Abstract

DNA topology plays a key role in regulation of gene expression by affecting interactions between DNA and RNA polymerase and other regulatory proteins. In this work, I review the process of transcription and selected mechanisms of its regulation, focusing on the effects of DNA topology. A key characteristic of DNA topology is the level of supercoiling. I describe how the DNA supercoiling influences initiation of transcription, and how it is affected by topoisomerases and nucleoid-associating proteins. I then discuss selected examples of regulation of gene expression by topology. Finally, I discuss the alternative σ^N factor from *Bacillus subtilis*, which allows more efficient transcription initiation from linear (*i.e.* relaxed) rather than supercoiled DNA templates. In this property, σ^N diametrically differs from other σ factors.

Key words: DNA, topology, RNA polymerase, transcription, promoter, sigma factor