# ppGpp binding to RNA polymerase accounts for its role in transcription-coupled DNA repair

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The small molecule alarmone guanosine-3',5'-(bis)pyrophosphate (ppGpp) serves in bacteria to adapt their physiology in response to environmental changes. It has been known for years that acting synergistically with its cofactor DksA, ppGpp globally reprogram gene expression in response to nutrient deprivation by altering the initiation properties of RNA polymerase. Besides RNA polymerase, variety of diverse cellular targets of ppGpp have been described, which are involved in a wide range of cellular processes. Evidences also suggest an independent role of ppGpp in preserving genomic integrity. It was shown previously that ppGpp is induced in response to DNA damage and couples transcription to DNA repair, suggesting RNA polymerase elongation complex as a target for ppGpp. Here, we prepared a series of E.coli strains carrying new chromosomal mutations in RNA polymerase affecting ppGpp binding to elongation complex that lead to markedly decreased cellular survival under different DNA damaging conditions. In contrast to previously described RNA polymerase holoenzyme mutants that eliminated ppGpp function in stringent response, new mutants are tolerable to amino acids starvation. Data suggest different mode of action of ppGpp under various stresses. This work is supported by the Russian Science Foundation grant 17-74-30030.