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Maternal fat compromises early embryo development

Joint research carried out within COST Action 'GEMINI' led to breakthrough discoveries on maternal-embryo interaction.

Scientific findings emphasise the importance of women being a healthy weight before starting a pregnancy. The outcome was published in the online journal Public Library of Science ONE (PLoS ONE) by a group of scientists that carried out joint research enabled by a Short-Term Scientific Mission (STSM) funded by COST.

The participants – from Antwerp (Belgium), Hull (UK) and Madrid (Spain) – are involved in the networking activities of COST Action FA0702 'Maternal Interaction with Gametes and Embryos' (GEMINI).

According to the new research, exposing eggs to high levels of saturated fatty acids – as commonly found in the ovaries of obese women and those with Type II diabetes – negatively impacts the development of the embryo. The scientists involved found that when embryos resulting from cattle eggs were exposed to high levels of fatty acids, they had fewer cells, altered gene expression and altered metabolic activity -- all factors likely to make them less viable or less able to develop normally.

Although the work was carried out using eggs from cows, the findings could help to explain why women suffering from metabolic disorders like obesity and diabetes struggle to conceive.

University of Antwerp Professor Jo Leroy said: "We know from our previous research that high levels of fatty acids can affect the development of eggs in the ovary, but this is the first time we've been able to follow through to show a negative impact on the surviving embryo."

The researchers are now hoping to take their findings into a clinical setting and to investigate whether exposing eggs to high levels of fatty acids can also lead to post natal effects.

COST Action GEMINI has established a network of European researchers working on different aspects of maternal interaction with gametes and embryo in different species. This Action aims to promote further understanding of interaction mechanisms of gametes and embryos with their maternal environment, by joining laboratories from different countries with excellent expertise in the fields of reproductive biology.

Information

PLoS ONE
- Elevated Non-Esterified Fatty Acid Concentrations during Bovine Oocyte Maturation Compromise Early Embryo Physiology

In the news
- Press release of the University of Hull, United Kingdom
- Article on Guardian.co.uk
- Article on Dailymail.co.uk

COST Action FA0702 'Maternal Interaction with Gametes and Embryos' (GEMINI)
- GEMINI page on COST website
- GEMINI website
- GEMINI on Facebook

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