac murmur on physical examination. Neurological abnormalities included progressive ataxia, decreased pupillary light reflex, and blindness soon after birth. On diagnostic imaging, CT identified expanded ventricles and thyroid hypoplasia on the left side. MRI detected expanded ventricles, especially in the rostral cerebrum at the mesencephalic aqueduct, compared with normal calves, so we suspected hydrocephalus causing stenosis of the mesencephalic aqueduct. Postmortem examination revealed a structure in the mesencephalic aqueduct resembling the "web" type of aqueductal stenosis described in humans. This case report indicates the utility of describing mesencephalic aqueductal stenosis by web and detection of other malformations on CT and MRI for antemortem diagnosis in calves.

KEY WORDS: aqueductal stenosis, calf, CT, MRI

出典 doi: 10.1292/jvms.18-0020

https://www.jstage.jst.go.jp/article/jvms/81/1/81_18-0020/_article

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Anesthetic effect of a mixture of alfaxalone, medetomidine, and butorphanol for inducing surgical anesthesia in ICR, BALB/c, and C57BL/6 mouse strains

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ABSTRACT. The anesthetic effects of alfaxalone combined with medetomidine and butorphanol were investigated for ICR, BALB/c, and C57BL/6 mice. Mice were administered a combination of 0.5 or 0.75 mg/kg medetomidine and 5 mg/kg butorphanol with 30 or 40 mg/kg alfaxalone (0.5MBA30, 0.75MBA30 and 0.75MBA40, respectively). The drug combinations were administered subcutaneously and were compared with a widely used combination of 0.3 mg/kg medetomidine, 4 mg/kg midazolam, and 5 mg/kg butorphanol (MMB). All three MBA combinations achieved surgical anesthesia, although the recovery time was longer with 0.75MBA30 and 0.75MBA40 compared with 0.5MBA30. Furthermore, several mice exhibited a considerable jumping reaction immediately after injection with 0.75MBA30 and 0.75MBA40. Therefore, 0.5MBA30 may be suitable for inducing surgical anesthesia in the mouse strains tested. The anesthetic scores for 0.5MBA30 were improved compared with those of MMB in all three mouse strains; however, the body temperature drop in C57BL/6 mice was greater with 0.5MBA30. Our results show that the alfaxalone combination, 0.5MBA30, should allow surgical operations that are more stable in more strains of mice than MMB, although the combination may cause hypothermia, especially in C57BL/6 mice.

KEY WORDS: alfaxalone, anesthesia, butorphanol, medetomidine, mice

J. Vet. Med. Sci.
81(6): 937–945, 2019
doi: 10.1292/jvms.18-0712

Received: 27 November 2018
Accepted: 23 April 2019
Published online in J-STAGE:
10 May 2019

出典 doi: 10.1292/jvms.18-0712

https://www.jstage.jst.go.jp/article/jvms/81/6/81_18-0712/_article

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- 1) Primary intrahepatic squamous cell carcinoma in a sika deer.
Matsuda K, Yamada J, Kogame S, **Murata R**, Sano Y.
J. Vet. Med. Sci. Dec 11. 2019. doi: 10.1292/jvms.19-0610.
- 2) Relationship Between mRNA of Immune Factors Expressed by Milk Somatic Cells and Bacteria Present in Healthy Lactating Holstein Cows.
Ohtsuka H, Hirose H, Murakami K, **Murata R**, Kato T, Tajima M.
J. Vet. Res. 63: 369-373. 2019. doi: 10.2478/jvetres-2019-0042.

Primary intrahepatic squamous cell carcinoma in a sika deer

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Running head: INTRAHEPATIC SCC IN A SIKA DEER

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ABSTRACT. A white nodule was detected in the liver of a wild female sika deer. The nodule was histologically diagnosed as squamous cell carcinoma (SCC), and it transitioned into a hyperplastic and chronically inflamed intrahepatic bile duct showing *Fasciola* infection. Therefore, the tumor was demonstrated to have originated from the biliary epithelium of the intrahepatic bile duct. Hyperplastic and chronic inflammatory changes of the biliary epithelium might have contributed the carcinogenesis of the present case, as proposed in human primary intrahepatic SCC cases. To the best of our knowledge, this is the first reported case of primary intrahepatic SCC in an animal.

出典 doi: 10.1292/jvms.19-0610.

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_19-0610/_article

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SHORT COMMUNICATION

Relationship between mRNA of immune factors expressed by milk somatic cells and bacteria present in healthy lactating Holstein cows

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Received: January 9, 2019

Accepted: July 2, 2019

Abstract

Introduction: The characteristics of immune factors in somatic cells from lactating dairy cows and their association with commensal bacteria in normal milk have not been clarified. This study investigated the relationship between the pathogenic bacteria in milk and somatic cell immune factors in healthy lactating cows. **Material and Methods:** In total 44 healthy Holstein cows were studied on one farm. Milk samples were collected aseptically using a cannula and these samples were cultured for detection of bacteria and analysis of mRNA of immune factors expressed by somatic cells. Cows were divided into two groups based on the microbial status of their milk samples: 12 cows showed bacteria in cultures (positive group), and the other 32 cows did not (negative group). **Results:** The mRNA levels of IL-6, lactotransferrin, and cathelicidin expressed by somatic cells after milking decreased significantly compared to those before milking in both groups ($P < 0.05$). There were significantly lower mRNA levels of IL-6 and cathelicidin in the positive group compared to those in the negative group before milking. **Conclusion:** These results suggest that mRNA levels of IL-6 and cathelicidin expressed by the somatic cells may be affected by the presence of bacteria in healthy lactating dairy cows.

出典 doi: 10.2478/jvetres-2019-0042.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6749727/>

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- 1) Immunosuppression in cows following intramammary infusion of *Mycoplasma bovis*.

Gondaira S, Nishi K, Tanaka T, Yamamoto T, Nebu T, Watanabe R, Konnai S, Hayashi T, Kiku Y, Okamoto M, Matsuda K, Koiwa M, Iwano H, Nagahata H, Higuchi H.

Infect. Immun. 2019. Dec 16. doi: 10.1128/IAI.00521-19.

II. その他<Others>

- 1) Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells.

Nishi K, **Gondaira S**, Okamoto M, Nebu T, Koiwa M, Ohtsuka H, Murai K, Matsuda K, Fujiki J, Iwano H, Nagahata H, Higuchi H.

J. Microbiol. Exp. 7: 167-171. 2019. doi: 10.15406/jmen.2019.07.00256

Immunosuppression in cows following intramammary infusion of *Mycoplasma bovis*

Satoshi Gondaira, Koji Nishi, Takahiro Tanaka, Takashi Yamamoto, Takanori Nebu, Reina Watanabe, Satoru Konnai, Tomohito Hayashi, Yoshio Kiku, Mariko Okamoto, Kazuya Matsuda, Masateru Koiwa, Hidetomo Iwano, Hajime Nagahata, Hidetoshi Higuchi

DOI: 10.1128/IAI.00521-19

Article

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ABSTRACT

Mycoplasma bovis (*M. bovis*) is a destructive pathogen that causes large economic losses in rearing cattle for beef and dairy worldwide. *M. bovis* causes suppression and evasion of host immune response; however, the mechanisms of host immune function involved in *M. bovis* mastitis have not been elucidated. The purpose of this study is to elucidate the characteristics of the bovine immune response to mycoplasmal mastitis. We evaluated the responsiveness of the bovine mammary gland following infusion of *M. bovis*. Somatic cell counts and bacterial counts in milk from the infected quarter were increased. However, the proliferation of peripheral blood mononuclear cells (blood MNCs) and mononuclear cells isolated from *M. bovis*-stimulated mammary lymph nodes (lymph node MNCs) did not differ from that in the unstimulated cells. Transcriptome analysis revealed that the mRNA levels of innate immune system-related genes in blood MNCs, complement factor D (CFD), ficolin 1 (FCN1), and tumor necrosis factor superfamily member 13 (TNFSF13), decreased following intramammary infusion of *M. bovis*. The mRNA levels of immune exhaustion-related genes, programmed cell death 1 (PD-1), programmed cell death-ligand 1 (PD-L1), lymphocyte activation gene 3 (LAG3), and cytotoxic T-lymphocyte-associated protein 4 (CTLA4), of milk mononuclear cells (milk MNCs) in the infected quarter were increased compared with those before infusion. Increase in immune exhaustion-related gene expression and decrease in innate immune response-related genes of MNCs in quarters from cows were newly characterized by *M. bovis*-induced mastitis. These results suggested that *M. bovis*-induced mastitis affected the immune function of bovine MNCs, which is associated with prolonged duration of infection with *M. bovis*.

