

The zygote is a human cell but it is not any particular cell. To become a specific type of cell, such as a skin cell or a muscle cell, all the non-skin or non-muscle DNA must be permanently zippered shut. There are three main ways that DNA can be silenced.

1) DNA methylation

Methyl:

This is the most permanent form of locking away information.

Enzymes put methyl tags (CH_3) on cytosines in the areas that are to be locked.

2) Histone modification

The histone spools on which DNA is wound can control whether a gene is expressed or not. ("Expressed" means that the information is being used and proteins are being made.)

3) Micro RNAs (miRNA)

Micro RNAs are non-coding RNAs whose sole purpose is to mess up RNA. When a miRNA attaches, that portion of the RNA becomes unusable. Thus, gene expression is blocked.