

Abstract Submitted  
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**G-Quadruplex unfolding by Bloom helicase has low-processivity in ATP**<sup>1</sup> JAGAT BUDHATHOKI, HAMZA BALCI, Kent State Univ - Kent, JAYA G. YODH COLLABORATION — Non-telomeric G-quadruplex (GQ) structures may result in genomic instability unless they are destabilized by proteins. Bulk biochemical studies have shown that Bloom helicase (BLM) unfolds both intermolecular and intramolecular GQ in the presence of ATP. Using single molecule FRET, we show that binding of BLM to ssDNA in the vicinity of an intramolecular GQ leads to unfolding of the GQ in the absence of ATP. Surprisingly this result has similarity with single strand DNA binding protein (SSB) RPA which also unfolds GQ upon binding to a neighboring overhang. These similarities point to common features where helicases and SSB initiate binding and in some instances is adequate for GQ unfolding. Furthermore, we studied GQ unfolding by BLM in the presence of ATP, the efficiency of which was found to be significantly higher compared to that in the absence of ATP. However, BLM unfolded GQ only a few times before dissociating from the DNA, which points to a GQ unfolding mechanism with low processivity.

<sup>1</sup>ICAM

Jagat Budhathoki  
Kent State Univ - Kent

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