

Abstract

Insertion sequences are the smallest type of mobile genetic element. They are formed from specific repetitive elements, between which gene for transposition is placed. That is an enzyme used for their genome propagation.

REP elements are short repetitive sequences abundantly represented in many bacterial classes. They are placed in noncoding regions of genome. They have a palindromic structure, thanks to that their sides are complementary. ssRNA and ssDNA forms of REP can form a stem-loop structure. In the host genome, there are hundreds of these elements. REPs are usually grouped in higher structural units: REPIN, which has structure REP-spacer-REP, or BIME with iREP-spacer-iREP structure. These structures are associated with RAYT, tyrosine nuclease related to IS200/IS605 transposase family. The RAYT is a domesticated enzyme propagating REP elements through the genome. The presence of REP elements has an influence on transcription and translation of neighbouring genes. In addition, REPs interact with proteins important for cell physiology.

This thesis is focused on the dissemination of REP elements, their characteristics, function in cells, and cooperation with RAYT nucleases. This thesis also summarizes the findings of RAYT and their similarities and differences from other families of transposases.

Key words:

REP elements, BIME, REPIN, RAYT, IS200/IS605, Y1 transposases, mobile genetic elements