Stem cell finding could advance immunotherapy for lung cancer

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A University of Cincinnati (UC) Cancer Institute lung cancer research team reports that lung cancer stem cells can be isolated—and then grown—in a preclinical model, offering a new avenue for investigating immunotherapy treatment options that specifically target stem cells.

John C. Morris, MD, and his colleagues report their findings in the Nov. 13, 2012, issue of PLOS One, a peer-reviewed online publication that features original research from all disciplines within science and medicine.

Stem cells are unique cells that can divide and differentiate into specialized cells types—for example cardiac muscle or liver tissue. These cells also have the ability to self-renew and produce more stem cells.

"Increasing evidence supports the idea that cancerous tumors have a population of stem cells, also called cancer-initiating cells, that continually regenerate and fuel cancer growth," explains Morris, senior author of the study and professor at the UC College of Medicine. "These cancer stem cells may also have the highest potential to spread to other organs."

Current models used to study cancer stem cells provide limited information on the interaction between cancer stem cells with the immune system, making the study of new therapies that utilize the body's immune system to fight off cancer virtually impossible.

In this study, the UC team set out to find a viable, consistent way to isolate lung cancer stem cells that could be used in a mouse model with full immune system function. The team was able to achieve this using a functional laboratory test known as "tumorsphere" assay.

The test—which shows how cells grow in culture—allowed them to enrich for cancer stem cells.

"Studying these unique cells could greatly improve our understanding of lung cancer's origins and lead to the novel therapeutics targeting these cells and help to more effectively eradicate this disease," adds Morris. "Immunotherapy is the future of cancer treatment. We are hopeful that this new method will accelerate our investigation of immunotherapies to specifically target cancer stem cells."

The team is working to characterize how cancer stem cells escape the body's immune system in order to develop more effective therapies that target stem cells.

"One of the hypotheses behind why cancer therapies fail is that the drug only kills cells deemed to be 'bad' (because of certain molecular characteristics), but leaves behind stem cells to repopulate the tumor," adds Morris. "Stem cells are not frequently dividing, so they are much less sensitive to existing chemotherapies used to eliminate cells deemed abnormal."

Provided by University of Cincinnati Academic Health Center