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Genes found linking sexual maturity to body fat in women

Sunday 21 November

An international group of scientists, including researchers at the Medical Research Council (MRC), has discovered 30 genes that control the age at which girls reach sexual maturity. They found that many of the genes responsible for puberty also play a strong role in how the body metabolises fat, establishing new biological links between going through puberty at a young age and being at increased risk of obesity.

This knowledge will help to explain why girls in some families are more likely to go through puberty at an early age, and may eventually help to prevent chronic health problems associated with excessive weight gain.

Reaching puberty at an early age not only puts women at an increased risk of obesity, but is also associated with a number of illnesses and poorer health in later life. A study of more than 100,000 women from Europe, the US and Australia found that many of the genes identified play an important role in the regulation of body weight. The study also identified specific genes involved in hormone regulation and cell development, showing that timing of puberty is controlled by a complex range of biological processes.

Lead author Cathy Elks at the MRC Epidemiology Unit in Cambridge says:

“It is interesting that several of the new genes for puberty timing have been linked in other studies to body weight gain and obesity. This suggests that females in some families may inherit a joint genetic susceptibility to weight gain and early puberty.”

Senior author Dr Ken Ong at the MRC Epidemiology Unit in Cambridge says:

“We know that girls who are overweight are more likely to go through puberty at younger ages. Our findings tell us that being overweight and early puberty are intricately linked. It is also important to understand that these ‘common genetic factors’ can be modified by changes in lifestyle. If rates of childhood obesity continue to rise we will see many more girls reach puberty at young ages. Conversely, efforts to prevent or reduce childhood obesity will help avoid early puberty.”

Senior author Dr Anna Murray at the University of Exeter says:

“Scientists have long been fascinated by how the body knows whether it has enough nutrient stores to launch into puberty which leads to reproductive maturation. We found that the timing of puberty is related to fatty acid metabolic pathways. There is evidence that the brain can sense these types of body fats.”

The study was supported in the UK by the Medical Research Council and the Wellcome Trust.

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The findings are reported in the journal *Nature Genetics* by the large international ReproGen consortium, with scientists from 104 worldwide institutions, including UK-based researchers from the MRC Epidemiology Unit in Cambridge, the MRC Human Genetics Unit in Edinburgh, the University of Edinburgh and the Peninsula Medical School in Exeter.

Notes to editors

1. For media queries please contact +44 (0) 207 395 2345 or email press_office@headoffice.mrc.ac.uk. The MRC Press Office's out of hours mobile number is +44 7818 428 297

2. *Thirty new loci for age at menarche identified by a meta-analysis of genome-wide association studies* is published online in *Nature Genetics*.

3. For almost 100 years the Medical Research Council has improved the health of people in the UK and around the world by supporting the highest quality science. The MRC invests in world-class scientists. It has produced 29 Nobel Prize winners and sustains a flourishing environment for internationally recognised research. The MRC focuses on making an impact and provides the financial muscle and scientific expertise behind medical breakthroughs, including the first antibiotic penicillin, the structure of DNA and the lethal link between smoking and cancer. Today MRC funded scientists tackle research into the major health challenges of the 21st century. www.mrc.ac.uk

4. The researchers are extremely grateful to all study participants for making this research possible.

