



TARA

Life Science Center of  
Tsukuba Advanced Research Alliance

# TARA Seminar

16:30~18:00, Wed. January 25th, 2017  
Seminar room, Building A, TARA Center

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## CpG-free DNA induces *de novo* methylation of CpG islands

CpG-free DNA はCpG islandsにおける新規DNAメチル化を誘導できる

DNA methylation plays major roles in defining cell identity and function during both embryogenesis and adult physiology. However, a detailed understanding of this process has been impeded by a lack of robust tools for targeted and stable DNA methylation editing technologies. Here we show that insertion of CpG-free DNA into CpG islands (CGIs) induces stable *de novo* methylation in CGIs in pluripotent stem cells (PSCs). By targeting the CGI associated with *MLH1*, we have generated the first cellular model of a cancer-related epimutation. To further explore the therapeutic potential of this strategy, we demonstrated complete and stable correction of aberrant DNA methylation in iPSCs derived from a patient with Angelman syndrome (AS), thereby restoring expression of the AS-causing gene, *UBE3A*, in neurons differentiated from AS-iPSCs. Our strategy opens the door for targeted CGI methylation editing for a better understanding of human physiology and disease.

Organizer; Prof. Akiyoshi Fukamizu <akif @ tara.tsukuba.ac.jp>

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