

EFFECT OF METFORMIN ON EARLY EMBRYO DEVELOPMENT IN FEMALE DIABETIC MICE

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Abstract Body

Metformin is a dimethylbiguanide drug and has an important role in reproductive medicine for the treatment of diabetes mellitus and polycystic ovarian syndrome and the administration is continued even during pregnancy. However, metformin can cross through placenta and hence there can be chances of direct effect on embryonic development and fetal physiology. It is an adenosine 5'-monophosphate activated protein kinase (AMPK) activator and causes meiotic arrest in oocytes and reduces blastocyst development. Hence, this study was aimed at elucidating the effect of metformin on embryo development in female diabetic mice treated with metformin. Type II diabetes was induced in *Swiss albino* mice in High Fat Diet (HFD) fed mice (4 weeks) followed by a single dose of streptozotocin (125 mg/kg body weight) intraperitoneally. Animals with blood glucose levels ≥ 180 mg/dL were considered diabetic and used for further studies. Diabetic mice were injected with metformin (200 mg/kg body weight) for 28 days. The mice were then mated with healthy fertile males and 2 cell embryos collected from oviduct were cultured till blastocyst stage. The average number of 2 cell embryos was significantly higher in metformin group when compared to control ($p < 0.001$) and diabetic control ($p < 0.05$). However, embryos from metformin group showed a significant decrease in blastocyst rate ($p < 0.001$) and total cell number per blastocyst ($p < 0.05$) in comparison to diabetic control. Embryos in diabetic animals showed faster growth compared to control embryos but after metformin administration it was similar to that of control group. In conclusion, the embryos of diabetic mice show faster development which gets corrected by metformin administration. However, metformin reduces blastocyst rate and total cell number in these embryos.