S18-3
Grouping of *Legionella pneumophila* by environmental habitats and each infection risk

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生態環境による *Legionella pneumophila* の分類と感染リスク

○倉 文明

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Key word: *Legionella pneumophila*, bath water, soil, cooling tower water

*Legionella* is an opportunistic pathogen causing pneumonia and does not transmit between humans. In Japan, a major source of infection seems to be bath water (BW). In our study, 29% of 113 BW samples were culture positive for *Legionella*. By using multiple logistic regression analysis, a standard plate count in BW was found to be an important risk factor for *Legionella* contamination. Amounts of ATP in BW had a threshold for *Legionella* contamination in BW. In a spa model, after stopping disinfection, bacterial counts increased first, amoeba counts secondly, and finally legionellae increased to a level of ~105 cfu/100 mL. In large spa outbreaks, such concentrations of *Legionella* were actually recorded although the occurrence of legionellosis is low. The majority of *Legionella* spp. detected in cultures have been *L. pneumophila* in both clinical and environmental samples. Recent sequence-based typing of *L. pneumophila* highlighted international comparison and grouping of strains, using a minimum spanning tree (MST). We found that environmental isolates from BW, cooling tower water, and soil formed clonal complexes (CCs) each. Furthermore, clinical isolates in a MST could be grouped in comparison with CCs of environmental isolates, showing that a part of unknown sources of infection were related to soil and that one CC did not associate with environments ever tested.

S18-4
Linkage of anthropogenic environmental change and infectious disease in a lake ecosystem

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水域環境変化と感染症の連環

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Key word: Environmental change, infectious disease, lake ecosystem, KHV, linkage

Objective: Research objective is to verify the hypothesis that anthropogenic environmental changes mediate disease outbreaks and spread by analyzing the lakeshore degradation by humans - koi herpesvirus (KHV) disease linkage in a lake as a case study. Methods: We intensively examined the ecological causes and effects of KHV disease in Lake Biwa, Japan. Although we previously had no methods to detect KHV and common carp (Cyprinus carpio carpio) in the natural environment, we have developed novel detection methods for them. Results: Spatial and temporal changes in water temperature in human-degraded littoral zones without a slope gradient are more homogenous than in natural littoral zones. We found that breeding habitats can become hot spots for transmission of KHV disease. We showed that temporarily high local densities of carp by decreasing breeding habitats caused by human activity resulted in outbreaks of KHV disease. Combining these data, we found that anthropogenic environmental changes mediate disease outbreaks and spread. Discussion: We will discuss how we can describe the link between the environment, pathogens, and humans for other infectious diseases based on KHV disease in order to understand their outbreaks and spread.