

NEWS RELEASE

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Genetic Info of Cloned Pigs May Help Babies Before Birth

FOR IMMEDIATE RELEASE

The birth of the first cloned animals in North Carolina may soon lead to advances in animal and human health, particularly the prevention of intrauterine growth retardation (IUGR).

Dr. Jorge Piedrahita and a team of researchers at North Carolina State University's College of Veterinary Medicine have successfully cloned a Duroc pig. The resulting two piglets were recently weaned and are in excellent health. The births themselves are not particularly remarkable for Piedrahita, since he has cloned animals in previous research projects – it's the benefits to animal and human health that are noteworthy.



Genetic lessons learned from cloned pigs such as these may lead to advances in human health.

Piedrahita is investigating instances of damage to genes during cloning, damage that can also occur naturally. “The cloning work we did here with pigs showed us that certain genes were dis-regulated or damaged and it showed us that some of those genes – so called imprinted genes – could be important to fetal development. We looked to see if some of the affected genes were imprinted in humans,” Piedrahita said. It turns out that Piedrahita's group discovered two new imprinted genes that have never been reported before.

The implications are far reaching. “What all of this is telling us is that the mechanisms that are dis-regulating genes in the pigs can be translated to what is happening in humans,” Piedrahita said. Researchers tested the top 42 genes affected by imprinting in pigs and discovered that all 42 of those genes are also expressed in human placentas.

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IUGR is a condition that affects between five and eight percent of all human births in the United States and results in low birth-weight. “These children then have a high predisposition to a host of other illnesses and diseases — coronary heart diseases, hypertension and diabetes. It’s a far-reaching problem and there is really no clear understanding of why this happens,” Piedrahita said.

Piedrahita’s lab analyzed the genes of the pigs and came up with a list of candidate genes that appeared important to fetal development. “When we looked at the candidate genes, it was obvious looking at the top ten genes that the ones that were coming up were known imprinted genes,” Piedrahita.

Piedrahita has established partnerships with Duke University and UNC-Chapel Hill to investigate a possible human health connection. Researchers there will provide normal placental material that will be compared to that of genetic material known to have IUGR. That will help determine if the two newly discovered genes are involved in IUGR.

“We’re looking for clinical markers. We’re going to study these candidate genes very carefully, with the hope that we can identify clinical markers that the doctors can actually use to predict which patients are susceptible to having a baby with IUGR,” he said.

“If you happen to know that the woman is susceptible to IUGR, you could intervene early in gestation to try and increase the nutritional level of that fetus. The problem is that IUGR is usually diagnosed later in the pregnancy, and by then your options are limited, so this would allow the patient to know her child is at risk and allow the doctor to intervene very early in the pregnancy – before IUGR would normally be diagnosed.” he said.

While Piedrahita’s lab will soon have another litter of cloned pigs, he says his aim is not to produce a large number of cloned animals. “Cloning is not just about making an identical animal, it is about generating a tremendous amount genetic information that can aid not only animal medicine but also human medicine,” he said.