Allergies and wheezing illnesses in childhood may be determined in the womb

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A child's chances of developing allergies or wheezing is related to how he or she grew at vital stages in the womb, according to scientists from the University of Southampton.

The new research, funded by the Medical Research Council (MRC) and the British Lung Foundation, and undertaken at Southampton General Hospital, reveals that fetuses which develop quickly in early pregnancy but falter later in pregnancy are likely to go on to develop allergies and asthma as children. Scientists believe this is due to changes in the development of their immune system and lungs.

A fetus that grows too slowly in the womb is also more likely to become

an infant who wheezes with common colds, possibly as a result of narrower airways in its lungs.

"Childhood allergies and asthma have become an epidemic in developed countries over the last 50 years. This research shows that in order to combat this, we need to understand more about how babies develop in the womb," comments Keith Godfrey, Professor of Epidemiology and Human Development at the University of Southampton and a consultant in dermatology at Southampton General Hospital.

"We already know that a baby's growth in the womb has an important influence on susceptibility to obesity and heart disease in later life, but this research provides some of the most direct evidence yet that changes in how the baby's immune system and lungs develops before birth can predispose them to some of the commonest childhood illnesses."

For the research, published in the Journal *Thorax*, University of Southampton scientists at the MRC Epidemiology Unit based at Southampton General Hospital studied more than 1,500 three year-old children who were taking part in the Southampton Women's Survey, the UK's largest study of women and their offspring. The Survey has studied how a woman's diet and lifestyle before and during pregnancy affects their baby's growth in the womb, and is monitoring how these early life influences determine health and development during childhood.

The team discovered evidence of sensitivity to common allergens (atopy) in 27 per cent of children who had developed quickly in early pregnancy but faltered later in pregnancy, as compared with 4 per cent in those with a slow early growth trajectory and quicker growth in late pregnancy.

Professor Stephen Holgate, from the Medical Research Council, says: "Unravelling the complex interplay between immunity and disease, over the course of a person's life, including before they are even born, is a

core part of the MRC's research strategy. Furthering our understanding of the body's natural resilience is critical to developing new advances in the treatment of infectious diseases, autoimmune diseases and allergies."

Ian Jarrold, Research Manager at the British Lung Foundation, says: "Children's lung health can be complex so this research, funded by the British Lung Foundation, is a considerable step forward in understanding why some children are more likely to develop allergies and asthma.

"The most commonly reported long-term illnesses in children and babies are conditions of the respiratory system. Increasing our understanding of childhood lung conditions is vital for developing new ways of diagnosing and treating lung diseases earlier in life."

More information: Paper: "*Patterns of fetal and infant growth are related to atrophy and wheezing disorders at age 3*". Katharine Pike, et al. Published in *Thorax*: DOI: 10.1136/thx.2010.134742

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