



**Figure 2.** The 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 (5mC) on a genome-wide scale, whereas the maternal does not. Passive loss of 5mC occurs during preimplantation development until the blastocyst stage when the ICM cells begin to acquire high levels of 5mC, H3K9me2, and H3K27me3. The placenta, which is largely derived from the TE of the blastocyst, remains relatively hypomethylated. PGCs undergo demethylation of 5mC and H3K9me2 progressively as they migrate into the gonads. De novo DNA methylation, including parent-specific imprinting, takes place during gametogenesis.