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Mycoplasma bovis-Induced Inhibition of Bovine Peripheral Blood Mononuclear Cell Proliferation Is Ameliorated after Blocking the Immune-Inhibitory Programmed Death 1 Receptor
Infect Immun, 2018

Therapeutic Effect of Nisin Z on Subclinical Mastitis in Lactating Cows
Antimicrob Agents Chemother, 2007

Localized immunity in experimental bovine mastitis caused by *Mycoplasma dispar*.
Infect Immun, 1975

***Mycoplasma leachii* causes bovine mastitis: Evidence from clinical symptoms, histopathology and immunohistochemistry**

出典 doi: 10.1128/IAI.00521-19

<https://iai.asm.org/content/early/2019/12/10/IAI.00521-19.long>

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Contents lists available at ScienceDirect

Veterinary Immunology and Immunopathology

journal homepage: www.elsevier.com/locate/vetimm

Research paper

Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells

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ARTICLE INFO

Keywords:

Mycoplasma bovis
Mycoplasma arthritis
 Synovial cells
 Inflammatory cytokines
 Matrix metalloproteinases

ABSTRACT

Mycoplasma bovis causes chronic arthritis in calves. *Mycoplasma arthritis* shows severe inflammatory reactions in joints that is commonly treated with antibiotics and results in significant economic losses in the calf industry. A previous study showed that inflammatory cytokines and matrix metalloproteinases (MMPs) produced by synovial cells promote progression of the pathophysiology of bacterial arthritis. However, the mechanism underlying the pathogenesis of bovine *Mycoplasma arthritis* has not been fully clarified. In this study, we examined the immunologic response of bovine synovial tissue to *M. bovis*. We observed significant increases in expression of interleukin (IL)-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial tissue from *Mycoplasma arthritis* calves compared with tissues from normal calves. Expression of IL-6, IL-8, and MMP-1 mRNA was also induced in cultured synovial cells stimulated with *M. bovis*, but not expression of IL-1 β and MMP-3 mRNA. In contrast, the culture supernatant of peripheral blood mononuclear cells stimulated with *M. bovis* induced marked increases in the expression of IL-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial cells. Our results indicate that inflammatory cytokines and MMPs produced by synovial cells play a key role in the pathogenesis of *Mycoplasma arthritis*. We suggest that interactions between synovial cells and mononuclear cells in the presence of *M. bovis* induce expression of these cytokines and MMPs in synovial cells, resulting in severe inflammatory reactions in the joints.

出典 doi: 10.1016/j.vetimm.2019.109920.

<https://www.sciencedirect.com/science/article/pii/S0165242719300777?via%3Dihub>

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II．その他<Others>

- 1) A CO2 removal system using extracorporeal lung and renal assist device with an acid and alkaline infusion.

Takahashi N, Nakada TA, **Sakai T**, Kato Y, Moriyama K, Nishida O, Oda S.
J. Artif. Organs. 2019 Oct 4. doi: 10.1007/s10047-019-01136-0.

ORIGINAL ARTICLE

Artificial Kidney / Dialysis



A CO₂ removal system using extracorporeal lung and renal assist device with an acid and alkaline infusion

Nozomi Takahashi¹ · Taka-aki Nakada¹ · Toshikazu Sakai² · Yu Kato² · Kazuhiro Moriyama³ · Osamu Nishida² · Shigeto Oda¹

Received: 3 July 2019 / Accepted: 22 September 2019
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Abstract

The patients with respiratory failure need high tidal volume by mechanical ventilation, which lead to the ventilator-induced lung injury. We developed an extracorporeal lung and renal assist device (ELRAD), comprising acid infusion, membrane lung, continuous hemodiafiltration and alkaline infusion. To evaluate this system, we conducted in vivo studies using experimental swine which were connected to the new system. In vivo experiments consist of four protocols; baseline = hemodiafiltration only (no O₂ gas flow to membrane lung); membrane lung = “Baseline” plus O₂ gas flow to membrane lung; “Acid infusion” = “Membrane lung” plus continuous acid infusion; ELRAD = “Acid infusion” plus continuous alkaline infusion. We changed the ventilatory rate of the mechanical ventilation to maintain PCO₂ at 50–55 mmHg during the four protocols. The results showed that there was statistically no significant difference in the levels of pH, HCO₃⁻, and base excess when each study protocol was initiated. The amount of CO₂ eliminated by the membrane lung significantly increased by 1.6 times in the acid infusion protocol and the ELRAD protocol compared to the conventional membrane lung protocol. Minute ventilation in the ELRAD protocol significantly decreased by 0.5 times compared with the hemodiafiltration only protocol ($P < 0.0001$), the membrane lung ($P = 0.0006$) and acid infusion protocol ($P = 0.0017$), respectively. In conclusion, a developed CO₂ removal system efficiently removed CO₂ at low blood flow and reduced minute ventilation, while maintaining acid–base balance within the normal range.

Keywords Extracorporeal circulation · Renal replacement therapy · Respiratory insufficiency · Lung injury · Hemodiafiltration

出典 doi: 10.1007/s10047-019-01136-0.

<https://link.springer.com/article/10.1007%2Fs10047-019-01136-0>

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- 1) Association of postpartum diseases occurring within 60 days after calving with productivity and reproductive performance in dairy cows in Fukuoka: A cow-level, retrospective cohort study

Goto A, Takahara K, **Sugiura T**, Oikawa S, Katamoto H, Nakada K

J. Vet. Med. Sci. 81(7): 1055-1061. 2019. doi: 10.1292/jvms.18-0384.



Association of postpartum diseases occurring within 60 days after calving with productivity and reproductive performance in dairy cows in Fukuoka: A cow-level, retrospective cohort study

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ABSTRACT. Peripartum disorders in dairy cows negatively influence their productivity and reproductive performance. However, only a few reports have clearly indicated the influence of such disorders on the productivity and reproductive performance at a local-area or cow-level in Japan. This study aimed to elucidate the influence of diseases occurring within 60 days after calving on subsequent productivity and reproductive performance. Accordingly, a wide-area database on dairy production was used for epidemiological analysis; subsequently, multivariable analysis was performed to investigate the association of such diseases with productivity or reproductive performance in 6,545 cows from 178 farms in Fukuoka. We used 305-day energy-corrected milk (305 ECM) as an index of productivity and conception and culling as indices of reproductive performance. With regard to causality, mixed-effects model was used for analyzing the association between disease and productivity, and Cox proportional hazard model was used for analyzing the association between disease and reproductive performance. Compared to the disease absence group, the disease presence group demonstrated significantly lower 305 ECM [−154 kg; 95% confidence interval (CI), −229 to −79] and risk of pregnancy [hazard ratio (HR), 0.85; 95% CI, 0.80–0.91] and higher risk of culling (HR, 1.36; 95% CI, 1.17–1.59). These results indicate that, in Fukuoka, dairy cows affected by diseases within 60 days after calving exhibit lower productivity and reproductive performance. Therefore, proper dairy cow management during the peripartum period to prevent diseases during early lactation may maintain or improve productivity.

