

Genetic markers for fetal overgrowth syndrome discovered

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Credit: Wikipedia

Humans and cattle share a similar epigenetic fetal overgrowth disorder that occurs more commonly following assisted reproduction procedures. In humans, this disorder is called Beckwith-Wiedemann syndrome (BWS), and in cattle it is called large offspring syndrome (LOS) and can result in the overgrowth of fetuses and enlarged babies. This naturally

occurring, but rare syndrome can cause physical abnormalities in humans and cattle and often results in the deaths of newborn calves and birth-related injuries to their mothers.

Now, researchers at the University of Missouri have identified a number of genes that contribute to LOS in [cattle](#). Rocío Melissa Rivera, an associate professor in the MU College of Agriculture, Food and Natural Resources, says identifying these genes in cattle will help identify genes that cause BWS in humans.

"The [human](#) disorder BWS is physically and molecularly very similar to LOS in cattle," Rivera said. "By identifying the LOS genes, we can take steps toward discovering which genes cause BWS in humans. Because these disorders have been associated with pregnancies from in vitro fertilization, knowing which [genes](#) cause these disorders will allow doctors to choose embryos for implantation that do not have the molecular markers for BWS."

Beckwith-Wiedmann syndrome results in babies that grow and gain weight more rapidly than normal in the womb and throughout early childhood. Many children with BWS have enlarged tongues, abdominal wall defects, asymmetric growth where some body parts grow faster than others, and are at a higher risk for cancer throughout childhood. BWS, other than the most severe cases, is not fatal to humans unless they develop undetected cancer.

Large offspring syndrome in cattle has many similar characteristics to BWS in humans, including rapid growth, weight gain in the womb, large tongues and abdominal wall defects. Calves with LOS can die within a week of birth because many cannot support their own weight and size.

"The use of [in vitro fertilization](#) is common in [cattle breeding](#), so LOS is a potential problem those breeders face," Rivera said. "It is important for

breeders to be able to identify the genetic causes of LOS so they can avoid impregnating their cattle with embryos that are predisposed to the disorder. This will allow the breeding process to be much more efficient as well as safe for the cattle being bred."

Rivera's study was published in the *Proceedings of the National Academy of Sciences* (PNAS).

More information: Characterization of global loss of imprinting in fetal overgrowth syndrome induced by assisted reproduction, Zhiyuan Chen, 4618–4623, [DOI: 10.1073/pnas.1422088112](https://doi.org/10.1073/pnas.1422088112)

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