

# Sc 10 Biotech Project: Research Template

Source #1			
Title of source: Scitable - Epigenetics Influences and Disease	Author: Danielle Simmons	Date of publication: 2008	Date accessed (by you): May 3rd, 2020
URL: <a href="https://www.nature.com/scitable/topicpage/epigenetic-influences-and-disease-895/">https://www.nature.com/scitable/topicpage/epigenetic-influences-and-disease-895/</a>			
Copy and paste relevant information directly from source:  <p>These findings suggest that diet can cause changes to genes that are passed down through generations by the males in a family, and that these alterations can affect susceptibility to certain diseases. But what are these changes, and how are they remembered? The answers to questions such as these lie in the concept of epigenetics.</p>		<p><b>Make "raw" notes in your own words (this is not a summary):</b></p> <ul style="list-style-type: none"> <li>• There are some factors that can change the way the males in the family's genes are passed on due to some environment factors, such as the quantity of food.</li> </ul>	

Source #2			
Title of source: U.S. National Library of Medicine	Author: Unknown	Date of publication: April 28th, 2020	Date accessed (by you): May 3rd, 2020

<p>URL: <a href="https://ghr.nlm.nih.gov/primer/howgeneswork/epigenome">https://ghr.nlm.nih.gov/primer/howgeneswork/epigenome</a></p>			
<p>Copy and paste relevant information directly from source: The epigenome comprises all of the chemical compounds that have been added to the entirety of one's DNA (genome) as a way to regulate the activity (expression) of all the genes within the genome. The chemical compounds of the epigenome are not part of the DNA sequence, but are on or attached to DNA</p>		<p><b>Make "raw" notes in your own words (this is not a summary):</b></p> <ul style="list-style-type: none"><li>• <b>Adding chemical compounds to genes are called epigenetic modifications</b></li><li>• <b>These chemical compounds are not a part of the DNA sequence, but they are attached to the DNA</b></li><li>• <b>The epigenome reads the chemical compounds and it can regulate the DNA activity</b></li><li>• <b>Epigenetic modifications can stay even when the cell divides, and also when the genes are being passed down to the next generation</b></li></ul>	

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<b>Source #3</b>			
Title of source:  Epigenome - an overview   ScienceDirect Topics	Author: C.Y. Lim	Date of publication: 2016	Date accessed (by you): May 3rd, 2020
URL: <a href="https://www.sciencedirect.com/topics/neuroscience/epigenome">https://www.sciencedirect.com/topics/neuroscience/epigenome</a>			
Copy and paste relevant information directly from source: Epigenome is the complete description of all the chemical modifications to DNA and histone proteins that regulate the expression of genes within the genome.		<p><b>Make "raw" notes in your own words (this is not a summary):</b></p> <ul style="list-style-type: none"> <li>• <b>An epigenome means all of the DNA that has been chemically modified</b></li> </ul>	

<b>Source #4</b>			
Title of source:  LiveScience	Author: Rachel Rettner	Date of publication: June 2013	Date accessed (by you): May 3rd, 2020
URL: <a href="https://www.livescience.com/37703-epigenetics.html">https://www.livescience.com/37703-epigenetics.html</a>			

<p>Copy and paste relevant information directly from source:</p> <p>Epigenetics is the reason why a skin cell looks different from a brain cell or a muscle cell. All three cells contain the same DNA, but their genes are expressed differently (turned "on" or "off"), which creates the different cell types.</p>		<p><b>Make "raw" notes in your own words (this is not a summary):</b></p> <ul style="list-style-type: none"><li>• <b>Chemical modification that turn genes (or parts of DNA sequences on or off)</b></li><li>• <b>Epigenetic modifications change the structure of DNA</b></li><li>• <b>Histone modifications are examples of epigenetic changes</b></li></ul>	
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## Notes - Part 2

### What is Epigenetic Modification?

- Epigenetic changes affect not the DNA, but the way how a cell reads genes
- There are two main types of epigenetic modification: the methyl group and histone proteins
- DNA methylation - the addition of methyl group, an example of epigenetic change
- The methyl group usually is the one that turns off the protein production of a gene
- Histones help wrap the DNA into a spiral and spool-like shape
- If histones "squeeze" the DNA, some will not be able to produce proteins
- If epigenetics help release the squeeze of histones, then the DNA can produce more proteins (turn the genes on)
- Without histones, the DNA sequence would be too long to fit inside cells

#### Epigenetic Modification and cancer risk

- Epigenetics can play a role in the development of cancer
  - An epigenetic change could turn off the gene that suppresses tumors, which could result in uncontrolled cellular growth
  - An epigenetic change could turn off the genes that help repair the damage in DNA, which could increase cancer risk
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- Example of a big advancement (methyl group)- mice with the *Agouti* gene

Fanny Barakaeva

- People who drink coffee can experience epigenetic changes to their DNA, and can be less likely to certain illnesses, such as heart disease
- It can be possible to pass down these epigenetic changes if they occur in the egg or sperm cells
- Usually the epigenetic changes get erased when the sperm and egg cell combine through a process called reprogramming

### **Sources in MLA format**

Gomolka, Magdalena. "Epigenetics - Something That We Do Not Have in Our Genes, and We Can Still Pass on to Our Children." *Fundacja BIRN*, 19 Feb. 2019, [fundacijabirn.pl/en/2019/02/19/epigenetics/](http://fundacijabirn.pl/en/2019/02/19/epigenetics/).

Klein, Alice. "Drinking Coffee Appears to Cause Epigenetic Changes to Your DNA." *New Scientist*, 28 Apr. 2020, [www.newscientist.com/article/2241666-drinking-coffee-appears-to-cause-epigenetic-changes-to-your-dna/?utm\\_medium=social&utm\\_campaign=echobox&utm\\_source=Facebook&fbclid=IwAR1vH-E4-KazdYNxK1NtyL6hfBWlryaIvc-qXAHf0tMji1K433JBKrzgafo#Echobox=1588083938](http://www.newscientist.com/article/2241666-drinking-coffee-appears-to-cause-epigenetic-changes-to-your-dna/?utm_medium=social&utm_campaign=echobox&utm_source=Facebook&fbclid=IwAR1vH-E4-KazdYNxK1NtyL6hfBWlryaIvc-qXAHf0tMji1K433JBKrzgafo#Echobox=1588083938).

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Lim, C.Y. "Epigenome." *Epigenome - an Overview | ScienceDirect Topics*, 2016, [www.sciencedirect.com/topics/neuroscience/epigenome](http://www.sciencedirect.com/topics/neuroscience/epigenome).

Rettner, Rachael. "Epigenetics: Definition & Examples." *LiveScience*, Purch, 24 June 2013, [www.livescience.com/37703-epigenetics.html](http://www.livescience.com/37703-epigenetics.html).

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Tollefsbol, Trygve O. "Advances in Epigenetic Technology." *Methods in Molecular Biology (Clifton, N.J.)*, U.S. National Library of Medicine, 2011, [www.ncbi.nlm.nih.gov/pmc/articles/PMC3227536/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3227536/).

Unknown. "What Is Epigenetics? - Genetics Home Reference - NIH." *U.S. National Library of Medicine, National Institutes of Health*, 28 Apr. 2020, [ghr.nlm.nih.gov/primer/howgeneswork/epigenome](http://ghr.nlm.nih.gov/primer/howgeneswork/epigenome).