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Stem cells could breathe new life into lung therapy

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LUNG cells made from embryonic stem cells have been injected into live animals for the first time. All the mouse cells settled in the lungs, raising hopes that the human equivalent could find and repair damage in people with lung disease.

The results boost efforts to use stem cells to fight lung diseases such as



chronic obstructive pulmonary disease (COPD). Advances in this area have lagged behind treatments for other organs such as the heart and liver.

In the latest experiments, Silé Lane of Imperial College London and her colleagues injected the tails of mice with cells called pneumocytes ? relatively primitive cells that can mature into several types of lung tissue, including the cells lining the air sacs of the lung. The pneumocytes were derived from mouse embryonic stem cells.

"This latest work is the first time anyone has implanted embryonic stem-cell-derived pneumocytes into animals," says Lane, who presented her results at the annual meeting of the European Respiratory Society in Stockholm, Sweden, this week.

Post-mortems revealed that all the cells they injected ended up in the lungs. Most lodged in the distal lung epithelium ? tissue lining the air sacs in the innermost reaches of the lung. Some also lodged near small airways and blood vessels.

The cells found their target both in healthy mice and in mice whose lungs had been deliberately damaged with lipopolysaccharide to mimic COPD. However, more cells reached the lungs of healthy mice and survived than in the sick ones ? a surprising result, given that stem cells usually congregate in damaged or diseased tissue, presumably summoned there by chemical distress signals from injured cells.

"The cells clearly don't need cues from an injury site to reach the lung," says Duncan Stewart of the University of Toronto, Canada, who has been using from the bone marrow to try and heal damaged blood vessels in the lung (*New Scientist* , 13 June, p 14)

The fact that the cells are reaching "the right places" is promising, says Luis Ortiz of the University of Pittsburgh, who is also working on lung treatments based on adult stem cells. But if they are to be therapeutically useful, they must also help heal injury, he says. When Lane publishes her research she says she will reveal whether the cells helped to heal the mice or not.

Even if they did, various hurdles have to be overcome before human pneumocytes can be used as a treatment. At the very least, research must prove that the cells don't proliferate and become cancerous.