Core-to-Core Program

Joint Seminar

With

Parasitology and Tropical Medicine / Environmental Hygiene

Friday, December 10, 2021

Time 13:30～15:30

Place M1号館33講義室

■ Speaker ■

Dr. Hirotomo Kato

Professor

Department of Infection and Immunity, Jichi Medical University

Leishmaniasis: field-to-lab & lab-to-field

Dr. Daisuke S. Yamamoto

Associate Professor

Department of Infection and Immunity, Jichi Medical University

A mosquito control technique using a synthetic cell ablation system

■ お問合せ先 ■

北里大学医学部寄生虫学・熱帯医学

〒252-0374　神奈川県相模原市南区北里1-15-1

TEL/FAX: 042-778-9312　E-mail:hkawada@med.kitasato-u.ac.jp

北里大学 KITASATO UNIVERSITY

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UNIVERSITY OF GHANA, LEGON

研究拠点形成事業
Core-to-Core Program

学祖と野口英世博士の出会いから120年、
再びガーナ国・アクラで協働事業が始まります。

寄生虫学・熱帯医学　環境衛生学　大村智記念研究所

寄生虫学・熱帯医学 / 環境衛生学　合同セミナー

2021年12月10日 金

時 間　13:30～15:30

場 所　M1号館33講義室

■ 講 演 者 ■

加藤　大智　博士

自治医科大学感染・免疫学講座医動物学部門　教授

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山本　大介　博士

自治医科大学感染・免疫学講座医動物学部門　准教授

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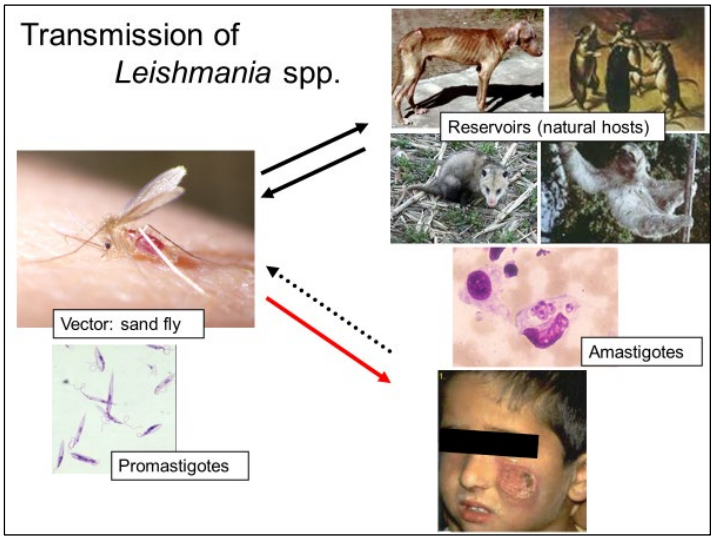
Leishmaniasis: field-to-lab & lab-to-field

Hirotomo Kato
Division of Medical Zoology, Department of Infection and Immunity, Jichi Medical University,
Tochigi 329-0498, Japan

Leishmaniasis is a neglected tropical disease caused by approximately 20 species of obligate intracellular protozoa of the genus *Leishmania*, affecting at least 12 million people in about 100 countries/areas. Most *Leishmania* species are transmitted by zoonotic cycle via the bite of an infected female sand fly, although anthroponotic transmission is reported in several species. *Leishmania* infection causes a broad range of clinical manifestations: cutaneous (CL), mucocutaneous (MCL), and visceral (VL) leishmaniases with different severities. Since parasite species infected is the major determinant for the clinical outcome, identification of the causative parasite is important for appropriate treatment and prognosis.



Phlebotomine sand flies are tiny blood-sucking insects with nocturnal habits that feed on a wide range of hosts including mammals, reptiles, and amphibians, depending on the species. To date, more than 1,000 sand fly species have been recorded in the world, of which approximately 10 percent are responsible for the transmission of *Leishmania.* In addition, each vector species transmits specific *Leishmania* species. Therefore, studies on sand fly fauna and the identification of vector species of leishmaniasis in endemic and surrounding areas are important for predictions of the risk of transmission and expansion of the disease.

We are conducting epidemiological research on leishmaniasis in South American and Asian countries. In this seminar, I would like to introduce our findings obtained through field and lab works, especially focusing on 1) Field activity, 2) Geographic distribution of *Leishmania* species and identification of genetically complex *Leishmania* strains, and 3) Vector research.

