

New genetic link found between normal fetal growth and cancer

April 9 2013

Two researchers at the National Institutes of Health discovered a new genetic link between the rapid growth of healthy fetuses and the uncontrolled cell division in cancer. The findings shed light on normal development and on the genetic underpinnings of common cancers.

The work, conducted using mouse and human tissue, appears in today's issue of the *Proceedings of the National Academy of Sciences*. The authors, Julian C. Lui, Ph.D., and Jeffrey Baron, M.D., work at the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD).

"We've long known that some of the genes that promote rapid growth in prenatal and early postnatal life become reactivated in cancer cells," said Dr. Baron. "Now we've identified a [molecular switch](#) that appears to turn on some of these genes, taking us a step forward in understanding normal body growth and the abnormal growth in some types of cancer."

Before birth, a team of more than 200 growth-promoting genes is highly active, fueling the fetus' explosive growth. After birth, these genes are gradually switched off, apparently to slow body growth as we age and approach adult size. In [cancer cells](#), some of these genes can be switched back on.

One of the major growth-promoting genes is called IGF2. This gene is critical for normal prenatal body growth and is reactivated in many types of cancer, showing remarkably high activity in bladder and prostate

cancer and some [childhood cancers](#).

For years, scientists did not know what turned IGF2 on and off. Now, using a variety of techniques and tissue types, Drs. Lui and Baron found evidence that a protein known as E2F3 activates the IGF2 gene in normal development and in cancer—in particular, in bladder and metastatic [prostate cancers](#).

More broadly, E2F3 appears to regulate not just IGF2, but also many other genes on the body-growth team. When E2F3 levels are high, these genes are active. When E2F3 takes a dive, so do these genes. The upshot is that E2F3 may function as one of the master switches that limit body growth. As such, it is of great interest as researchers seek to understand the complex genetic choreography responsible for normal growth and the diseases that result when it goes awry.

Provided by National Institutes of Health

Citation: New genetic link found between normal fetal growth and cancer (2013, April 9)
retrieved 28 April 2024 from
<https://medicalxpress.com/news/2013-04-genetic-link-fetal-growth-cancer.html>

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