

Researchers discover new airway stem cell

By [Kim Irwin](#)

14 Jul 2011

Researchers at UCLA have identified a new stem cell that participates in the repair of the lungs' large airways, which play a vital role in protecting the body from infectious agents and toxins in the environment.



Dr. Brigitte Gomperts

The airways protect the body by generating and clearing mucus, which is largely produced by the airways' specialised mucus glands. While the mechanisms of normal and excessive mucus production are not well understood, this newly discovered lung stem cell for the mucus glands will likely yield insights into this critical process.

The study, by scientists at the Eli and Edythe Broad Centre of Regenerative Medicine and Stem Cell Research at UCLA, represents the first time anyone has found the cell of origin for the many types of cells that make up the mucus glands and which can also repair the surface epithelium. The finding, the study states, is of "major importance to the field of lung regeneration."

Putting the brakes on mucus production

"We're very excited that we found this population of cells because it will allow us to study mechanisms of diseases of the upper airway," said Dr. Brigitte Gomperts, a UCLA assistant professor of paediatrics and haematology-oncology and the study's senior author. "For example, there currently are no treatments for excess mucus production, which we see in cystic fibrosis, asthma and chronic obstructive pulmonary disease. But if we can understand the mechanisms of how these stem cells repair the mucus glands, then we may be able to find a way to put the brakes on the system and prevent mucus over-production."

The study is published in the June 27 issue of the peer-reviewed journal *Stem Cells*.

Creating a model of repair

Ahmed Hegab, a UCLA postdoctoral scholar in Gomperts lab and the first author of the study, named the newly discovered cells "sub-mucosal gland duct stem cells" because they are found in the ducts where mucus is first secreted. Hegab and Gomperts had been looking for the lung stem cells for years and had created a model of repair of the airways in order to identify the location of the stem cells.

Once Gomperts and her team proved that the lung stem cells existed and found where they "lived," they set out to isolate them and confirm that they could self-renew - that is, grow more of themselves - and differentiate, turning into the cells that make up the mucus glands and surface epithelium. The researchers created model systems in which these isolated stem cells did, in fact, make mucus glands with all the types of cells required to make mucus and repair the surface barrier of the large airways.

Also a role in tumour initiation?

"Our ability to identify the stem cells and their regenerative ability has implications for the possible identification of novel therapeutic targets for airway diseases and potential cell-based therapies in the future," the study states.

The stem cells also may play a role in tumour initiation in lung cancer - when the repair goes awry - although further study is needed to confirm this, said Gomperts, who is also a member of UCLA's Jonsson Comprehensive Cancer Centre.

This study was funded by the California Institute for Regenerative Medicine, the American Thoracic Society/COPD Foundation, the Concern Foundation, the Thoracic Oncology Program and Specialised Program of Research Excellence in lung cancer at UCLA's Jonsson Comprehensive Cancer Centre, the University of California Cancer Research Coordinating Committee, and the Gwynne Hazen Cherry Memorial Laboratories.

Source: UCLA

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