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Differences in H3K4 trimethylation in *in vivo* and *in vitro* fertilization mouse preimplantation embryos

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ABSTRACT. Trimethylation of lysine 4 at histone 3 (H3K4me3) is considered a marker of active transcription; it plays an important role in transcription reprogramming efficiency. We compared the levels of H3K4me3 in mouse preimplantation embryos from MII stage oocytes produced by *in vivo* and *in vitro* fertilization (IVF) using immunofluorescence histochemistry. IVF embryos were further treated with trichostatin A (a histione deacetylase inhibitor) to investigate the effect of histone acetylation on H3K4me3. We found higher levels of H3K4me3 in MII stage oocytes in metaphase chromosomes. The pattern of H3K4 trimethylation of *in vivo* embryos from zygote to blastocyst stages was similar to that of IVF embryos; however, the concentration of H3K4me3 was significantly higher in the *in vivo* fertilization embryos. The levels of H3K4me3 in the trichostatin A-treated groups were also significantly increased. We conclude that culture condition and environmental changes can cause histone modification and that the

effect of these environmental conditions on epigenetic changes should be taken into consideration.

Key words: Lysine 4 at histone 3; Trimethylation; Culture conditions; *In vivo* and IVF embryos; Mouse

