VANDERBILT SCHOOL OF MEDICINE | Basic Sciences

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Biosketch

Dr. Dewar carried out his undergraduate studies at the University of Bath, England, and graduated in 2007 with First Class Honours in Molecular and Cellular Biology. He received his PhD in 2011 in yeast genetics from Newcastle University, England, before undertaking post-doctoral training in Johannes Walter's lab at Harvard Medical School, where he became a Charles A. King Trust Fellow. In 2016, Dr. Dewar joined the Vanderbilt Faculty as an Assistant Professor of Biochemistry.

Key Publications

"Mechanisms of DNA replication termination," ***Nat Rev Mol Cell Biol*****, 18, 507-516, 2017**

"CRL2Lrr1 promotes unloading of a vertebrate replisome from chromatin during replication termination," ***Genes Dev*****, 31, 275-290, 2017**

"The Mechanism of replication termination in vertebrates," ***Nature*****, 525, 345-50, 2015**

"DNA Endgame: Using frog egg extracts to unravel how copying of the DNA blueprint is terminated"

DNA inside a human cell is faithfully replicated with an error rate of ~1 in a billion. The fidelity of this process is critical **to prevent a diverse set of diseases, from cancer, to dwarfism and neurodegeneration**. DNA replication in humans involves loading and activation of ~60,000 DNA replication machines which copy the DNA.

Completion of DNA replication is called termination and occurs when pairs of copy machines meet head-on upon the same stretch of DNA. **Termination is highly perilous in bacteria and viruses** and was assumed to be equally-problematic in humans. This assumption persisted for decades, because technical limitations prevented termination from being studied in cells. However, using a 'cell in a tube' approach derived from frog egg extracts, **Dr. Dewar showed that termination in humans is rapid**, suggesting humans possess specific proteins to promote termination.

The Dewar lab is working to identify proteins that promote rapid termination. It is particularly important to study termination **because this process is targeted during chemotherapy**. The Dewar lab is also working to understand a specialized form of termination that occurs at **telomeres**, which cap chromosome ends and **impair cellular aging**.