Enhanced culture environment of Blastocysts from mouse with high-concentration plasma extracts and/or adipose tissue-derived mesenchymal stem in vitro

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The technology of in vitro culture(IVC) from oocyte to blastocysts stage is mature and standard, but post-blastocyst is relatively more challenging. The evidence suggests that adding human umbilical cord blood serum(hCS) can support blastocysts develop to the early somite stage, but hCS is difficult to obtain and culture is unstable. Nowadays, many materials and methods available for post-blastocyst culture, but they may be complex or challenging. Plasma extract(PE) is a substance obtained after centrifugation of blood, containing various growth factors that promote wound healing, angiogenesis, and stem cell proliferation, which have been used in human dentistry and wound healing. Previous studies have shown that co-culturing with mesenchymal stem cells (MSC) is beneficial for embryo and oocytes, and its impact is related to factors such as growth factors. In this study, in order to understand the effects of PE and MSCs on in vitro culture, blastocysts were cultured in culture conditions adding PE and/or MSCs feeder and cultured in vitro for eight days. In the experiment, 20% hCS was used as the control group, and 5%, 10%, 20% PE or/and MSCs feeder groups were added for co-culture. The results showed that the 5% PE group had the best effect, and there was no significant difference from the control group when cultured to the early somite stage (hCS:5%PE=18.52%:16.67%), indicating that 5%PE could replace hCS in vitro. Taken together, these results provide a new, simplified option for blastocyst culture in vitro.

key word: in vitro culture, high-concentration plasma extract, adipose tissue-derived mesenchymal stem, blastocyst