Institute for Aging Research
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Could Age of First Period Influence Development of Diseases in Older Women?

Genetics involved with menarche may hold keys to preventing diabetes or osteoporosis in later life

BOSTON—A novel study shows that the age girls reach puberty is influenced by 'imprinted genes'—a subset of genes whose activity differs depending on which parent contributes the gene. This is the first evidence that imprinted genes can control the rate of development after birth and details of this study were published today in the journal *Nature.*

Age of the first period, known as menarche, is a marker for the timing of puberty in females. Medical evidence shows that the onset of menses varies between girls, is an inherited trait, and is linked to breast cancer, diabetes and heart disease risks. "This research is the first step in understanding the genetics involved with the onset of puberty in girls," says Douglas P. Kiel, M.D., M.P.H., Director of the Musculoskeletal Research Center at Harvard Medical School–affiliated Hebrew SeniorLife Institute for Aging Research (IFAR) in Boston, Mass. "By uncovering which genes influence menarche, we can then focus on its link to increased disease risks, such as osteoporosis or diabetes, in later life."

The findings come from an international study of more than 180,000 women involving scientists from 166 institutions around the globe. The researchers identified 123 genetic variations that were associated with the timing of when girls experienced their first menstrual cycle by analyzing the DNA of 182,416 women of European descent from 57 studies. Six of these variants were found to be clustered within imprinted regions of the genome.

The activity of imprinted genes differs depending on which parent the gene is inherited from – some genes are only active when inherited from the mother, others are only active when inherited from the father. Both types of imprinted genes were identified as determining puberty timing in girls, indicating a possible biological conflict between the parents over their child's rate of development. Further evidence for the parental imbalance in inheritance patterns was obtained by analyzing the association between these imprinted genes and timing of puberty in a study of over 35,000 women in Iceland, for whom detailed information on their family trees were available.

David Karasik, Ph.D., an associate scientist with Hebrew SeniorLife IFAR who also was involved with the study adds, "The genetics involved in female reproductive maturation is complex. Our findings extend knowledge of genetic influences that could contribute to the development of age-related conditions including menopause and osteoporosis.

About the Institute for Aging Research

Scientists at the Institute for Aging Research seek to transform the human experience of aging by conducting research that will ensure a life of health, dignity and productivity into advanced age. The Institute carries out rigorous studies that discover the mechanisms of age-related disease and disability; lead to the prevention, treatment and cure of disease; advance the standard of care for older people; and inform public decision-making. The Geriomics Program within IFAR studies the genetic architecture underlying diseases of aging.

About Hebrew SeniorLife

Hebrew SeniorLife, an affiliate of Harvard Medical School, is a national senior services leader uniquely dedicated to rethinking, researching and redefining the possibilities of aging. Based in Boston, the non-profit, non-sectarian organization has provided communities and health care for seniors, research into aging, and education for geriatric care providers since 1903. For more information about Hebrew SeniorLife, visit http://www.hebrewseniorlife.org, follow us on Twitter @H_SeniorLife, like us on Facebook or read our blog.

Reference

Perry, JRB et al. Parent-of-origin specific allelic associations among 106 genomic1 loci for age at menarche. Nature; 23 July 2014. DOI 10.1038/nature13545