

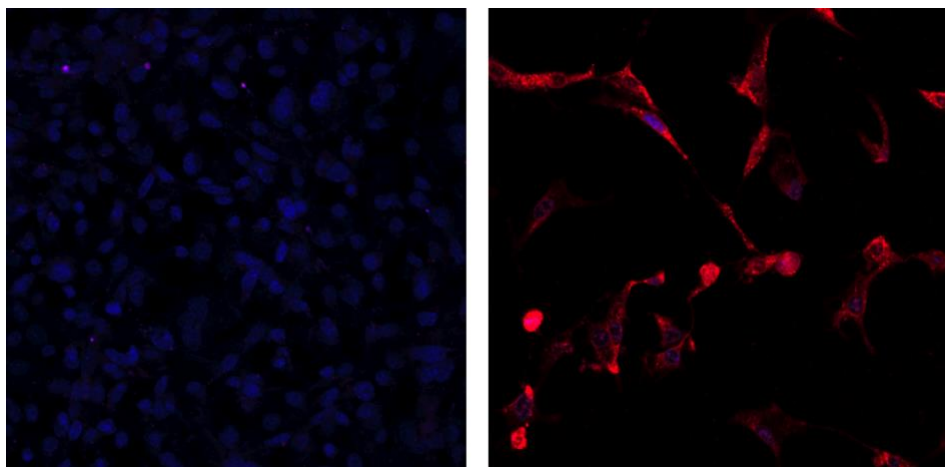
## Detecting and Treating Cancer Cells

Beacon and Oncotag systems targeting mutant p53 in cancer cells

Gain of function (GOF) mutants of p53 are responsible for activating and promoting oncogenic gene expression in cells and are expressed to varying degrees in most cancers. The highest percentages are seen in ovarian, colorectal and lung cancers, making it an ideal target for cancer treatment. Currently there are no methods of detecting the expression of GOF p53 within live cells without taking a biopsy, culturing, fixing, and staining potentially affected cells. An approach that could identify and treat cancerous cells based on the presence of GOF p53 could have high clinical impact such as the reduction in time to diagnose and prescribe treatment.

### The technology

Researchers at VCU have developed a system for identifying cells expressing the GOF p53 mutant. By designing a Beacon system that contains GOF p53 specific binding promoter constructs to control the expression of a fluorescence gene, cells containing the mutant protein can be detected (Figure 1). The system can be further utilized to screen for GOF p53 inhibitors as well as weaponized into an Oncotag system to express GOF p53-dependent lethality of suicide genes, immune modulators, and for placement in oncolytic virus vectors. The novelty of the Beacon/Oncotag system is the very specific targeting of cancer cells with virtually no adverse effects to surrounding cells and tissues. This system is unique in its use of GOF p53 as a driver of cancer cell detection and treatment, instead of attempting to inhibit its function.



**Figure 1.** When human cells harboring the Beacon system express no mutant p53, only background levels of fluorescence are detected (left), but when these cells express the mutant p53, the cells fluoresce and luminesce at high levels showing their induction by GOF p53 (right).

### Benefits

- » Specific targeting to mutant p53 expressing cells
- » Detection, drug screening, and treatment is achievable in live cells
- » Modifiable construct for multiple modes of cancer detecting and killing

### Applications

- » Cancer treatment
- » Screening of GOF p53 inhibitors
- » Therapy monitoring
- » Pathophysiology studies of GOF p53 cancers

#### Patent status:

Patent pending: U.S. and foreign rights are available.

#### License status:

This technology is available for licensing to industry for further development and commercialization.

#### Category:

Biomedical

#### VCU Tech #:

19-096

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