KEY WORDS: dairy cow, epidemiological analysis, peripartum period, productivity, reproductive performance

J. Vet. Med. Sci.
81(7): 1055–1062, 2019
doi: 10.1292/jvms.18-0384

Received: 5 July 2018
Accepted: 21 May 2019
Advanced Epub:
12 June 2019

出典 doi: 10.1292/jvms.18-0384.

https://www.jstage.jst.go.jp/article/jvms/81/7/81_18-0384/_article

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- 1) The first isolation and identification of canine parvovirus (CPV) type 2c variants during 2016-2018 genetic surveillance of dogs in Mongolia.
Temuujin U, Tserendorj A, **Fujiki J**, Sakoda Y, Tseren-Ochir EO, Okamatsu M, Matsuno K, Sharav T, Horiuchi M, Umemura T, Chultemdorj T.
Infect. Genet. Evol. 2019. 73:269-275.
doi: 10.1016/j.meegid.2019.05.006.
- 2) Analysis of Corticosterone and Testosterone Synthesis in Rat Salivary Gland Homogenates.
Ieko T, Sasaki H, Maeda N, **Fujiki J**, Iwano H, Yokota H.
Front. Endocrinol. 2019. 10:479.
doi: 10.3389/fendo.2019.00479.
- 3) Effect of Mycoplasma bovis on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells.
Nishi K, Gondaira S, Okamoto M, Nebu T, Koiwa M, Ohtsuka H, Murai K, Matsuda K, **Fujiki J**, IwanoH, Nagahata H, Higuchi H.
Vet. Immunol. Immunopathol. 2019 Oct;216:109920.
doi: 10.1016/j.vetimm.2019.109920. Epub 2019 Aug 7.
- 4) Glucuronidation as a metabolic barrier against zearalenone in rat everted intestine.
Ieko T, Inoue S, Inomata Y, Inoue H, **Fujiki J**, Iwano H.
J. Vet. Med. Sci. Dec 16. 2019.
doi: 10.1292/jvms.19-0570.



Contents lists available at ScienceDirect

Infection, Genetics and Evolution

journal homepage: www.elsevier.com/locate/meegid

Research paper

The first isolation and identification of canine parvovirus (CPV) type 2c variants during 2016–2018 genetic surveillance of dogs in Mongolia



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ARTICLE INFO

Keywords:

Canine parvovirus
Sequencing
Phylogenetic analysis
Molecular characterization

ABSTRACT

Canine parvovirus type 2 (CPV-2) causes a highly contagious and fatal disease, developing into acute hemorrhagic enteritis and myocarditis, in dogs. CPV-2 has evolved, generating antigenic variants CPV-2a/2b/2c that are globally distributed. However, investigating molecular characterization of CPV-2 among dog populations in Mongolia has been limited. Herein, 42 stool samples were collected from dogs with clinical signs of infection, and conventional PCR assays were employed to detect CPV-2 in 23. Our results indicated that during 2016–2018, the new CPV-2a and 2c subtypes were detected in 34.7% of the samples, and the new CPV-2b subtype was detected in 30.4% of samples. VP2 protein sequence analysis and next-generation sequencing of the complete viral genome confirmed these antigenic types. However, sequence analysis indicated new and unreported mutations, Pro580Thr, and Tyr584His in the CPV-2c subtype. From a PCR-positive sample, CPV-2c was successfully isolated, and we performed an immunofluorescence assay for antigen detection. Additionally, we performed genetic characterization and phylogenetic analysis to investigate genetic diversity among isolates from the region, resulting in high CPV-2 genetic diversity in the Mongolian dog population. Striking similarities were also observed between sequences of the strains isolated from Mongolia and China over a similar time span.

出典 doi: 10.1016/j.meegid.2019.05.006.

<https://www.sciencedirect.com/science/article/pii/S156713481930084X?via%3Dihub>

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Analysis of Corticosterone and Testosterone Synthesis in Rat Salivary Gland Homogenates

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OPEN ACCESS

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Specialty section:

This article was submitted to
Cellular Endocrinology,
a section of the journal

Extra-adrenal steroid hormone production has been reported in several tissues, the biological role of which is interesting in terms of hormonal regulation of metabolism, growth, and behavior. In this report, we describe for the first time steroidogenesis in rat salivary glands. Enzyme activities associated with corticosterone and testosterone production were detected in rat salivary glands by LC-MS analysis. In tissue homogenates of rat salivary glands, progesterone was produced enzymatically *in vitro* from pregnenolone in the presence of NADPH and NADH. Deoxycorticosterone was produced from progesterone, corticosterone from deoxycorticosterone, and testosterone from androstenedione (but not pregnenolone from cholesterol) via enzymatic reactions using the same tissue homogenates. Immunoblotting analysis indicated the expression of 11 β -hydroxylase (cytochrome P450 11 β 1; CYP11 β 1), which mediated the production of corticosterone from deoxycorticosterone. However, CYP family 11 subfamily A member 1 (CYP11A1)-mediated production of pregnenolone from cholesterol was not detected in the salivary glands by immunoblotting using a specific antibody. These results indicate that corticosterone and testosterone are produced from pregnenolone in rat salivary glands. The initial substrate in salivary steroidogenesis and the roles of salivary corticosterone and testosterone are discussed.

Keywords: salivary glands, steroidogenesis, corticosterone, testosterone, steroid, pregnenolone, sulfate, conjugate

出典 doi: 10.3389/fendo.2019.00479.

<https://www.frontiersin.org/articles/10.3389/fendo.2019.00479/full>

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Contents lists available at ScienceDirect

Veterinary Immunology and Immunopathology

journal homepage: www.elsevier.com/locate/vetimm

Research paper

Effect of *Mycoplasma bovis* on expression of inflammatory cytokines and matrix metalloproteinases mRNA in bovine synovial cells

Koji Nishi^a, Satoshi Gondaira^a, Mariko Okamoto^{a,1}, Takanori Nebu^a, Masateru Koiwa^{b,2}, Hiromichi Ohtsuka^b, Kiyokazu Murai^c, Kazuya Matsuda^d, Jumpei Fujiki^e, Hidetomo Iwano^e, Hajime Nagahata^a, Hidetoshi Higuchi^{a,*}

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ARTICLE INFO

Keywords:

Mycoplasma bovis

Mycoplasma arthritis

Synovial cells

Inflammatory cytokines

Matrix metalloproteinases

ABSTRACT

Mycoplasma bovis causes chronic arthritis in calves. Mycoplasma arthritis shows severe inflammatory reactions in joints that is commonly treated with antibiotics and results in significant economic losses in the calf industry. A previous study showed that inflammatory cytokines and matrix metalloproteinases (MMPs) produced by synovial cells promote progression of the pathophysiology of bacterial arthritis. However, the mechanism underlying the pathogenesis of bovine Mycoplasma arthritis has not been fully clarified. In this study, we examined the immunologic response of bovine synovial tissue to *M. bovis*. We observed significant increases in expression of interleukin (IL)-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial tissue from Mycoplasma arthritis calves compared with tissues from normal calves. Expression of IL-6, IL-8, and MMP-1 mRNA was also induced in cultured synovial cells stimulated with *M. bovis*, but not expression of IL-1 β and MMP-3 mRNA. In contrast, the culture supernatant of peripheral blood mononuclear cells stimulated with *M. bovis* induced marked increases in the expression of IL-1 β , IL-6, IL-8, MMP-1, and MMP-3 mRNA in synovial cells. Our results indicate that inflammatory cytokines and MMPs produced by synovial cells play a key role in the pathogenesis of Mycoplasma arthritis. We suggest that interactions between synovial cells and mononuclear cells in the presence of *M. bovis* induce expression of these cytokines and MMPs in synovial cells, resulting in severe inflammatory reactions in the joints.

出典 doi: 10.1016/j.vetimm.2019.109920.

<https://www.sciencedirect.com/science/article/pii/S0165242719300777?via%3Dihub>

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FULL PAPER

Toxicology

Glucuronidation as a metabolic barrier against zearalenone in rat everted intestine

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J. Vet. Med. Sci.
82(2): **-**, 2020
doi: 10.1292/jvms.19-0570

Received: 17 October 2019
Accepted: 28 November 2019
Advanced Epub:
16 December 2019

ABSTRACT. Zearalenone (ZON), produced by *Fusarium* fungi, exhibits estrogenic activity. Livestock can be exposed to ZON orally through contaminating feeds such as cereals, leading to reproductive disorders such as infertility and miscarriage via endocrine system disruption. However, the details of ZON metabolism remain unclear, and the mechanism of its toxicity has not been fully elucidated. In this study, we investigated the kinetics of ZON absorption and metabolism in rat segmented everted intestines. ZON absorption was confirmed in each intestine segment 60 min after application to the mucosal buffer at 10 μ M. Approximately half of the absorbed ZON was metabolized to α -zearalenol, which tended to be mainly glucuronidated in intestinal cells. In the proximal intestine, most of the glucuronide metabolized by intestinal cells was excreted to the mucosal side, suggesting that the intestine plays an important role as a first drug metabolism barrier for ZON. However, in the distal intestine, ZON metabolites tended to be transported to the serosal side. Glucuronide transported to the serosal side could be carried via the systemic circulation to the local tissues, where it could be reactivated by deconjugation. These results are important with regard to the mechanism of endocrine disruption caused by ZON.

