A Novel Mouse Model to Mimic the Evolution of Cancer

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For years, cancer has been thought of as an evolutionary process, responding to varying selective pressures throughout the body in an effort to survive. Due to the fact that reiterative rounds of genetic mutations facilitate cancer, and that the effect of these mutations depends on the genetic background of the tumor, it can be hypothesized that the order of such mutations plays a role in said evolutionary process and therefore affect cancer phenotype. The MGRT transgene (created in year one), which allows for gene knockout at will, was inserted into a mouse and bred until a homozygous genotype was attained. Transgene functionality was then confirmed through fluorescence imaging and genotyping analysis of cells and prostate tissue. The newly completed genetically engineered model will be applied in the future to study whether the order and timing of Pten and Rb1 tumor suppressor gene mutation affects prostate cancer phenotype. If findings prove that it does, it could improve personalized cancer therapy: a movement designed to select individual therapies based on the genetic mutations that have occurred in a patient's cancer. Personalized cancer therapy however, does not account for the evolutionary history of tumors. Subsequently, if such a history is important, then accounting for it could improve efficiency of cancer therapy selection.

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