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Key drivers of embryo-endometrial crosstalk to establish pregnancy

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Abstract

Human embryo implantation requires an activated blastocyst, a receptive endometrium and communication between the two. Implantation is initiated following apposition and firm adhesion to the endometrium where abnormalities in firm adhesion results in implantation failure and infertility. Abnormal implantation can result in disease associated with placental insufficiency. Very little is known of blastocyst-endometrial interactions in humans. Recently non-coding RNA have been identified to be dysregulated in implantation disorders including implantation failure/infertility and miscarriage and preeclampsia suggesting they may be useful as biomarkers and treatments for these conditions. Using a unique model to study human embryo – endometrial interactions we demonstrate that cellular and extracellular non-coding RNA regulate embryo implantation. We also demonstrate that microRNA processing machinery in the endometrium is abnormal during receptivity in women with unexplained infertility implying an important role in the endometrial tissue preparation for implantation. As each microRNA has the ability to alter the levels of many genes and proteins they are master regulators and may be useful as treatment targets for disorders of implantation.

Biography

After obtaining her Bachelor of Science in Melbourne, Professor Eva Dimitriadis gained eight years' experience as a research assistant in Melbourne, Munich and Dublin before completing her PhD studies at Trinity College Dublin, Ireland. She undertook post-doctoral studies at the University of Dublin before returning to Australia to undertake research in reproductive biology at Prince Henry's Institute, now Hudson Institute of Medical Research. Prof Dimitriadis has a passion for understanding infertility, the factors that contribute to making the endometrium receptive to an implanting embryo and endometrial-trophoblast interactions during implantation. Her research program includes investigating non-invasive biomarkers of implantation potential. She has a strong focus on microRNA regulation of these processes and investigating novel sustained release targeted delivery options. A number of her projects have a clinical translational focus, and have moved into pre-clinical trials. Prof Dimitriadis also has a strong interest in developing new non-hormonal contraceptives that also prevent sexually transmitted diseases and the development of novel treatments for endometrial cancer. Prof Dimitriadis has international, national and industry collaborations including Monash IVF, the Walter and Eliza Hall Institute of Medical Research, Monash University, University of Melbourne, University of Tokyo, Commonwealth Serum Laboratories and the Karolinska Institutet in Sweden.

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