

James & Esther King Biomedical Research Program

Alabugin, Igor

Chemistry
Florida State University

2009 Program
Technology Transfer Commercialization Partnership
(1-year project)

Project Title: Tunable Light-Activated Agents for Double-Stranded DNA-Cleavage

Project Summary: Lung cancer is the leading cause of cancer death among both men and women in the U.S. Of that, 90 percent of lung cancer deaths among men and approximately 80 percent of lung cancer deaths among women are attributed to smoking. According to the American Cancer Society, tobacco consumption is linked to at least 15 different cancers, and accounts for ~30 percent of all cancer deaths. Smoking also increases the risk of many other types of cancer, such as cancers of the throat, mouth, and esophagus. We have developed a new family of light-activated molecules combining unprecedented efficiency of double-stranded DNA cleavage with built-in selectivity for cancer cells. Spatial and temporal selectivity for the activation stems from the use of light, which can activate the prodrugs accumulated in the cancer cells. Importantly, the delivery of light via fiber optics is effective for the types of cancer, that are commonly associated with smoking (lungs, mouth, throat, and esophagus). In this project, we will join efforts with Florida Custom Synthesis, Inc., for the development of a library of hybrid molecules needed to find the optimal combination of photochemical warheads with functional parts capable of selective delivery of the warheads to their target in the cancer cells.