Abstract:

Bacteria are exposed to various environmental conditions during their growth. They have to cope with rapid changes in temperature, lack of nutrition, etc. To survive, bacteria alter their gene expression. One type of regulation of gene expression is regulation by small RNAs (sRNAs). In bacteria, a well-studied sRNA is 6S RNA that binds to the RNA polymerase holoenzyme. However, 6S RNA has not been identified in several bacterial species. Mycobacteria are a genus that probably does not have 6S RNA. Instead, *Mycobacterium smegmatis* possess another sRNA – Ms1. Ms1 structurally resembles 6S RNA and indeed it was first identified as a 6S RNA structural homologue. However, Ms1 binds to RNAP devoid of any sigma factor, and, therefore, is significantly distinct from 6S RNA.

This work describes regulation of expression of Ms1. DNA fragments of different length from the region upstream of the Ms1 gene were prepared. These fragments were fused to the *lacZ* reporter gene and their activity was tested in different growth phases and under stress. This allowed identification and characterization of the core promoter sequence and regulatory sequences that might interact with transcription factor(s). Promoter activity increased with increased length of the promoter fragment and after transition into stationary phase. Transcription slightly decreased after hyperosmotic stress and increased after ethanol stress. Finally, a model of Ms1 expression regulation is proposed.