TRF2 binds to promoter G-quadruplexes genome-wide

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Abstract

TRF2 is a protein in charge of protecting the endcaps of chromosomes known as telomeres. But increasing evidence suggests that TRF2 also carries out important non-telomere-related functions, including DNA repair and transcription regulation. To better understand these functions, researchers recently mapped out where else TRF2 sites might exist. ChIP-Seq assays of fibrosarcoma cells revealed extra-telomeric TRF2 sites throughout the genome, which were highly enriched in DNA sequences with the potential to form G-quadruplexes, a DNA structure formed by G-rich sequences with a specific pattern, known to play a critical role in gene expression. TRF2 bound tightly to these sites, and further experiments revealed that TRF2 occupancy resulted in altered mRNA expression in nine target genes. Because naturally occurring intracellular G-quadruplexes are difficult to detect, TRF2 binding may serve as a new tool to specifically detect these regions. Future studies could help reveal mechanisms through which TRF2 modifies the transcriptional outcome of gene promoters and further clarify the roles of TRF2 both on and away from chromosomal telomeres.