



**Figure 2.** Epigenetic mechanisms involved in the regulation of gene expression during neurogenesis. Typically, CpG island–containing genes are mostly housekeeping genes and, consequently, are ubiquitously active. In early development, just postimplantation, these genes may not yet be active, but are marked by a bivalent chromatin signature, consisting of H3K4me3 and H3K27me3. Most of these genes will be activated during development via H3K27 demethylation (*top line*). A subset of these genes that are tissue-specific neurogenic genes may, subsequently, become silenced in nonneuronal or fully differentiated neuronal cells, through H3K9 methylated heterochromatin formation (*top right*). Other neuronal-specific genes may delay activation, but remain bivalently primed for expression until neuronal differentiation ensues (*middle line*). Pluripotency genes, largely, do not contain CpG islands in their promoters. They are active during early development and become repressed following differentiation by conventional H3K9 methylation and DNA methylation mechanisms. ESC, embryonic stem cell; NSC, neuronal stem cell; CGI, CpG island.