FALL 2022

Biochemistry and Molecular Biology Brown Bag Series

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BMS Ph.D. Student

"Instability at $(ATTCT)_n$ Pentanucleotide Repeats in Human Cells"

Tuesday, November 8, 2022

11:00 AM

135 Oelman Hall

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https://science-math.wright.edu/biochemistry-and-molecular-biology

Abstract:

Instability at $(ATTCT)_n$ Pentanucleotide Repeats in Human Cells.

Microsatellites are unstable, short repeats of DNA (1 to 6 nucleotides) that can expand, contract or break, leading to mutations that threaten the genomic integrity. To understand the effect of these repeats on chromosomal instability, our laboratory generated a dual fluorescent system to quantitate replication dependent DSBs at these microsatellites using flow cytometry. The HeLa cell line was the model system used where different microsatellites capable of forming triplex, quadruplex and hairpin structures have been incorporated adjacent to the human c-myc origin of replication with defined replication polarity. When DNA double strand breaks occur, repair can lead to different mutagenic patterns and recombination products that can be monitored using flow cytometry and DNA sequencing. Using this model system, we have been able to demonstrate that trinucleotide repeat $(CTG)_{100}$ hairpins and guanine-rich quadruplex forming DNAs are unstable under replication stress. Here, we study instability at the spinocerebellar ataxia 10 (ATTCT) pentanucleotide. I will contrast the pattern of breaks at the pentanucleotide repeat and at the $(CTG)_{100}$ repeat and discuss whether knocking down proteins involved in Break Induced Replication (BIR) repair can affect recombination and replication in our model system containing those ATTCT repeats.