

Scientists focus on 'guardian of the genome' to understand preterm births

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PNNL scientists are unraveling the molecular cascade involved in preterm birth. Credit: Jens Bergander / Flickr

Scientists have gotten a better look at the effects of a gene known as the "guardian of the genome" in causing premature births and miscarriages.

Trp53 is a well-known [tumor suppressor gene](#) that maintains genomic stability under normal conditions. But when the gene is changed or mutated, the resulting protein can contribute to [cancer progression](#) and wreak havoc in other ways.

A team of scientists led by corresponding author Kristin Burnum-Johnson at the Department of Energy's Pacific Northwest National

Laboratory has traced some of the steps that occur in [lab mice](#) in which the gene is not active in the uterus. The team found that molecules called lipids that are crucial for proper cell signaling and others functions are changed during early pregnancy. Those are among the first changes that happen in preterm labor—a term that encompasses both miscarriages and premature births. Each year, an estimated 15 million babies are born prematurely worldwide, according to the World Health Organization, and every day there are [more than 7,000 stillbirths](#).

Now Burnum-Johnson's team is exploring the molecular factors that cause one form of infertility. The team is analyzing the normal signaling or "crosstalk" that takes place between uterine cells and the embryonic structure called a blastocyst that will ultimately give rise to baby and placenta. The team is using a sophisticated form of mass spectrometry imaging to identify which lipids are at play when the blastocyst does not implant properly—one of the most common causes of a failure to conceive.

More information: Ingela Lanekoff et al. Trp53 deficient mice predisposed to preterm birth display region-specific lipid alterations at the embryo implantation site, *Scientific Reports* (2016). [DOI: 10.1038/srep33023](#)

Provided by Pacific Northwest National Laboratory

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