References

Kato et al., *Am J Trop Med Hyg* 77:324-329. 2007, *Am J Trop Med Hyg* 79:719-721. 2008, *J Clin Microbiol* 48:3661-3665, 2010, *Acta Trop* 141:79-87, 2015, *PLoS Negl Trop Dis* 10:e0004844, 2016, *PLoS Negl Trop Dis* 10:e0004336, 2016, *PLoS Negl Trop Dis* 13:e0007496, 2019, *PLoS Negl Trop Dis* 13:e0007403, 2019, *Front Cell Infect Microbiol* 11:625001, 2021. Fujita et al., *Acta Trop* 121:93-98, 2012. Gomez et al., *Acta Trop*. 137:118-122, 2014, *Acta Trop* 140:41-49, 2014. Tabbabi et al., *PLoS Negl Trop Dis* 14:e0008797, 2020, *Microorganisms* 9:68, 2021.

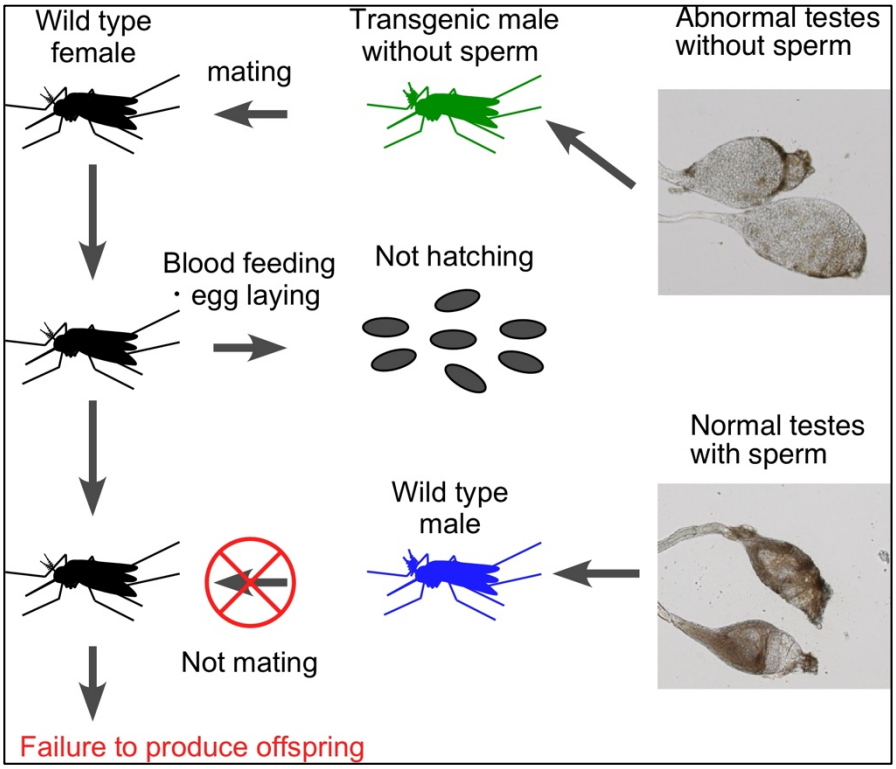
A mosquito control technique using a synthetic cell ablation system

Daisuke S. Yamamoto*

*Division of Medical Zoology, Department of Infection and Immunity, Jichi Medical University, Yakushiji, Shimotsuke, Tochigi, Japan

Malaria is an infectious disease and a significant public health burden that is estimated to kill over 400,000 people each year globally. The control of *Anopheles* mosquitoes, the malaria vector, is an effective method to control malaria. One promising strategy is the genetic control of mosquitoes through transgenesis and genome editing.

Recently, we developed a new cell death induction system in insect tissues using one of the pro-apoptotic factors derived from mouse and a tissue-specific promoter. This system is effective in inhibiting and analyzing the function of specific tissues of insects. In this study, we adapted this system to inhibit testes function in *Anopheles* mosquitoes and produced transgenic lines. Males of this line lacked normal sperm in testes, but could successfully mate with females. Females that mated with these males became infertile and the sterility effect was persistent. Therefore, this system could be a useful tool for analyzing the function of tissues in *Anopheles* mosquitoes and to control their population.



References

Yamamoto DS, Sumitani M, Kasashima K, Sezutsu H, Matsuoka H, Kato H. A synthetic male-specific sterilization system using the mammalian pro-apoptotic factor in a malaria vector mosquito. *Sci Rep*, 2019; 9: 8160.

Yamamoto DS, Sumitani M, Kasashima K, Sezutsu H, Matsuoka H. Inhibition of malaria infection in transgenic anopheline mosquitoes lacking salivary gland cells. *PLoS Pathog*, 2016; 12: e1005872.