Abstract

Maintenance of genomic integrity is an essential mechanism for every cell. Genomic integrity is disturbed by diverse exogenous or endogenous effects influencing the cell and causing damage of its DNA. Cellular mechanisms capable of fixing these disturbances in structure or sequence are indispensable because damaged genetic information can later cause expression of damaged proteins or inaccurate segregation of chromosomes to daughter cells. Therefore, many effective mechanisms for fixing wide range of types of DNA damage have evolved. This thesis focuses mainly on the eucaryotic MRN complex, which plays an important role in detection and repair of double strand breaks.

Many viral families try to block these cellular repair mechanisms because they are activated soon after viral infection. One of the reasons for their activation is the resemblance of some viral genomes to the cellular DNA with double strand breaks. Thus, in many cases, the cell ends up inhibiting the life cycle of the virus by attempting to repair viral genomes. However, there are viruses that use cellular repair mechanisms for the replication of their genome, making these mechanisms essential for their own growth.

Key words: DNA damage response, homologous recombination, non-homologous end-joining, MRN complex, *Adenoviridae, Papillomaviridae, Herpesviridae*