

New research alters understanding of lung growth

A ground-breaking international study into the way lungs grow and develop has challenged existing medical understanding that our lungs are completely formed by the age of 3.

The researchers, led by a team at the University of Leicester, put forward a theory for the first time based on research evidence that new air sacs (alveoli), are constantly being formed. This contradicts information in most medical textbooks that explain that the tiny air sacs begin to develop before birth (around the 6th month of pregnancy) and continue to increase in number until the age of about 3 years.

Dr. Manjith Narayanan, one of the leaders of the study from the University of Leicester, said, 'It was believed that there was no further increase in the number of alveoli beyond that age, and that the existing alveoli just expanded as the lungs grew bigger until final adult size was reached. Our study has challenged this by suggesting that new alveoli continue to be formed as the lungs grow.'

Professor Mike Silverman, Emeritus Professor of Child Health at Leicester, said, 'This research has important implications. If we can continue to develop new alveoli beyond early childhood, going on through adolescence, there is the potential for lung repair following injury that was never realised before. Conversely, external factors (possibly including inhaled pollution) could have a negative impact on lung development. We now have the basis for looking at many factors with the potential to impact on lung health in the future.'

The study was published in the *American Journal of Respiratory and Critical Care Medicine*.

COPD: small airway obstruction and emphysema

In chronic obstructive pulmonary disease (COPD) the main site of airway obstruction is in the small airways (<2 mm internal diameter). High-resolution computed tomography (CT) has shown that in the lungs of people with severe COPD, the areas with emphysematous destruction show a reduced number of airways. Now researchers in Canada and the USA have reported further CT studies that may lead to changes in the definition of emphysema.

The study, published in the *New England Journal of Medicine*, included 78 patients at different stages of COPD who were studied using multidetector CT. The isolated lungs from patients with COPD who had undergone lung transplantation and donor (control) lungs were also examined. Micro CT was used to assess the extent of emphysema, the number of terminal bronchioles per ml of lung volume, and the minimum diameters and cross-sectional areas of terminal bronchioles. On multidetector CT the number of airways measuring 2.0 to 2.5 mm in diameter was reduced in patients with stages 1 to 4 COPD compared with controls. Lung samples from patients with stage 4 disease showed reductions of between 81% and 99.7% in the total cross-sectional area of terminal bronchioles and of 72–89% in the number of terminal bronchioles. The narrowing and loss of terminal bronchioles happened before

emphysematous destruction.

The narrowing and disappearance of small conducting airways occurs before the onset of emphysematous destruction and explains the increase in peripheral airway resistance in COPD.

Smoking and tuberculosis worldwide

Smoking tobacco increases the likelihood of tuberculosis (TB) and death from the disease. A mathematical modelling analysis has illustrated the problem of smoking and TB worldwide.

A report published in the *BMJ* estimates that smoking would cause 18 million extra cases of TB globally between 2010 and 2050 (256 million cases without smoking, 274 million with smoking). Deaths from TB were estimated at 61 million without smoking and 101 million with smoking. Smoking would be responsible for a 64% increase in TB mortality in Europe and a 135% increase in the eastern Mediterranean. Because of smoking, the Millennium Development Goal for TB (reduction of 50% in prevalence and mortality between 1990 and 2015) will not be met in the Americas, eastern Mediterranean, south-east Asia, and Western Pacific regions of the World Health Organization (WHO). It was estimated that reduction of smoking prevalence by 1% a year in each WHO region from 2015, and eventual eradication of smoking, would reduce TB cases by 239 million and tuberculosis deaths by 74 million between 2015 and 2050 (13% and 27% reductions). A doubling of the present rate of increase in smoking prevalence (up to a prevalence of 50%) would result in a 6% rise in cases of TB and a 12% rise in deaths from TB between 2015 and 2050.

Recurrent wheeze in preschool children: daily versus intermittent inhaled budesonide

Recurrent wheezing in preschool children is often precipitated by recurrent respiratory infections and may lead to severe exacerbations calling for the use of systemic steroid therapy. In a multicentre US trial, reported in the *New England Journal of Medicine*, intermittent high-dose inhaled budesonide has been compared with a daily low-dose regimen.

The study included 278 children aged 12–53 months with recurrent wheezing and increased risk of future asthma. Randomisation was to 1 year of treatment with a budesonide inhalation suspension either high-dose intermittent (1 mg twice daily for 7 days beginning at the onset of a respiratory illness) or low-dose daily (0.5 mg every night). The rate of exacerbations of wheezing needing oral steroid was similar in the two groups; 0.95 exacerbations per patient-year (intermittent) vs 0.97 per patient-year (daily). There were no significant differences between the groups in time to first exacerbation or in adverse events. The cumulative dose of budesonide over the year was 46 mg (intermittent) vs 150 mg (daily).

Outcomes were similar in the two groups but the cumulative dose of inhaled budesonide was less in the high-dose intermittent group.