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Telomeres and the Rrm3p Helicase

[I am studying the Rrm3p helicase to understand better how both helicases and telomeres play a role in cancer.]

Chromosomes are linear structures of FNA and protein. Telomeres are the structures at the end of chromosomes. Telomeres consist of unique DNA sequences and proteins that stabilize chromosomes and ensure that they are copied to completion when cells divide. In order to do this successfully the DNA of telomeres must be a minimum length. Telomeres are lengthened by a protein called telomerase. Telomerase is not active in normal human cells but is in 90% of all human cancers including 75% of breast carcinomas. Therefore understanding how telomeres function could greatly improve our ability to treat many cancers by targeting telomerase.

I am studying the protein Rrm3p. This protein has been shown to affect the length and formation of telomeres in the baker's yeast, *Saccharomyces cerevisiae.* Humans possess a similar protein. Therefore understanding how this protein affects telomeres in the baker's yeast will help us determine its function in humans. This protein is another link to improving our knowledge of telomeres and telomerase and thus may contribute to the discovery of a cancer treatment targeting telomeres and telomerase.

Rrm3p is a protein that functions as a helicase. A helicase is a protein that separates two DNA strands. Helicases are essential for the normal function of DNA including their duplication. Mutations in helicases have been shown to cause human disease including an increase in cancer rates. Therefore understanding how Rrm3p functions in yeast will also help us understand how helicases function in general. This knowledge will improve our understanding of how mutations in helicase can contribute to cancer and aid in the development of a treatment that will benefit the people both in and outside of New Jersey.