KEY WORDS: absorption, everted intestine, glucuronidation, metabolism, zearalenone

出典 doi: 10.1292/jvms.19-0570.

https://www.jstage.jst.go.jp/article/jvms/advpub/0/advpub_19-0570/_article

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- 1) MRL/MpJ mice produce more oocytes and exhibit impaired fertilisation and accelerated luteinisation after superovulation treatment.

Hosotani M, Ichii O, Nakamura T, Masum MA, Otani Y, Otsuka-Kanazawa S, Elewa YHA, Kon Y.

Reprod. Fertil. Dev. 31: 760-773. 2019. doi: 10.1071/RD18319


II. その他<Others>

- 1) Age-related glomerular lesions with albuminuria in male cotton rats.

Ichii O, Nakamura T, Irie T, Otani Y, **Hosotani M**, Masum MA, Islam RM, Horino T, Sunden Y, Elewa YHA, Kon Y.

Histochem. Cell. Biol. doi: 10.1007/s00418-019-01824-1

MRL/MpJ mice produce more oocytes and exhibit impaired fertilisation and accelerated luteinisation after superovulation treatment

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Abstract. MRL/MpJ mice exhibit distinct phenotypes in several biological processes, including wound healing. Herein we report two unique phenotypes in the female reproductive system of MRL/MpJ mice that affect ovulation and luteinisation. We found that superovulation treatment resulted in the production of significantly more oocytes in MRL/MpJ than C57BL/6 mice (71.0 ± 13.4 vs 26.8 ± 2.8 respectively). However, no exon mutations were detected in genes coding for female reproductive hormones or their receptors in MRL/MpJ mice. In addition, the fertilisation rate was lower for ovulated oocytes from MRL/MpJ than C57BL/6 mice, with most of the fertilised oocytes showing abnormal morphology, characterised by deformation and cytolysis. Histological tracing of luteinisation showed that MRL/MpJ mice formed corpora lutea within 36 h after ovulation, whereas C57BL/6 mice were still at the corpora haemorrhagica formation stage after 36 h. The balance between the expression of matrix metalloproteinases and their tissue inhibitors shifted towards the former earlier after ovulation in MRL/MpJ than C57BL/6 mice. This result indicates a possible link between accelerated extracellular matrix remodelling in the ovulated or ruptured follicles and luteinisation in MRL/MpJ mice. Together, these findings reveal novel phenotypes in MRL/MpJ mice that provide novel insights into reproductive biology.

Additional keywords: extracellular matrix, histology, *in vitro* fertilisation, ovary.

出典 doi: 10.1071/RD18319

<https://www.publish.csiro.au/RD/RD18319>

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Age-related glomerular lesions with albuminuria in male cotton rats

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Accepted: 10 October 2019
© Springer-Verlag GmbH Germany, part of Springer Nature 2019

Abstract

The increased prevalence of aging-related chronic kidney disease (CKD) among humans is a problem worldwide. Aged cotton rats (*Sigmodon hispidus*) are considered novel model animals for studying CKD, especially as the females develop severe tubulointerstitial lesions with anemia. To investigate the renal pathologic features in aged male cotton rats and their characteristic glomerular injuries, the animals were divided into young, adult, old-aged, and advanced-aged groups (1–4, 5–8, 9–12, and 13–17 months, respectively) and pathologically analyzed. Anemia and renal dysfunction, as indicated by hematologic and serologic parameters, were significantly milder in the advanced-aged males than in the old-aged females. The males had increased urinary albumin-to-creatinine ratios from the old-age period, with the advanced-aged males having significantly higher levels than those in the old-aged females and young males. The old-aged females did not show clear glomerular injuries, whereas the advanced-aged males showed membranous lesions characterized by irregular and thickened glomerular basement membranes (GBMs). Characteristically, several large-sized projections from the GBM toward the podocytes were observed by microscopy, and podocytes covering these projections effaced their foot processes. The advanced-aged males showed aging-related IgG immune-complex depositions in the paramesangial regions and along the GBM. Furthermore, the positive reaction for podocin (a podocyte molecule) was granulated along the GBM. Thus, we clarified the albuminuria associated with altered glomerular structures in advanced-aged cotton rats, and that these phenotypes were closely associated with aging. These data help to clarify the aging-related pathogenesis of glomerular injury.

Keywords Cotton rats · Aging · Male · Glomerulus · Albuminuria · Glomerular basement membrane · Podocyte

出典 doi: 10.1007/s00418-019-01824-1

<https://link.springer.com/article/10.1007/s00418-019-01824-1>

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- 1) **Kitazawa T.** Harada R, Sakata I, Sakai T, Kaiya H.
A verification study of gastrointestinal motility-stimulating action of guinea-pig motilin using isolated gastrointestinal strips from rabbits and guinea-pigs.
Gen. Comp. Endocrinol. 2019. 274:106-112. doi: 10.1016/j.ygcen.2019.01.010.
- 2) **Kitazawa T.** Kaiya H.
Regulation of gastrointestinal motility by motilin and ghrelin in vertebrates.
Front. Endocrinol. (Lausanne). 2019. 10:278. doi: 10.3389/fendo.2019.00278.
eCollection 2019.

II. その他 <Others>

- 1) Ono Y, Sugiyama S, Matsushita M, **Kitazawa T.** Amano T, Uno Y, Ikushiro S, Teraoka H.
Limited expression of functional cytochrome p450 2C subtypes in the liver and small intestine of domestic cats.
Xenobiotica. 2019;49: 627-635. doi: 10.1080/00498254.2018.1483543.
- 2) Kubota A, Kawai YK, Yamashita N, Lee JS, Kondoh D, Zhang S, Nishi Y, Suzuki K, **Kitazawa T.** Teraoka H.
Transcriptional profiling of cytochrome P450 genes in the liver of adult zebrafish, *Danio rerio*.
J. Toxicol. Sci. 2019. 44:347-356. doi: 10.2131/jts.44.347.
- 3) Sugiyama S, Uno Y, Amano T, **Kitazawa T.** Teraoka H.
Genetic diversity of cytochrome P450 3A with different metabolic activity in domestic cats.
J. Vet. Med. Sci. 2019. 81:598-600. doi: 10.1292/jvms.18-0692.

- 4) Sugiyama S, Uno Y, Amano T, **Kitazawa T**, Teraoka H.
Genetic diversity of cytochrome P450 1A2 with different metabolic activities in domestic cats.
J. Vet. Med. Sci. 2019. 81:980-982. doi: 10.1292/jvms.19-0106.
- 5) Sugiyama S, Uno Y, Amano T, **Kitazawa T**, Teraoka H.
Genetic diversity of cytochrome P450 2A with different metabolic activities in domestic cats.
J. Vet. Med. Sci. 2019. 81:983-985. doi: 10.1292/jvms.19-0107.



