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The role of PARP1 in reprogramming transcription upon genotoxic stress

Abstract: Genotoxic stress triggers a genome-wide transcriptional reprogramming, which involves an initial transcriptional shutdown followed by a recovery phase. While these processes are crucial for DNA repair and cell survival, the underlying molecular mechanisms remain poorly understood. In this talk, I will first present our recent work uncovering the role of PARP1-P-TEFb signaling in mediating the rapid transcriptional shutdown in response to DNA damage. This shutdown is essential for maintaining genome stability and ensuring cell survival during genotoxic stress. I will then discuss our findings that highlight PARP1's critical role in the recovery phase of transcription, where we discovered that PARP1 activity stabilizes key transcription factors necessary for optimal transcriptional restart after DNA damage. Together, these findings reveal the multifaceted role of PARP1 in orchestrating transcriptional reprogramming in response to genotoxic stress.

Keywords: Transcriptional reprogramming, DNA damage, PARP1, genotoxic stress