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Science Watch

THE RESPIRATORY SYSTEM

The Editor

In the March/April issue of the WEMJ we published the excellent article by Dr. Nabil Jarad on the history of pulmonary emphysema and the new treatments available[1]. This was groundbreaking stuff with new surgical and minimally invasive techniques showing how the treatment of previously intractable conditions is improving due to advances in medical science.

In the last month some interesting reports with a pulmonary slant have appeared in the science journals. First to catch the eye is a paper in Nature[2], also referred to in a short report in New Scientist [3]. A team from Novartis have discovered a completely new type of cell in the human airway. They have named this the "pulmonary ionocyte" as it is particularly active in movement of ions in and out of cells. A similar cell in frog skin and fish gills moves ions to regulate the pH of the liquid layer next to them and it is likely that it is doing something similar in human lungs. Although making up less than two per cent of all the cells in the airway epithelium it appears to be the main cell type where the CFTR gene expresses activity via a protein that allows movement of ions across cell membranes. This gene is mutated in cystic fibrosis causing the mucus to be thickened thus leading to infection. Knowledge of the exact cells involved may assist future treatment.

Also this week is a report[4] that low buggies expose toddlers to high levels of air pollution. This has been suggested as a problem for some years and Professor Prashant Kumar found that toddlers are exposed to 60% more toxic particles than their parents. Old fashioned prams expose the babies to considerably less pollution. Previous reports have shown than much of the pollution is from cars but that the car drivers are the least affected of all commuters! It is well known that much of the pollution is in the form of particulates and that diesel vehicles are the major culprits. Such particulates may harm the lungs, exacerbating asthma, predisposing to cancer and in infants may damage the frontal lobes of the brain. Nitrogen oxides (collectively known as NOx) are also a big problem, mainly affecting the respiratory system. [5]

According to Kristin Jenkins a simple blood test could soon improve the early diagnosis of lung cancer [6]. The test measures levels of four circulating proteins and these are then used to calculate a lung cancer risk score. A report on the study, which was part of the Integrative Analysis of Lung Cancer Etiology and Risk (INTEGRAL) Consortium for Early Detection of Lung Cancer, was published online on July 12 in JAMA Oncology [7] .

A POINTER TO FUTURE TREATMENT?

Another report in News Scientist this week [8] may indicate a far-future treatment for some of the respiratory conditions mentioned earlier in this article. At the University of Texas they have managed to get pig lung cells to grow into pulmonary tissue, creating a lung that expanded to normal tissue densities when transplanted into a pig. As yet the pulmonary arterial system was not hooked up so they do not know if the bioengineered lungs will oxygenate lungs but the team, led by Joan Nichols, hopes to do this soon. They predict that some day the technique will be used in human lungs, using the patient's own cells and thus avoiding any problems of rejection.

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