

(別紙) 研究成果の概要 (英文)

Title of research project	The study of emergence trends and characterization of colistin-resistant bacteria
Research project number	1703
Research period	FY 2017 – 2018
Name of principal research investigator (PI)	Yutaka Tamura

Abstract/Summary

To collect the insufficient data on Food Health Impact Assessment regarding colistin resistance in livestock, several experiments were performed. First of all, only *mcr-1* gene were known as plasmid mediated colistin resistance genes in the beginning of this project. During this project, the other *mcr* genes were reported, one after another. Therefore, the other *mcr* genes were also tested in this project. This study clarified the prevalence and character of chromosomal and plasmid-mediated colistin resistant bacteria. In addition, quantitative assessment of emergence of *mcr* gene-positive *Escherichia coli* in pigs were performed from this project data with previous data. In future, these results would be useful information to re-evaluate the Food Health Impact Assessment reports on colistin.

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1. List of papers published on the basis of this research

Contribution of Novel Amino Acid Alterations in PmrA or PmrB to Colistin Resistance in *mcr*-Negative *Escherichia coli* Clinical Isolates, Including Major Multidrug-Resistant Lineages O25b:H4-ST131-H30Rx and Non-x.

Sato T, Shiraishi T, Hiyama Y, Honda H, Shinagawa M, Usui M, Kuronuma K, Masumori N, Takahashi S, Tamura Y, Yokota SI.

© Antimicrob Agents Chemother. 2018 Aug 27;62(9). pii: e00864-18. doi: 10.1128/AAC.00864-18. Print 2018 Sep.

PMID: 29914952

Isolation of a *mcr-1*-harbouring *Escherichia coli* isolate from a human clinical setting in Sapporo, Japan.

Sato T, Fukuda A, Usui M, Shinagawa M, Shiraishi T, Tamura Y, Takahashi S, Yokota

SI.

©J Glob Antimicrob Resist. 2018 Jun;13:20-21. doi: 10.1016/j.jgar.2018.02.010.
Epub 2018 Feb 21. No abstract available.

PMID: 29476984

High prevalence of *mcr-1*, *mcr-3*, and *mcr-5* in *Escherichia coli* derived from diseased pigs in Japan.

Fukuda A, Sato T, Shinagawa M, Takahashi S, Asai T, Yokota SI, Usui M, Tamura Y.

©Int J Antimicrob Agents. 2018 51 (1). 163-164.

2. List of presentations based on this research

Takayanagi S, Sugiyama M, Asai T. Isolation of colistin-resistant bacteria from retail meat by using selective agar. 2018. Central Japan Veterinary Conference. Nagoyo.

Takayanagi S, Sugiyama M, Usui M, Asai T. Applying several concentration of colistin on selective agar for isolation of colistin-resistant bacteria from retail meat. 2018. The 161th meeting of the Japanese Society of Veterinary Science. Tsukuba.

Takayanagi S, Sugiyama M, Asai T. The prevalence of colistin resistant bacteria and *mcr* genes in retail meat in Japan. 2018. The 161th meeting of the Japanese Society of Veterinary Science. Tsukuba.

Toyotaka Sato, Masaru Usui, Masaaki Shinagawa, Akira Fukuda, Hiroyuki Honda, Tsukasa Shiraiishi, Hiroki Takahashi, Yutaka Tamura, Satoshi Takahashi, Shin-ichi Yokota. Colistin and tigecycline resistance in an epidemic clone, ST131, *Escherichia coli* clinical isolates. 2018. The 91th Annual meeting of Japanese Society for Bacteriology.

Toyotaka Sato. Molecular epidemiological analysis of antimicrobial resistant bacteria isolated from animals and human. The seventh Open Seminar of Bacteriology.

Sugawara N, Miyama G, Tamura Y, Makita K. Condition of usage of colistin in Japanese pig farm. 2018. The meeting of veterinary epidemiology. Tokyo.

Makita K, Fujimot Y, Miyama G, Sugawara N, Usui M, Asai T, Kawanishi M, Tamura Y. Evaluation of the risk of emergence of colistin resistance *E. coli* in pig farms by using sample based model. 2019. The meeting of veterinary epidemiology. Tokyo.

Sugawara N, Tamura Y, Makita K. The affect of ban of using the colistin as food additive in pig farm. 2019. The meeting of veterinary epidemiology. Tokyo.

3. The number and summary of patents and patent applications

Nothing

4. Others (awards, press releases, software and database construction)

Construction of risk model for emergence of colistin-resistant *Escherichia coli*