

Description for the general public

Genus *Streptomyces* belong to *Actinobacteria*, which are predominantly soil-dwelling, Gram-positive bacteria. *Streptomyces coelicolor* is a model organism in studies of the genus *Streptomyces*. *S. coelicolor* is a very interesting subject of basic research due to the unique, complex life cycle that these bacteria undergo. This complex life cycle resembles some features of the development cycle of eukaryotic filamentous fungi.

DNA replication is a key cellular process. In bacteria, this stepwise process usually begins at one strictly defined chromosomal *locus* - *oriC* (origin of chromosomal replication) and requires DnaA initiator protein activity. Initiation of chromosome replication must be tightly regulated to ensure that the number of chromosomes in the daughter cells remains constant. So far, molecular mechanisms that are involved in controlling the bacterial initiation of chromosome replication process are best studied in *Escherichia coli*, *Bacillus subtilis* and *Caulobacter crescentus*. Not much is known about the regulatory machinery in *Streptomyces*.

Global analysis of the *Streptomyces coelicolor* M600 proteome revealed that DnaA protein might be subject to phosphorylation. This particular post-translational modification has been observed for the first time for DnaA protein in bacteria and may function as a novel controlling mechanism for initiation of chromosome replication in bacteria. To date, nothing is known about the biological function of DnaA phosphorylation. This project aims to describe, for the first time, the molecular role of phosphorylation of DnaA initiator protein. We will also take an attempt to identify proteins involved in the DnaA post-translational modification.