Research Hotline

UPDATE FROM THE CUTTING EDGE

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The abstracts of the recent research information appearing in Vol.12 No.7-9 of "AIST TODAY" are introduced here, classified by research areas.
For inquiry about the full articles, please contact the authors via e-mail.

Life Science and Biotechnology

Novel function of elongation factors of protein synthesis
Translational elongation factors as replication factors

Qβ virus infects Escherichia coli and replicates its genomic RNA using Qβ replicase, which comprises the virus-encoded RNA-dependent RNA polymerase (β-subunit) and the host translational elongation factors EF-Tu and -Ts. We determined structures of complex representing RNA polymerization by Qβ replicase. At the elongation stage, where a ten nucleotide (nt) RNA is synthesized, the C-terminal region of β-subunit and EF-Tu together direct the over-hanging 3'-adenosine of the template RNA in a double-stranded complex with the growing RNA into an exit channel. At the following RNA elongation stage, the double-stranded RNA is split apart by a wedge formed by the C-terminal region of the β-subunit. The 3'-part of the single-stranded template RNA translocates into the exit channel with assistance from EF-Tu, and the 5'-part of the single-stranded growing RNA is released from Qβ replicase. EF-Tu in Qβ replicase modulates RNA elongation processes, beyond its established function in protein synthesis.

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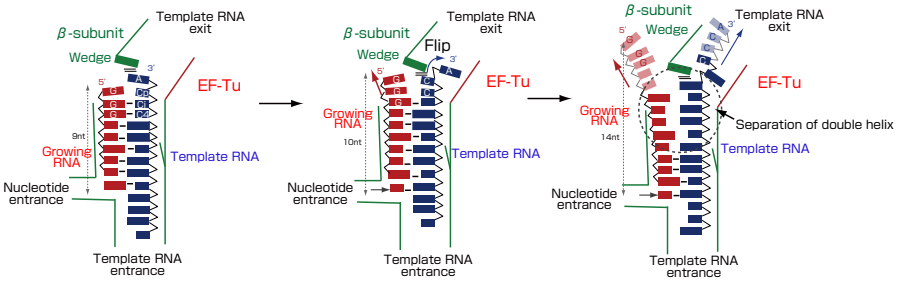

Structures of Qβ replicase representing RNA elongation stages
Structures where 9 nt (left), 10 nt (middle) and 14 nt (right) long RNAs are synthesized