A verification study of gastrointestinal motility-stimulating action of guinea-pig motilin using isolated gastrointestinal strips from rabbits and guinea-pigs



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ARTICLE INFO

Keywords:

Guinea-pig
Motilin
Gastrointestinal tract
Contraction
Motilin receptor

ABSTRACT

Motilin (MLN), a 22-amino-acid peptide hormone, is generally present in the mucosa of the upper gastrointestinal (GI) tract, mainly the duodenum of mammals, and it regulates GI motility, especially that related to interdigestive migrating contraction. However, MLN and its receptor are absent in mice and rats, and MLN does not cause any mechanical responses in the rat and mouse GI tracts. The guinea-pig is also a rodent, but expression of the MLN gene in the guinea-pig has been reported. In the present study, two guinea-pig MLNs, FIPIFTYSELRRRTQEREQNKGL found in the Ensemble Genome Database (gpMLN-1) and FVPIFTYSELRRRTQEREQNKRL reported by Xu et al. (2001) (gpMLN-2), were synthesized, and their biological activities were evaluated in the rabbit duodenum and guinea-pig GI tract *in vitro*. Both gpMLNs showed contractile activity in longitudinal muscle strips of the rabbit duodenum. The EC₅₀ values of gpMLN-1 and gpMLN-2 were slightly higher than that of human MLN (hMLN), but the maximum contractions were as same as that of hMLN. Treatment with GM109 and hMLN-induced receptor desensitization decreased the contractile activity of both gpMLNs, indicating that the two gpMLN candidates are able to activate the MLN receptor (MLN-R) of the rabbit duodenum. In guinea-pig GI preparations, hMLN and gpMLNs did not show any mechanical responses in circular muscle strips from the gastric antrum or in longitudinal strips of the duodenum, ileum and colon although acetylcholine and 1,1-dimethyl-4-phenylpiperazinium (DMPP) caused definite mechanical responses. The DMPP-induced neural responses in the gastric circular muscle and ileal longitudinal muscles were not modified by gpMLN-1. Even in the gastric and ileal strips with intact mucosa, no mechanical responses were seen with either of the gpMLNs. Furthermore, RT-PCR using various primer sets failed to amplify the gpMLN-2 mRNA. In conclusion, gpMLNs including one that was already reported and the other that was newly found in a database were effective to the rabbit MLN-R, whereas they did not cause any contractions or modification of neural responses in the guinea-pig GI tract, indicating that the MLN system is vestigial and not functional in regulation of GI motility in the guinea-pig as well as in other rodents such as rats and mice.

出典 doi: 10.1016/j.ygcen.2019.01.010.

<https://doi.org/10.1016/j.ygcen.2019.01.010>

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Regulation of Gastrointestinal Motility by Motilin and Ghrelin in Vertebrates

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OPEN ACCESS

Edited by:

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Madrid, Spain

Reviewed by:

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University of Toyama, Japan
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Newfoundland, Canada
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Specialty section:

This article was submitted to
Neuroendocrine Science,
a section of the journal
Frontiers in Endocrinology

Received: 16 January 2019

Accepted: 16 April 2019

Published: 17 May 2019

Citation:

Kitazawa T and Kaiya H (2019)
Regulation of Gastrointestinal Motility
by Motilin and Ghrelin in Vertebrates.
Front. Endocrinol. 10:278.
doi: 10.3389/fendo.2019.00278

The energy balance of vertebrates is regulated by the difference in energy input and energy expenditure. Generally, most vertebrates obtain their energy from nutrients of foods through the gastrointestinal (GI) tract. Therefore, food intake and following food digestion, including motility of the GI tract, secretion and absorption, are crucial physiological events for energy homeostasis. GI motility changes depending on feeding, and GI motility is divided into fasting (interdigestive) and postprandial (digestive) contraction patterns. GI motility is controlled by contractility of smooth muscles of the GI tract, extrinsic and intrinsic neurons (motor and sensory) and some hormones. In mammals, ghrelin (GHL) and motilin (MLN) stimulate appetite and GI motility and contribute to the regulation of energy homeostasis. GHL and MLN are produced in the mucosal layer of the stomach and upper small intestine, respectively. GHL is a multifunctional peptide and is involved in glucose metabolism, endocrine/exocrine functions and cardiovascular and reproductive functions, in addition to feeding and GI motility in mammals. On the other hand, the action of MLN is restricted and species such as rodentia, including mice and rats, lack MLN peptide and its receptor. From a phylogenetic point of view, GHL and its receptor GHS-R1a have been identified in various vertebrates, and their structural features and various physiological functions have been revealed. On the other hand, MLN or MLN-like peptide (MLN-LP) and its receptors have been found only in some fish, birds and mammals. Here, we review the actions of GHL and MLN with a focus on contractility of the GI tract of species from fish to mammals.

Keywords: energy homeostasis, ghrelin, motilin, gastrointestinal motility, vertebrates, evolution

INTRODUCTION

Food intake, digestion of foods, and absorption of nutrients through the gastrointestinal (GI) tract wall are fundamental physiological events for living vertebrates. The GI system is the gateway for food entry, and it is well known that GI motility positively influences feeding behavior and contributes to the regulation of energy homeostasis. In general, GI motility of vertebrates is regulated by contractility of smooth muscles controlled by extrinsic parasympathetic and sympathetic neurons, intrinsic enteric sensory and motor neurons, and some GI hormones (1–3). Hormones are signal transduction molecules carried through the bloodstream to transmit biological information from one cell to another by activation of specific receptors on the target

出典 doi: 10.3389/fendo.2019.00278.

<https://doi.org/10.3389/fendo.2019.00278>

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RESEARCH ARTICLE

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Limited expression of functional cytochrome p450 2c subtypes in the liver and small intestine of domestic cats

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ABSTRACT

1. Compared to information for herbivores and omnivores, knowledge on xenobiotic metabolism in carnivores is limited. The cytochrome P450 2C (CYP2C) subfamily is recognized as one of the most important CYP groups in human and dog. We identified and characterized CYP2C isoforms and variants in cat, which is an obligate carnivore.
2. Quantitative RT-PCR and immunoblot analyses were carried out to evaluate the expression of CYP2C in the liver and small intestine. A functional CYP2C isoform was heterologously expressed in yeast microsomes to determine the enzymatic activity.
3. Cat had two CYP2C genes, 21 and 41, in the genome; however, CYP2C21P was a pseudogene that had many stop codons. Three splicing variants of CYP2C41 were identified (v1–v3), but only one of them (v1) showed a complete deduced amino acid sequence as CYP2C protein. Transcripts of feline CYP2C41v1 were detected but the amounts were negligible or very small in the liver and small intestine. Immunoreactivity to an antihuman CYP2C antibody was confirmed in the recombinant feline CYP2C41v1 but not in the feline liver.
4. Recombinant feline CYP2C41v1 metabolized several substrates, including dibenzylfluorescein that is specific to human CYP2C.
5. The results suggest a limited role of functional CYP2C isoforms in xenobiotic metabolism in cat.

ARTICLE HISTORY

Received 22 February 2018
Revised 29 May 2018
Accepted 29 May 2018

KEYWORDS

Carnivore; cytochrome P450 2C; domestic cats; xenobiotics

出典 doi: 10.1080/00498254.2018.1483543.

<https://doi.org/10.1080/00498254.2018.1483543>

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Original Article

Transcriptional profiling of cytochrome P450 genes in the liver of adult zebrafish, *Danio rerio*

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(Received December 12, 2018; Accepted February 19, 2019)

ABSTRACT — Increasing use of zebrafish in biomedical, toxicological and developmental studies requires explicit knowledge of cytochrome P450 (CYP), given the central role of CYP in oxidative biotransformation of xenobiotics and many regulatory molecules. A full complement of CYP genes in zebrafish and their transcript expression during early development have already been examined. Here we established a comprehensive picture of CYP gene expression in the adult zebrafish liver using a RNA-seq technique. Transcriptional profiling of a full complement of CYP genes revealed that CYP2AD2, CYP3A65, CYP1A, CYP2P9 and CYP2Y3 are major CYP genes expressed in the adult zebrafish liver in both sexes. Quantitative real-time RT-PCR analysis for selected CYP genes further supported our RNA-seq data. There were significant sex differences in the transcript levels for CYP1A, CYP1B1, CYP1D1 and CYP2N13, with males having higher expression levels than those in females in all cases. A similar feature of gender-specific expression was observed for CYP2AD2 and CYP2P9, suggesting sex-specific regulation of constitutive expression of some CYP genes in the adult zebrafish liver. The present study revealed several “orphan” CYP genes as dominant isozymes at transcript levels in the adult zebrafish liver, implying crucial roles of these CYP genes in liver physiology and drug metabolism. The current results establish a foundation for studies with zebrafish in drug discovery and toxicology.

Key words: Zebrafish, Cytochrome P450, CYP, Liver, Transcript expression

出典 doi: 10.2131/jts.44.347.

