

Plasmids, which are defined as extrachromosomal, autonomously replicating DNA molecules occurring in cells, are carriers of genes coding for various virulence factors of bacteria, as well as of genes determining antibiotic resistance. On the other hand, they are also commonly used vectors in genetic engineering. Thus, plasmids play important roles in various aspects of human life as medicine and biotechnology. Accordingly, understanding mechanisms of their replication and biology are undoubtedly important not only for science, but also for the whole society. ColE1-like plasmids are among the most abundant in the nature and the most commonly studied extrachromosomal genetic elements. In this project, the previously unknown aspects of the replication of these plasmids will be studied. Particularly, the role of the Hfq protein, which is known as an important factor modulating RNA interactions, will be investigated. Recent results indicate that Hfq can also interact with DNA, and influence replication of ColE1-like plasmids. The planned studies should lead to understand molecular mechanisms of these processes. In fact, the involvement of Hfq in the regulation of plasmid replication suggests that this protein may be involved in considerably more diverse processes than it was suggested previously. This may shed a new light on the regulatory processes occurring in bacteria.