FERTILISATION *IN VITRO* CAUSES PRECOCIOUS ACTIVATION OF TRANSCRIPTION FROM THE ZYGOTIC GENOME

C. O'Neill*, *T. Stojanov

Human Reproduction Unit, Royal North Shore Hospital, St Leonards, NSW, Australia

In vitro fertilisation (IVF) may have long-term adverse effects on progeny. Infants conceived by *in vitro* fertilisation are more likely to be born small for dates and, in a mouse model, culture *in vitro* caused changes in neurological performance of progeny. Changes in the pattern of gene expression in IVF embryos have been detected, and these may be one cause of the long-term effects. This study investigates the effect of IVF on the ontogeny of onset of expression from the embryonic genome in the mouse.

The expression of two markers for the onset of transcription (the transcription requiring complex (TRC) and hsp 70.1) was assessed in 2-cell embryos produced by IVF or fertilisation *in situ* (ISF). It was confirmed that the time from fertilisation to first cleavage was not different for IVF and ISF. Zygotes were cultured and at 1-hourly intervals those cleaved were 'picked off' (time 0 h after cleavage) and placed in groups of 10 in 10 μL of modified-HTF. The expression of the gene products was assayed at times after 'pick-off'.

The proportion of embryos expressing TRC increased with time after cleavage ($P < 0.001$). IVF embryos expressed it significantly earlier ($P < 0.01$) than ISF embryos. Some IVF embryos expressed TRC immediately after cleavage and this was never found for ISF embryos. All IVF embryos were TRC-positive by 2.5 h after cleavage, while this did not occur until 4.5 h post cleavage for ISF. Hsp70.1 transcripts were first detected in IVF embryos 2 h after cleavage but not until 6 h after cleavage in ISF embryos ($P < 0.01$).

The onset of transcription at the 2-cell stage is currently thought to reflect major reorganization of the nucleosomal structure of DNA. Evidence for precocious onset of transcription may indicate that this fundamentally import process is changed following IVF, and warrants further investigation.

10.1071/SRB04Ab240