<https://doi.org/10.2131/jts.44.347>

最終責任者 Hiroki Teraoka (Corresponding Author)



NOTE

Toxicology

Genetic diversity of cytochrome P450 3A with different metabolic activity in domestic cats

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J. Vet. Med. Sci.
81(4): 598–600, 2019
doi: 10.1292/jvms.18-0692

Received: 21 November 2018
Accepted: 20 February 2019
Published online in J-STAGE:
4 March 2019

ABSTRACT. Knowledge on genetic polymorphisms of metabolising enzymes including cytochrome P450 (CYP) is very limited in cats. We investigated polymorphisms in CYP3A131, one of the major CYP isoforms in the feline liver and small intestine. Eight non-synonymous variants and one synonymous variant of feline CYP3A131 were identified in 29 cats. A major non-synonymous type was not observed. Metabolic parameters (K_m and V_{max}) of dibenzylfluorescein hydroxylation were ranged within about 2 times for the identified non-synonymous variants by using a heterologous coexpression system of CYP3A131 and feline cytochrome P450 reductase in *Escherichia coli*. The results confirmed the polymorphic nature of CYP3A131 as a basis for effective application of medicines and prevention of adverse reactions in the treatment of domestic cats.

KEY WORDS: cytochrome P450, domestic cat, polymorphism, xenobiotic

出典 doi: 10.1292/jvms.18-0692.

<https://doi.org/10.1292/jvms.18-0692>

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NOTE

Toxicology

Genetic diversity of cytochrome P450 1A2 with different metabolic activities in domestic cats

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J. Vet. Med. Sci.
81(7): 980–982, 2019
doi: 10.1292/jvms.19-0106

Received: 22 February 2019
Accepted: 6 May 2019
Advanced Epub:
21 May 2019

ABSTRACT. Knowledge of genetic polymorphisms of metabolizing enzymes of medical drugs and xenobiotics including cytochrome P450 (CYP) is very limited in cats. We investigated polymorphisms in CYP1A2, one of the major CYP isoforms in the feline liver. Wild-type and three non-synonymous polymorphic variants, but no synonymous variant, were identified in feline CYP1A2 in 50 alleles of domestic cats in Japan. Metabolic parameters, K_m and V_{max} , of ethoxyresorufin hydroxylation by CYP1A2 were shown to range within two times for identified non-synonymous variants by using a heterologous coexpression system. The results confirmed the polymorphic nature of CYP1A2 as a basis for effective application of medicines and prevention of adverse reactions in the treatment of domestic cats as well as for hereditary disorders.

KEY WORDS: cytochrome P450, domestic cat, polymorphism, xenobiotic

出典 doi: 10.1292/jvms.19-0106.

<https://doi.org/10.1292/jvms.19-0106>

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NOTE

Toxicology

Genetic diversity of cytochrome P450 2A with different metabolic activities in domestic cats

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J. Vet. Med. Sci.
81(7): 983–985, 2019
doi: 10.1292/jvms.19-0107

Received: 22 February 2019
Accepted: 6 May 2019
Advanced Epub:
21 May 2019

ABSTRACT. Knowledge of genetic polymorphisms of cytochrome P450 (CYP), the most important xenobiotic metabolizing enzyme, is very limited in cats. Preliminarily, we investigated genetic polymorphisms in CYP2A13, one of the major CYP isoforms in the liver and lung. Four synonymous and three non-synonymous polymorphic variants were identified in feline CYP2A13 in domestic cats in Japan, without an obvious major type. Metabolic parameters, *K_m* and *V_{max}*, of coumarin hydroxylation of CYP2A13 were shown to range within two times for the identified non-synonymous polymorphic variants by using heterologous coexpression system in *Escherichia coli*. The results confirmed the polymorphic nature of CYP2A13 as a basis for effective application of medicines and prevention of adverse reactions in treatment of domestic cats.

KEY WORDS: cytochrome P450, domestic cat, polymorphism, xenobiotic

出典 doi: 10.1292/jvms.19-0107.

<https://doi.org/10.1292/jvms.19-0107>

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1) *Bergeyella zoohelcum* isolated from oral cavities of therapy dogs.

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Zoonoses and public health. 66.8: 936-942. 2019. doi: 10.1111/zph.12644

Bergeyella zoohelcum isolated from oral cavities of therapy dogs

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Funding information

Ministry of Health, Labour and Welfare, Grant/Award Number: 20330701; Japan Society for the Promotion of Science, Grant/Award Number: 17K09243; Rakuno Gakuen University, Grant/Award Number: Grant-in-Aid for Cooperative Research from Rakuno

Abstract

Bergeyella zoohelcum causes rare but severe human clinical diseases, which mostly arise from animal bites. Notably, *Bergeyella* infections can also occur in older people after prolonged exposure to dogs or cats without biting. We detected *B. zoohelcum* in oral cavities of therapy dogs in close contact with older people residing in nursing homes. Twenty-two bacterial isolates were identified as *B. zoohelcum* by using matrix-assisted laser desorption ionization time-of-flight mass spectrometry (MALDI-TOF MS) and 16S rRNA gene sequencing. Our results showed that MALDI-TOF MS is an effective tool for rapid identification of rarely isolated, difficult-to-identify microorganisms, such as *B. zoohelcum*, derived from not only human clinical samples but also animal samples. To our knowledge, this is the first report on detection of *B. zoohelcum* from therapy dogs. We have provided information on dog-assisted therapy to improve the relationship between humans and animals in ageing societies, particularly for preventive healthcare of older people living in nursing care facilities.

KEYWORDS

ageing society, *Bergeyella zoohelcum*, older people, oral cavity, therapy dog

出典 doi: 10.1111/zph.12644

<https://onlinelibrary.wiley.com/doi/epdf/10.1111/zph.12644>

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- 1) Comparison between Minimum Alveolar Concentration and Minimum Alveolar Concentration for Blunting Adrenergic Response after Administration of Sevoflurane in Cats.

Sano T., Akashi N., Ishizuka T., Tamura J., Fukui S., Oyama N., Itami T., Ishikawa Y., Sakata H., Miyoshi K. and Yamashita K.

J. Vet. Sci. Res. 4 (1): 2019. doi: 10.23880/oajvsr-16000174

II. その他<Others>

- 1) Sedative and physiological effects of low-dose intramuscular alfaxalone in rabbits.

Ishikawa Y, Sakata H, Tachibana Y, Itami T, Oyama N, Umar MA, **Sano T**, Yamashita K.

J. Vet. Med. Sci. 81:851-856. 2019. doi: 10.1292/jvms.18-0618.

- 2) Effect of sevoflurane anesthesia on neuromuscular blockade produced by rocuronium infusion in dogs.

Sakata H, Ishikawa Y, Ishihara G, Oyama N, Itami T, Umar MA, **Sano T**, Yamashita K.

J. Vet. Med. Sci. 81:425-433. 2019. doi: 10.1292/jvms.18-0479.

- 3) Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study.

Itami T, Hanazono K, Oyama N, **Sano T**, Makita K, Yamashita K.

PLoS One. 14:e0213414. 2019. doi: 10.1371/journal.pone.0213414.

Comparison between Minimum Alveolar Concentration and Minimum Alveolar Concentration for Blunting Adrenergic Response after Administration of Sevoflurane in Cats

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Research Article

Volume 4 Issue 1

Received Date: March 08, 2019

Published Date: March 20, 2019

DOI: 10.23880/oajvsr-16000174

Abstract

Objectives: Minimum alveolar concentration (MAC) is defined as the alveolar concentration of anesthetic at 1 atmosphere that produces immobility in 50% of subjects exposed to a noxious stimulus. There is limited information regarding the MAC of sevoflurane required for blunting adrenergic responses (MAC-BAR) in cats. The aim of this study was to compare the MAC and MAC-BAR of sevoflurane required to prevent autonomic responses and purposeful movements in cats.

Methods: Six adult healthy domestic short-haired cats were anesthetized with sevoflurane. The MAC and MAC-BAR values for sevoflurane were determined by judging the cats' responses to a noxious electrical stimulus (50 V, 50 Hz, 10 msec) applied to the ventral side of the tail base.

Results: The difference between the MAC and MAC-BAR values for sevoflurane was not statistically significant.

Conclusions and Relevance: These results suggest that autonomic responses are prevented by anesthetic concentrations of sevoflurane at which purposeful movements are absent. Detrimental cardiovascular side effects, such as hypotension and impaired cardiac contractility, can occur easily in cat's anesthetized using sevoflurane.

