

Maternal gene causes more piglets to be born

March 26 2012, by Albert Sikkema

A sow gives birth to more piglets if the DIO3 gene from its mother is expressed instead of the same gene inherited from its father. This is shown during research conducted by the Animal Breeding and Genomics Centre in Wageningen UR.

We already know that during [sexual reproduction](#), offsprings get 50 percent of the genes from the father and the other half from its mother. While the parents' genes determine the offsprings' traits, some of these genes are switched on only on the paternal side while others are switched on only on the maternal side. This influences certain traits, such as the number of piglets born.

In genetics, this means that there is a difference between two DNA classes: BA (in which B is maternal and switched on and A is paternal and switched off) and AB (the exact opposite). This is called 'genetic imprinting'. The switches which turn the genes 'on' and 'off' are present in specific parts of the genome, as was already discovered in earlier research on humans. Researchers Albart Coster and Ole Masen used [genetic markers](#) to examine the pig genome to find the genes which regulate fertility. Their search brought them to the DIO3 gene. Subsequent research showed that if the breeding pig gets a strain of this gene from the mother, it gives birth to 12.7 piglets on the average. If the DIO3 strain originates from the father, only 11.9 [piglets](#) are born. It is remarkable that just one gene can bring about such a considerable difference.

'Other [genes](#) can also influence the sow's fertility,' says Bovenhuis, 'but

the DIO gene alone is responsible for 15 percent of the [genetic variation](#) in offsprings.' This gene can therefore be a major selection criterion in the pig breeding sector. But Bovenhuis says that their research is significant because it offers fundamental knowledge on the [epigenetics](#) of, for example, humans and mice. This is also why their [article](#) has been published in the [Plos One](#) journal at the end of February.

Geneticists do not yet know exactly whether imprinting affects embryo development or fertility. This can only be discovered if there is a big difference in the offsprings' traits. 'If the effect of the DIO3 gene on fertility had only been a few percent, we would never have discovered this gene,' says Bovenhuis.

Provided by Wageningen University

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