A Comparison of the Mechanism and Effects of HIF-Targeting Oligonucleotides on Normal and Cancerous Breast Cells

Adams, Katharine

Based on the results of previous work done by the researcher, which showed that quadruplex-forming oligonucleotides induced cell death in four breast cancer cell lines, this project studied and compared the mechanism of the oligonucleotides in four breast cancer cell lines (MDA-MB-231, MDA-MB-468, MCF-7, and SKBR-3) and one normal breast cell line (MCF-10a). It was hypothesized that the oligonucleotides would bind to the G-rich sequence for which they coded in the promoter region of the HIF gene, preventing its transcription and thus the production a protein essential for breast cancer survival. A Western blot showed that the oligonucleotides decreased HIF expression, and a confocal analysis demonstrated that the oligonucleotides worked inside the nucleus. In addition, an MTT assay showed that the oligonucleotides had no effect on a normal breast cell line, MCF-10a, most likely because the oligonucleotides were not taken up into the nuclei of the MCF-10a cells (demonstrated by a confocal analysis), where HIF inhibition was shown to occur. Further research is being conducted.

Awards Won:
Fourth Award of $500