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Mouse study links delayed female sexual maturity to longer lifespan

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An intriguing clue to longevity lurks in the sexual maturation timetable of female mammals, Jackson Laboratory researchers and their collaborators report.

Jackson researchers including Research Scientist Rong Yuan, Ph.D., had previously established that mouse strains with lower circulating levels of the hormone IGF1 at age six months live longer than other strains. In research published May 7 in the Proceedings of the National Academy of Sciences, Yuan and colleagues report that females from strains with lower IGF1 levels also reach sexual maturity at a significantly later age.

"This suggests a genetically regulated tradeoff—delayed reproduction but longer life—that is at least partially mediated by IGF1," Yuan says.

The researchers conclude that IGF1 may co-regulate female sexual maturation and longevity. They showed that mouse strains derived from wild populations carry specific gene variants that delay sexual maturation, and they identified a candidate gene, Nrip1, involved in regulating sexual maturation that may also affect longevity by controlling IGF1 levels.

Yuan notes that researchers in England recently showed that higher levels of IGF1 and other hormones in girls are associated with earlier age of menarche (onset of menstruation). In the newly published research, Yuan and colleagues used the biological benchmark of vaginal patency (VP) as indicator of sexual maturity in mice.

Mice from the inbred strain C57BL/6J, also known as "Black 6," showed 9 percent lower IGF1, 6 percent delayed age of VP and 24 percent extended lifespan compared to a Black 6 substrain that carries a gene variation that increases IGF1.

Using a technique called haplotype mapping, the researchers screened genetic and physiological data for 31 different inbred mouse strains and found genes that regulate female sexual maturation and lifespan, on Chromosomes 4 and 16. They showed that wild-derived mouse strains share a genetic profile associated with delayed VP and increased longevity, and identified a candidate gene, Nrip1, that controls IGF1 and age of VP.

Provided by Jackson Laboratory