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Expression of Micro RNAs in the Liver Tissue of Mice Generated through in vitro Embryo Culture and Embryo Transfer

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Abstract : Assisted reproduction is associated with impaired glucose metabolism in adulthood. miRNAs are key regulators of glucose metabolism. Whether embryo culture and/or transfer alters the expression of miRNAs and to what extent this process affects glucose metabolism remain largely unknown. The purpose of the present study was to examine the expression of miRNAs in the liver in mice obtained by the transfer of blastocysts. The study was comprised of an experimental (EG) and a control group (CG). EG was generated by embryo transfer to pseudo-pregnant females. Mice born from naturally ovulating females were used as the CG. Differential expression of miRNAs, blood glucose, plasma insulin, liver glycogen, and activities of some of the rate-limiting enzymes involved in glucose metabolism were determined at ten weeks of age. Blood glucose, plasma insulin, and glycogen concentrations were similar between the groups in both sexes. Activities of enzymes were similar among females. EG males had significantly less glucokinase and phosphofructokinase activity compared to CG males. None of the miRNAs were differentially expressed in males. On the other hand, miR-143-3p expression was upregulated in EG females. Expression of none of the genes targeted by miR143-3p differed between the groups. These results demonstrate that miR143-3p, a novel regulator of type 2 diabetes, is upregulated in mice generated by assisted reproduction in a sexually-dimorphic manner with no apparent effect on glucose and insulin levels at ten weeks of age. It remains to be determined if this process is associated with impaired glucose homeostasis in the long term.

Keywords : assisted reproduction, blastocyst, embryo culture, glucose metabolism, miR143-3p, oxygen
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