Abstract

RNA polymerase (RNAP) is a key enzyme in regulation of bacterial gene expression. RNAP is multi-subunit enzyme and its σ subunits (factors) are used for DNA recognition. Regulation of RNAP complexed with the major σ factor has been thoroughly studied; in contrast, mechanisms of regulation of RNAP containing alternative σ factors are much less understood. This thesis is focused mainly on the model organism *Bacillus subtilis* and its alternative σ factors σ^F, σ^G, σ^I a σ^K. We studied the ability of RNAP in complex with these factors to recognize promoter sequences, to initiate transcription in dependence on the concentration of the initiating nucleoside triphosphate (iNTP), and to interact with selected proteins. For σ^F, a promoter regulated by the concentration of iNTP was discovered; for σ^I, to the contrary, this mechanism was not observed. In the case of σ^G-dependent transcription we were not able to examine regulation by the concentration of iNTP. Nevertheless, stimulation of σ^G-dependent transcription by a protein called YlyA, previously described in the literature, was confirmed. This stimulation was newly identified also for σ^F-dependent transcription. Further, we examined possible functional interaction between HelD and σ^K, but this link was not confirmed. Finally, this thesis contributed to elucidating the influence of artificial modification of nucleobases on transcription.