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Team discovers stem cells in the esophagus

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Despite previous indications to the contrary, the esophagus does have its own pool of stem cells, said researchers from the University of Pittsburgh School of Medicine in an animal study published online today in *Cell Reports*. The findings could lead to new insights into the development and treatment of esophageal cancer and the precancerous condition known as Barrett's esophagus.

According to the American Cancer Society, more than 18,000 people will be diagnosed with esophageal cancer in the U.S. in 2014 and almost 15,500 people will die from it. In Barrett's esophagus, the lining of the esophagus changes for unknown reasons to resemble that of the intestine, though gastro-esophageal reflux disease or GERD is a risk factor for its development.

"The esophageal lining must renew regularly as cells slough off into the gastrointestinal tract," said senior investigator Eric Lagasse, Pharm.D., Ph.D., associate professor of pathology, Pitt School of Medicine, and director of the Cancer Stem Cell Center at the McGowan Institute for Regenerative Medicine. "To do that, cells in the deeper layers of the esophagus divide about twice a week to produce daughter cells that become the specialized cells of the lining. Until now, we haven't been able to determine whether all the cells in the deeper layers are the same or if there is a subpopulation of stem cells there."

The research team grew pieces or "organoids" of esophageal tissue from mouse samples, and then conducted experiments to identify and track the different cells in the basal layer of the tissue. They found a small

population of cells that divide more slowly, are more primitive, can generate specialized or differentiated cells, and have the ability to self-renew, which is a defining trait of stem cells.

"It was thought that there were no stem cells in the esophagus because all the cells were dividing rather than resting or quiescent, which is more typical of stem cells," Dr. Lagasse noted. "Our findings reveal that there indeed are esophageal stem cells, and rather than being quiescent, they divide slowly compared to the rest of the deeper layer cells."

In future work, the researchers will examine human esophageal tissues for evidence of stem cell dysfunction in Barrett's esophagus disease.

"Some scientists have speculated that abnormalities of esophageal stem cells could be the origin of the tissue changes that occur in Barrett's disease," Dr. Lagasse said. "Our current and future studies could make it possible to test this long-standing hypothesis."

Provided by University of Pittsburgh Schools of the Health Sciences

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