Title: Antibiotic effects on bacterial operons with internal promoters

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Abstract

In a recent study, we showed evidence that synthetic closely spaced promoters in tandem formation can exhibit 'attenuation' under rifampicin stress. Namely, these promoters' activity is more reduced by the antibiotic (AB) because of being in tandem formation. This phenomenon was shown to relate with 'RNAP locking' at the downstream promoter, which reduces RNA production from either promoter, due to RNAP collisions and falloffs. We are now exploring whether this phenomenon affects also natural operons with internal promoters. Using a chromosome-integrated YFP strain library, we measured gene expression in cells under three different ABs (rifampicin, fidaxomicin, and actinomycin D). All three ABs are known to block transcription, but by different modes of action. We present data supporting that, for all three ABs, genes that are downstream from the internal promoters are more repressed than the genes upstream. The findings suggest that the internal promoters in operons may enhance the effects of transcription-targeting ABs, potentially influencing where some genes locate in operons.