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Programmable Synthetic Gene Circuit as a Potential Therapeutic Intervention for Liver Cancer

Abstract: Synthetic gene circuits are designed to implement desired cellular functions in living cells through sensing, integration and processing of molecular information. Here, we developed two types of sensory switches by using synthetic TALE repressors and deactivated Cas9 repressors, which can response to cancer specific microRNAs. In addition, we cloned the sensory switch circuit into an adenoviral vector. We demonstrated that the engineered adenovirus can be used to specifically kill hepacellular carcinoma cells in vitro and in the mouse model. Our results highlight a potential strategy that may lead to innovative therapeutics for liver cancer.