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Scientists Find Faster, Cheaper Way to Identify Cancer-Causing Genes

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Researchers at the University of Virginia Health System have found a new way to study how genes function in living organisms, and their approach could substantially cut the time and costs that drug makers spend in searching for potential targets for new cancer therapies.

“A big problem in biology is that there are many thousands of genes. Testing the function of any one of them in a living organism, such as a mouse, has traditionally been slow and very expensive,” notes Ian Macara, PhD, professor of microbiology at UVA’s School of Medicine and co-author of a study published in the June 15 issue of *Genes & Development*. “The new technology is hundreds of times cheaper and many times faster than traditional approaches. While we used it to study the function of a specific breast-developing gene, our method can be replicated in screening for genes that can suppress tumors or cause cancer.”

In *Genes & Development,* UVA researchers describe how they isolated mammary gland stem cells from mice and then infected the cells with a virus that enabled the scientists to manipulate a particular gene and cause it to glow green. When transplanted in mice that had undergone mastectomies, the altered stem cells regenerated entire new breasts within a few months. Because the target gene glowed green, researchers could monitor its role in the development of the new breast.

The UVA study tracked Par3, a polarity protein that controls how cells acquire particular shapes, so that they have a top and a bottom. “When

we shut off this gene, the stem cells had problems differentiating into the right types of cells, causing problems with mammary development. Interestingly, the glands that formed looked very much like early, pre-malignant tumor growths," explains Luke Martin McCaffrey, PhD, a post-doctoral fellow in the Center for Cell Signaling at UVA and study co-author.

Par3's function is of interest to cancer researchers and drug developers because the protein helps regulate the shape of epithelial cells, which can become malignant when deformed. Over 90 percent of solid tumors arise from epithelial cells, and early dissemination of transformed cells to distant sites is the leading cause of death from cancer.

More information: http://genesdev.cshlp.org/content/23/12/1450.abstract