

Fiscal Year 2017, Tokyo Institute of Technology ASPIRE League Research Grant

Selected Research Project for Type 1 in FY2017

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	Tsinghua	Ting Zhu, Investigator, Associate Professor School of Life Sciences
Subject of the research project		Analysis and harnessing bacterial community
Summary of the research project		<p>Most microbes on the earth live as communities consisting of various species that interact with each other. However, uncultured and veiled microbes still exist in large quantities, and only several percent of all microbes have been isolated and cultured in laboratories. The term VBNC (Viable But Non-Culturable) means the state where "microbes are uncultured though their existence is confirmed". Studies on reviving microbes from the VBNC state are carried out all over the world, but there are limited examples of success. Meanwhile, in recent years, next-generation sequencers (NGS) have become popular, and studies on the VBNC microbes have begun to show a change; DNAs/RNAs are extracted from microbial communities, and their sequences are massively read to reveal the function of individual microbes without isolating each microbe.</p> <p>In ordinary laboratory experiments, microbes are grown as planktonic cells using rich media. However, microbes in the true environment often exist as sessile (adherence) cells. Even if it is the same species, the gene expression</p>

Summary of the research project	<p>pattern is known to vary between planktonic and sessile cells. Therefore, studies on sessile cells are necessary to understand the microbial ecology accurately, but such studies are lagging behind.</p> <p>Considering the above-mentioned circumstances, in this grant application, we perform research on "analysis and utilization of microbial community" and "analysis of sessile cells". Specifically, we study the following two points. 1) Biofilm is a kind of sessile cell community and consists of many kinds of microbes. Using an artificial system in which biofilm is reproduced repeatedly in the laboratory, differences between planktonic and sessile cells are analyzed. 2) We propose a new method using metatranscriptomic analyses to find industrially useful genes from microbial communities that contain VBNC microbes.</p>
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