Keywords: Anesthesia; Feline; Minimum Alveolar Concentration; Blunting Adrenergic Response; Sevoflurane



FULL PAPER

Surgery

Sedative and physiological effects of low-dose intramuscular alfaxalone in rabbits

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ABSTRACT. To evaluate sedative and physiological effects of low dose intramuscular (IM) alfaxalone, six healthy rabbits were administered single IM doses of alfaxalone at 1 mg/kg (IM1), 2.5 mg/kg (IM2.5), or 5 mg/kg (IM5) with a minimum of 7-day washout period. Sedative effects were subjectively evaluated using a composite measure scoring system (maximum sedation score of 16) and pulse rate, respiratory rate, non-invasive blood pressure, and percutaneous oxygen-hemoglobin saturation were measured before and after IM alfaxalone. Loss of righting reflex (LRR) was achieved in all rabbits after IM2.5 and IM5 treatments but in only three rabbits after IM1 treatment. Median (interquartile range) times to LRR were 16 min (15–17), 6 min (6–6), and 4 min (4–4), and median durations of LRR were 0.5 min (0–7), 22.5 min (19–27), and 53 min (48–58) after IM1, IM2.5, and IM5 treatments, respectively. The duration of LRR after IM5 treatment was significantly longer than those after IM1 and IM2.5 treatments ($P < 0.01$). Median value of total sedation scores peaked at 10 min [score 3.5 (3–4)], from 10 min [score 13.5 (12–14)] to 15 min [score 13.5 (12–14)], and from 10 min [score 15 (12–15)] to 15 min [score 15 (14–15)] after IM1, IM2.5, and IM5 treatments, respectively. No rabbit showed circulatory depression and apnea although respiratory rate decreased after IM 2.5 and IM5 treatments. In conclusion, alfaxalone produced a dose-dependent sedative effect and a deep sedation was achieved by alfaxalone at 2.5 mg/kg IM in rabbits.

KEY WORDS: alfaxalone, intramuscular administration, rabbit, sedation

J. Vet. Med. Sci.
81(6): 851–856, 2019
doi: 10.1292/jvms.18-0618

Received: 22 October 2018
Accepted: 4 April 2019
Published online in J-STAGE:
2 May 2019

出典 doi: 10.1292/jvms.18-0479.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6612508/>

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FULL PAPER

Surgery

Effect of sevoflurane anesthesia on neuromuscular blockade produced by rocuronium infusion in dogs

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ABSTRACT. This study evaluated the effect of sevoflurane anesthesia on neuromuscular blockade with rocuronium in dogs. Six healthy beagle dogs were anesthetized four times with a minimum 14-day washout period. On each occasion, the dogs were administered 1.25-, 1.5-, 1.75-, or 2.0-fold of the individualized minimum alveolar concentration (MAC) of sevoflurane and received an infusion of rocuronium (0.5 mg/kg followed by 0.2 mg/kg/hr) for 120 min. Neuromuscular function was monitored with acceleromyography and train-of-four (TOF) stimulation of the left hind limb. Time to achieve TOF count 0 (onset time), time from the onset of neuromuscular blockade to the reappearance of TOF count 4 (blockade period), and time from the onset of rocuronium infusion to attaining a 70 or 90% TOF ratio (TOFR₇₀ or TOFR₉₀) were recorded. There were no significant differences in the onset time, blockade period, and plasma rocuronium concentration between the sevoflurane MAC multiples. The TOFR₇₀ and TOFR₉₀ were dose-dependently prolonged with the sevoflurane MAC multiples. There were significant differences in the TOFR₇₀ and TOFR₉₀ between the 1.25 sevoflurane MAC (median: 55 and 77.5 min, respectively) and 1.75 sevoflurane MAC (122.0 and 122.6 min; $P=0.020$ and $P=0.020$, respectively), 1.25 sevoflurane MAC and 2.0 sevoflurane MAC (126.0 and 131.4 min; $P=0.020$ and $P=0.020$), and 1.5 sevoflurane MAC (97.5 and 121.3 min) and 2.0 sevoflurane MAC ($P=0.033$ and $P=0.032$). In dogs, sevoflurane anesthesia produced dose-dependent prolongation of recovery from neuromuscular blockade produced by rocuronium.

KEY WORDS: dog, interaction, neuromuscular blockade, rocuronium, sevoflurane

J. Vet. Med. Sci.
81(3): 425–433, 2019
doi: 10.1292/jvms.18-0479

Received: 13 August 2018
Accepted: 2 January 2019
Published online in J-STAGE:
30 January 2019

出典 doi: 10.1292/jvms.18-0479.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6451902/>

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RESEARCH ARTICLE

Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study

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OPEN ACCESS

Citation: Itami T, Hanazono K, Oyama N, Sano T, Makita K, Yamashita K (2019) Cardiovascular effects of intravenous colforsin in normal and acute respiratory acidosis canine models: A dose-response study. PLoS ONE 14(7): e0213414. <https://doi.org/10.1371/journal.pone.0213414>

Editor: Ferenc Gallyas, Jr., University of PECS Medical School, HUNGARY

Received: February 18, 2019

Accepted: June 25, 2019

Published: July 10, 2019

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Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Funding: This work was supported by JSPS KAKENHI Grant Number JP 26861516. The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Competing Interests: The authors have declared that no competing interests exist.

Abstract

In acidosis, catecholamines are attenuated, and higher doses are often required to improve cardiovascular function. Colforsin activates adenylate cyclase in cardiomyocytes without beta-adrenoceptor. Here, six beagles were administered colforsin or dobutamine four times during eucapnia (partial pressure of arterial carbon dioxide 35–40 mm Hg; normal) and hypercapnia (ibid 90–110 mm Hg; acidosis) conditions. The latter was induced by CO₂ inhalation. Anesthesia was induced with propofol and maintained with isoflurane. Cardiovascular function was measured by thermodilution and a Swan-Ganz catheter at baseline and 60 min after 0.3 µg/kg/min (low), 0.6 µg/kg/min (middle), and 1.2 µg/kg/min (high) colforsin administration. The median pH was 7.38 [range 7.33–7.42] and 7.01 [range 6.96–7.08] at baseline in the Normal and Acidosis conditions, respectively. Endogenous adrenaline and noradrenaline levels at baseline were significantly ($P < 0.05$) higher in the Acidosis than in the Normal condition. Colforsin induced cardiovascular effects similar to those caused by dobutamine. Colforsin increased cardiac output in the Normal condition (baseline: 3.9 ± 0.2 L/kg/m² [mean \pm standard error], low: 5.2 ± 0.4 L/kg/min², middle: 7.0 ± 0.4 L/kg/m², high: 9.4 ± 0.2 L/kg/m²; $P < 0.001$) and Acidosis condition (baseline: 6.1 ± 0.3 L/kg/m², low: 6.2 ± 0.2 L/kg/m², middle: 7.2 ± 0.2 L/kg/m², high: 8.3 ± 0.2 L/kg/m²; $P < 0.001$). Colforsin significantly increased heart rate and decreased systemic vascular resistance compared to values at baseline. Both drugs increased pulmonary artery pressure, but colforsin (high: 13.3 ± 0.6 mmHg in Normal and 20.1 ± 0.2 mmHg in Acidosis) may have lower clinical impact on the pulmonary artery than dobutamine (high: 19.7 ± 0.6 in Normal and 26.7 ± 0.5 in Acidosis). Interaction between both drugs and experimental conditions was observed in terms of cardiovascular function, which were similarly attenuated with colforsin and dobutamine under acute respiratory acidosis.

