Necrosis of Lung Adenocarcinoma by Targeting a Novel Egg-Specific Protein

Mandal, Mriganka (School: Escuela Especializada en Ciencias, Matemáticas y Tecnología)

Current cancer treatments involve chemotherapy, immunotherapy, and radiation, among others. However, these are non-specific, resulting in serious side effects. SAS1B, a recently discovered mammalian egg-specific surface protein, has also been found on uterine cancer cells, making it a novel target for cancer-specific therapy via antibody-drug conjugates. Minimal side effects would ensue, compared to chemotherapy and immunotherapy targeting somatic cell-specific proteins. Since lung cancer is the leading cause of cancer death in the United States, and the most common form of this is adenocarcinoma, comprising 40 percent of all lung cancer occurrences, the goal of this study was to validate if SAS1B could be used as a target to kill lung adenocarcinoma cells. SAS1B mRNA was confirmed by RT-PCR in adenocarcinoma cells and tumors, western blotting confirmed SAS1B protein expression in cells, indirect immunofluorescence imaging confirmed SAS1B expression on live cell membranes, and SAS1B-targeted antibody-drug conjugate assays caused a 93 percent cell mortality at a 1.0 nM concentration. My prior research also showed significant cell death in squamous cell lung carcinoma, making up 25-30 percent of all lung cancer occurrences. Therefore, this research proved that an anti-SAS1B antibody-drug conjugate could be used as a therapeutic agent to treat lung adenocarcinoma and squamous cell carcinoma, the majority of lung cancers (65-70 percent). Additionally, tumor analysis brought an entirely new dimension to my project, proving that therapeutics could be developed for adenocarcinoma tumors using SAS1B as a target.