

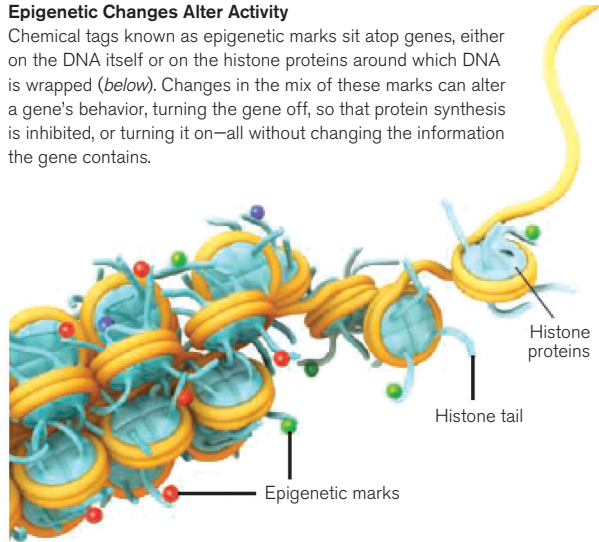
FIGURE 2.26 Epigenetic Changes Alter Gene Activity

Genes can be turned on or turned off. Being tightly packed keeps genes in an inactive state by preventing access to processes that turn genes on. When action is needed, a section of DNA unfurls and the gene turns on. Whether a segment is relaxed and able to be activated or condensed resulting in no action is influenced by epigenetic marks or tags.

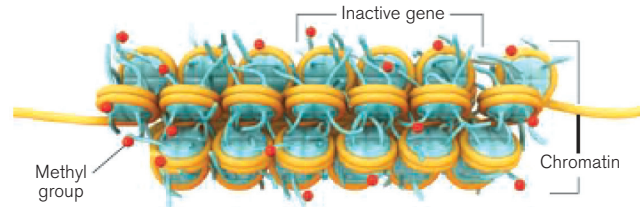
Source: Nestler (2011).

Epigenetic Changes Alter Activity

Chemical tags known as epigenetic marks sit atop genes, either on the DNA itself or on the histone proteins around which DNA is wrapped (*below*). Changes in the mix of these marks can alter a gene's behavior, turning the gene off, so that protein synthesis is inhibited, or turning it on—all without changing the information the gene contains.



Gene off: Some epigenetic marks inhibit genes by inducing tight folding of chromatin (DNA complexed with histones and other proteins) and thus keeping genes from being read: methyl groups sometimes play that role.



Gene on: Other marks, such as acetyl groups, tend to spur gene activity by helping to unfurl the chromatin.

