Abstract

Transcription is catalysed by the enzyme RNA polymerase (RNAP). RNAP contains a core made up of two α subunits, one of each β, β'and ω. These subunits are conserved in all bacteria. The ω subunit is a small subunit with a molecular weight of 7.6 kDa that binds β'. ω is important for the folding and integrity of RNAP and promoter selection. This was shown by experiments performed with Gram-negative bacteria but the knowledge about ω in Gram-positive bacteria is minimal. In my Diploma Thesis, I characterized ω from the model Gram-positive bacterium from the phylum Firmicutes, *Bacillus subtilis*. First, I prepared various expression strains for isolation of *Bacillus subtilis* ω. Then, I successfully isolated the ω subunit, which was the main initial aim of this Diploma Thesis. Subsequently, I tested the influence of the ω subunit on *in vitro* transcription by RNAP associated with the primary σ^A factor and alternative σ^F and σ^E factors that regulate sporulation in *Bacillus subtilis*. I also evaluated the effect of δ, a small RNAP subunit found in Firmicutes, both alone and in combination with ω. The experiments revealed that ω stimulated transcription both from vegetative promoters and sporulation-related promoters. Moreover, this stimulation was synergistically amplified by the δ subunit. This nicely correlated with a previous observation where *B. subtilis* strains lacking ω and δ displayed decreased sporulation efficiency. Overall, this Thesis has created the tools to study ω of *Bacillus subtilis*, performed an initial characterization of its effects on transcription, and paved the way to further exploration of its biological role.

Key words: ω subunit, δ subunit, RNA polymerase, transcription, sporulation, SigA, SigF, SigE