Development of a Novel Oncolytic Virus for Cancer Treatment and Diagnosis

Mohan, Aditya

In this innovative research, a novel oncolytic virus, AM105, is designed to target and selectively kill cancer cells. Current methods of cancer treatment including radiation and chemotherapy often impact healthy cells, leading to detrimental side-effects. Based on bioinformatic data analysis, a conditionally transcriptive adenovirus, AM105, is synthesized that is able to identify cancer cells from healthy cells and selectively induce the expression of an innovative anti-cancerous peptide that promotes cell death. Using HeLa and A549 cancer cells and GM38 healthy cells as an in vitro model, AM105 is shown to outperform currently accepted “golden standard” drugs using cell viability assays, western blots, flow cytometry, and confocal microscopy. AM105 is uniquely able to induce infected cancer cells to secrete anti-cancerous peptides, allowing it to target surrounding non-infected cancer cells as well. This novel approach to kill cancer cells without needing the drug to interact with each individual cell, leads to low dosages and effective treatment. This virus is able to kill nearly 98% of all cancer cells based on in vitro experiments and can be used to treat multiple cancer types including cervical, lung, and breast carcinomas. In addition to this therapeutic value, AM105 is also designed to express a near infared reporter gene in cancer cells for cancer diagnostic and monitoring applications. This novel oncolytic virus, AM105, which contains a new anti-cancerous peptide, a unique targeting and secretion mechanism, and a reporter gene, represents a novel approach to treat and diagnose cancer.

Awards Won:
First Award of $5,000