出典 doi: 10.1371/journal.pone.0213414.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6619603/pdf/pone.0213414.pdf>

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- 1) Vision outcome with antiglaucoma therapy and prognostic factors in canine glaucoma: A 6-years retrospective study in Japan.
Kubo A, Ito Y, Masuko A, Maehara S, Miyasho T, Nakade T.
Jpn. J. Vet. Res. 2019. **67**(1): 93-102. doi: 10.14943/jjvr.67.1.93.
- 2) Deficiency of CRTH2, a Prostaglandin D2 Receptor, Aggravates Bleomycin-Induced Pulmonary Inflammation and Fibrosis.
Ueda S, Fukunaga K, Takihara T, Shiraishi Y, Oguma T, Shiomi T, Suzuki Y, Ishii M, Sayama K, Kagawa S, Hirai H, Nagata K, Nakamura M, Miyasho T, Betsuyaku T, Asano K.
Am. J. Respir. Cell. Mol. Biol. 2019. **60**(3): 289-298.
doi: 10.1165/rcmb.2017-0397OC.
- 3) Rapid prolactin induction in adult male rats after treatment with diethylstilbestrol.
Maeda N, Okumura K, Yamaguchi K, Haeno S, Yasui Y, Kimura N, Ieko T, Miyasho T, Yokota H.
J. Neuroendocrinol. 2019. **31**(10): e12769. doi: 10.1111/jne.12769.
- 4) Clinical significance of preoperative serum concentrations of interleukin-6 as a prognostic marker in patients with esophageal cancer.
Maeda Y, Takeuchi H, Matsuda S, Okamura A, Fukuda K, Miyasho T, Nakamura R, Suda K, Wada N, Kawakubo H, Kitagawa Y.
Esophagus. 2019. in press. doi: 10.1007/s10388-019-00708-6.

Vision outcome with antiglaucoma therapy and prognostic factors in canine glaucoma: A 6-years retrospective study in Japan

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Received for publication, June 6, 2018; accepted, September 17, 2018

Abstract

Vision outcome provides invaluable information in clinical decision making in the management of canine glaucoma. In the present study, data of glaucoma dogs were retrospectively evaluated for vision outcome by treatment modality (with or without surgical implantation of the Ahmed glaucoma valve, AGV) and by type of glaucoma, sex and breed in cases of medically treated glaucoma. Among 1990 dogs presented with eye diseases between 2011 and 2017, 224 dogs (11.3%) were diagnosed with glaucoma at initial presentation and 228 eyes of 207 dogs have follow-up records of at least 30 days were included in the analysis. At the time of first presentation, 62/228 eyes (27.2%) were visual. Visual preservation rates were constantly significantly higher in dogs that received AGV placement with a median time to vision loss of 76.4 weeks vs. 9.6 weeks in dogs that received medical treatment alone. Among dogs treated medically, vision outcome was comparable between two types of glaucoma (*i.e.*, primary and secondary) and between sexes. Medically treated Shiba dogs showed significantly lower vision preservation rates and a shorter median time to vision loss compared to other breeds. These results suggest that AGV implants result in better vision outcome compared to medical therapy alone and should be considered in dogs that are visual at the time of presentation and suitable for surgery. And Shiba dogs are considered as the factor that indicate poor vision outcome of medical treatment alone in the present study.

出典 doi: 10.14943/jjvr.67.1.93.

<http://hdl.handle.net/2115/72747>

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ORIGINAL RESEARCH

Deficiency of CRTH2, a Prostaglandin D₂ Receptor, Aggravates Bleomycin-induced Pulmonary Inflammation and Fibrosis

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Abstract

Chemoattractant receptor homologous with T-helper cell type 2 cells (CRTH2), a receptor for prostaglandin D₂, is preferentially expressed on T-helper cell type 2 lymphocytes, group 2 innate lymphoid cells, eosinophils, and basophils, and elicits the production of type 2 cytokines, including profibrotic IL-13. We hypothesized that lack of CRTH2 might protect against fibrotic lung disease, and we tested this hypothesis using a bleomycin-induced lung inflammation and fibrosis model in CRTH2-deficient (CRTH2^{-/-}) or wild-type BALB/c mice. Compared with wild-type mice, CRTH2^{-/-} mice treated with bleomycin exhibited significantly higher mortality, enhanced accumulation of inflammatory cells 14–21 days after bleomycin injection, reduced pulmonary compliance, and increased levels of collagen and total protein in the lungs. These phenotypes were associated with decreased levels of IFN- γ , IL-6, IL-10, and IL-17A in BAL

fluid. Adoptive transfer of splenocytes from wild-type, but not CRTH2^{-/-}, mice 2 days before injection of bleomycin resolved the sustained inflammation as well as the increased collagen and protein accumulation in the lungs of CRTH2^{-/-} mice. We consider that the disease model is driven by $\gamma\delta$ T cells that express CRTH2; thus, the adoptive transfer of $\gamma\delta$ T cells could ameliorate bleomycin-induced alveolar inflammation and fibrosis.

Keywords: bleomycin; CRTH2; $\gamma\delta$ T cell; IL-10; IL-17

Clinical Relevance

One of the prostaglandin 2 receptors, chemoattractant receptor homologous with T-helper cell type 2 cells, may have protective roles against bleomycin-induced lung injury.

出典 doi: 10.1165/rcmb.2017-0397OC.

<https://doi.org/10.1165/rcmb.2017-0397OC>

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Rapid prolactin induction in adult male rats after treatment with diethylstilbestrol

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Funding information
Grant-in-aid and Support Project to Assist Private Universities in Developing Bases for Research; Ministry of Education, Science, Sports and Culture and Technology

Abstract

Diethylstilbestrol (DES) is a synthetic oestrogen known to disrupt the endocrine system and to cause reproductive toxicity mediated via the hypothalamic-pituitary-adrenal axis; however, its molecular mechanism of action is poorly understood. In the present study, we found that, after only 1 week of exposure to DES, blood testosterone dramatically decreased and that this decrease was associated with a strong induction of prolactin (PRL). Even with the increase in PRL, the luteinising hormone and follicle-stimulating hormone mRNAs slightly decreased. Our results show that, after 48 hours of a single dose of DES, there was a six-fold increase in PRL expression. After exploring the upstream mechanisms, we determined that dopamine, which inhibits PRL secretion in male rats, did not decrease in the pituitary gland of DES-treated rats, whereas vasoactive intestinal peptide (VIP), which mediates the acute release of PRL, was elevated. Serotonin (5-HT) increased in the brain of male rats 24 hours after a single DES treatment; however, PRL, VIP or 5-HT was not induced by DES in female rats. Our results indicate that DES induces the expression of pituitary PRL in male rats by stimulating VIP in the hypothalamus and 5-HT in the central nervous system.

KEYWORDS

diethylstilbestrol, endocrine disrupter, prolactin, serotonin, vasoactive intestinal peptide

出典 doi: 10.1111/jne.12769.

<https://doi.org/10.1111/jne.12769>

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Clinical significance of preoperative serum concentrations of interleukin-6 as a prognostic marker in patients with esophageal cancer

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Received: 19 July 2019 / Accepted: 10 December 2019
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Abstract

Background Although the clinical outcome of esophageal cancer has recently improved, the relapse rate remains high for all disease stages. At present, there is no diagnostic method to predict the long-term outcome for esophageal cancer. In this study, we evaluated serum preoperative proinflammatory cytokine levels and investigated the correlation between preoperative interleukin-6 (IL-6) and IL-8 levels and survival of patients with esophageal cancer.

Methods Between 2008 and 2015, we evaluated preoperative serum cytokine levels in 122 patients who underwent esophagectomy for esophageal cancer. Serum IL-6 and IL-8 levels were measured by enzyme-linked immunosorbent assays. We investigated the relationship between serum cytokine levels and the response to chemotherapy and survival.

Results The preoperative IL-6 levels were significantly associated with shorter recurrence-free survival (RFS, $p=0.001$) and overall survival (OS, $p=0.001$) after esophagectomy. Higher IL-8 levels were significantly associated with RFS ($p=0.018$).

In the multivariate analysis, age, preoperative chemotherapy, lymph node metastasis, serum C-reactive protein (CRP) levels and serum IL-6 levels (hazard ratio (HR), 2.888; $p=0.049$) were significantly independent prognostic factors of RFS. Additionally, age, pathological stage, and serum IL-6 levels (HR, 3.247; $p=0.027$) were shown to be significantly independent prognostic factors of OS. Serum IL-6 levels were significantly higher in the non-responder group (pathological response pGrade0 and pGrade1) after neoadjuvant therapy.

Conclusions High preoperative serum IL-6 levels are associated with a poor response to chemotherapy or chemoradiotherapy and poor prognosis after esophagectomy. Preoperative serum IL-6 levels may be a useful independent prognostic marker for esophageal cancer patients.

出典 doi: 10.1007/s10388-019-00708-6.

<https://link.springer.com/article/10.1007/s10388-019-00708-6>

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