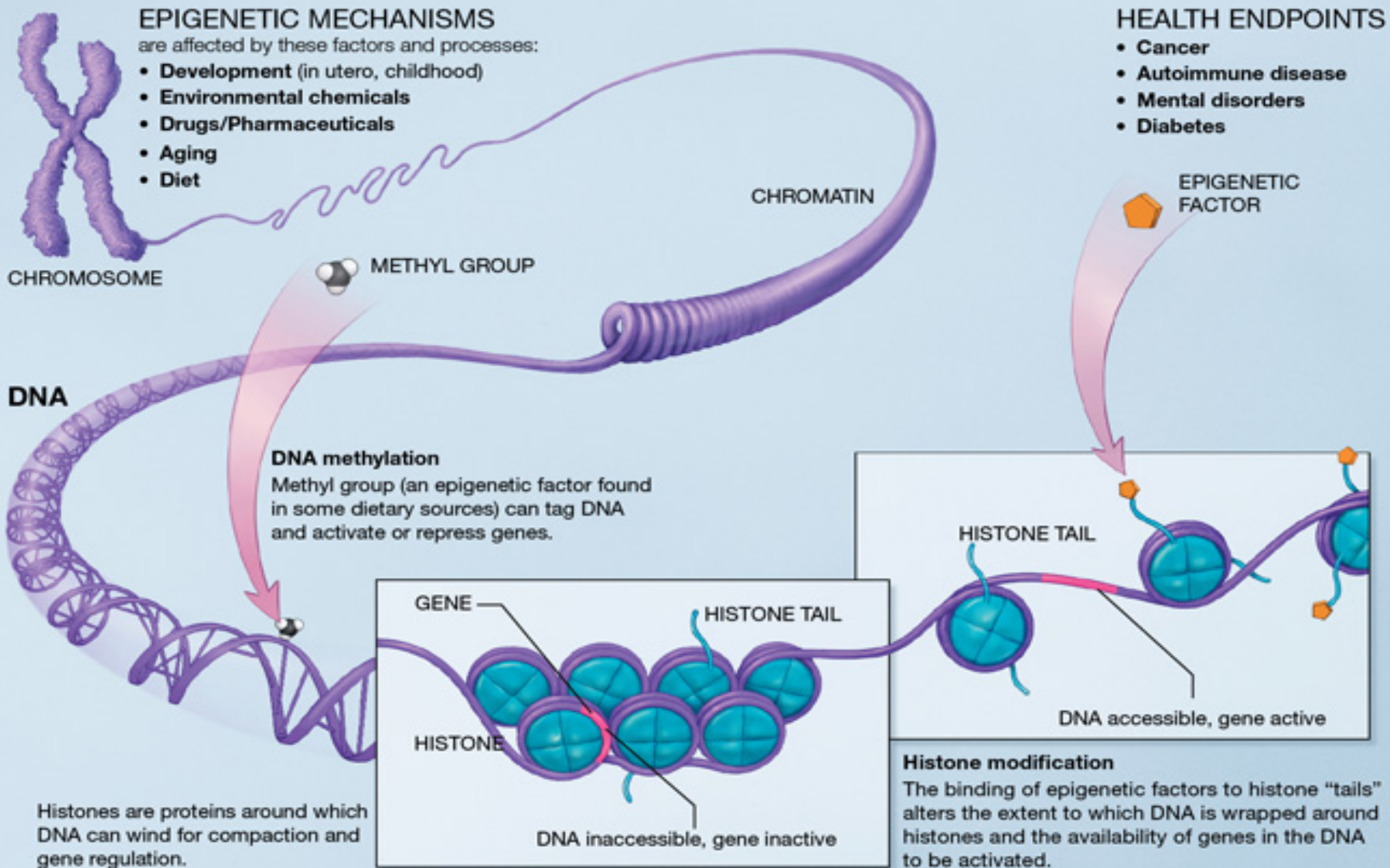


EPIGENETICS

What are Epigenetics?

- Epigenetics refers to how environmental and lifestyle factors can change the expression of our genes.
- Chemical tags attach to DNA or to structures surrounding DNA and can control gene expression by activating certain genes or “silencing” others.
- These changes in expression do not involve changes to DNA sequences.



<http://commonfund.nih.gov/epigenomics/figure.aspx>

Evidence for Epigenetics

- Giving a pregnant mother rat vitamin B12, folic acid, choline, and betaine results in different coat colour in identical genetically modified mice. Differences in DNA methylation are evident.
- Wild radishes develop spines and distasteful chemicals when living in areas with an abundance of caterpillars -- their offspring still develop these features even if they live in areas without caterpillars.
- Feeding a fungicide to pregnant rats leads to a low sperm count, not only in their offspring, but in their great-grandchildren. Their sperm has a high number of methyl tags.

Evidence for Epigenetics

- There is a connection between food availability for humans and the development of diseases such as heart disease and diabetes in later generations.
- Links between schizophrenia and strange methylation are being investigated.
- 50-year-old twins have four times as many differently expressed genes compared to 3-year-old twins implying that the genes were expressed due to environmental factors. The 50-year-old twin with more epigenetic evidence had the higher number of overexpressed genes.