

Germ cells

Embryo development

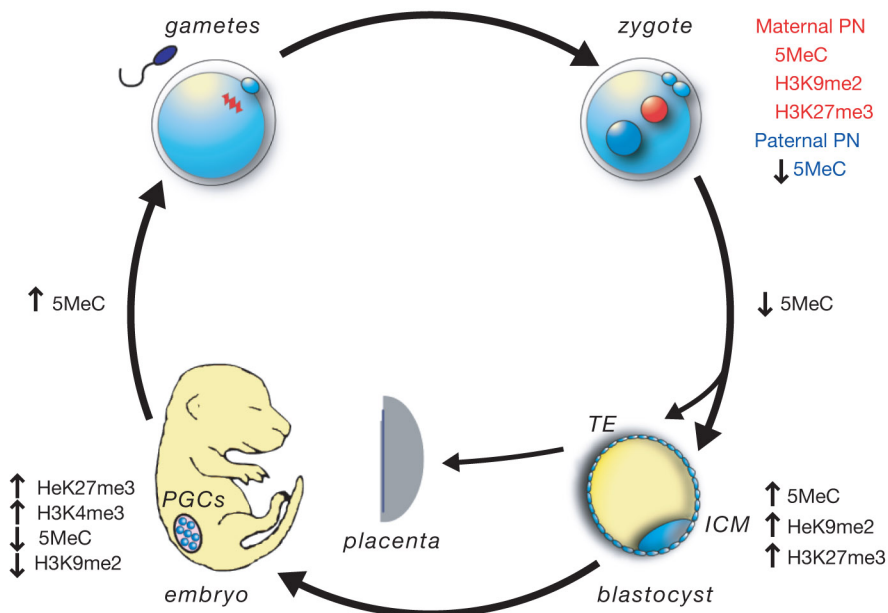


Figure 2. Epigenetic Reprogramming Cycle in Mammalian Development

Immediately after fertilization in the zygote, the paternal pronucleus (PN) is packaged with histones that lack H3K9me2 and H3K27me3, whereas the maternal chromatin contains these marks. The paternal PN also rapidly loses 5-methylcytosine (5MeC) on a genome-wide scale, while the maternal does not. Passive loss of 5MeC occurs during preimplantation development until the blastocyst stage, when the inner cell mass (ICM) cells begin to acquire high levels of 5MeC, H3K9me2, and H3K27me3. The placenta, which is largely derived from the trophoblast (TE) of the blastocyst, remains relatively hypomethylated. Primordial germ cells (PGCs) undergo demethylation of 5MeC and H3K9me2 before and after entry into the gonads. De novo DNA methylation, including parent-specific imprinting, takes place at later stages of germ-cell development.