

Laboratory of Bacteriology

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Research Overview

Microorganisms are ubiquitous and can sometimes threaten the health of animals and humans. Particularly, microorganisms that infect both animals and humans are of great concern in modern society, where human-animal interactions are diverse. These microorganisms can cause zoonotic diseases and food hygiene issues. Our laboratory conducts epidemiological surveys of ticks and wild animals that act as vectors in transmitting pathogens between animals and humans. We aim to elucidate how tick-borne diseases are maintained in nature. Additionally, we investigate antibiotic resistance in *Enterobacteriaceae* in the meat distribution industry to understand how resistance genes spread between animals and humans through meat.

Research Projects

1. Arthropod born zoonosis

Blood-sucking arthropods such as ticks and fleas can parasitize both humans and animals, potentially transmitting various zoonotic pathogens. In Japan, there is concern about the increasing incidence of Japanese spotted fever caused by *Rickettsia japonica*, which is transmitted by ticks. To clarify the distribution of ticks in Kyoto City, we are conducting tick surveys (Fig.1). Numerous wild animals inhabit the survey areas, and we

conducted ecological surveys using infrared cameras to examine how these wild animals are involved in the tick life cycle (Fig.2). We also conduct small wild animal trapping surveys using Sherman traps.

Recently, the intrusion of wild animals into urban areas has become a problem, raising concerns about the transmission of infectious diseases from wild animals. Our laboratory isolated *Bartonella* from masked palm civets, whose population increase has become an issue. *Bartonella* is a bacterium that causes zoonotic diseases such as cat scratch disease and can infect humans through flea bites. Since the pathogenicity of *Bartonella* in masked palm civets to



Fig. 1. Tick survey by flagging method.



Fig. 2. Life cycle of tick.

wild animals and humans is unknown, we will continue detailed analysis and investigate the arthropods that mediate the infection and the infection cycle to clarify the transmission routes. We will continue to examine the infection status of these wild animals.

2. Food born zoonosis

Antibiotic-resistant bacteria pose a public health problem as they limit the antibiotics available for treating bacterial infections. It has been suggested that antibiotic-resistant bacteria that emerged due to the use of antibiotics in livestock can attach to meat and be transmitted to humans. Therefore, our laboratory continues to isolate *E. coli* from the environment of meat inspection sites and investigate their antibiotic sensitivity to understand the current situation of antibiotic-resistant bacteria. Since our survey revealed that multi-drug resistant in *Enterobacteriaceae* in slaughterhouses, we need to continue monitoring the antibiotic resistance.