

# About Epigenetics!

Epigenetics is a brand new field of science that explains why the choices we make may be important!



## What is epigenetics?

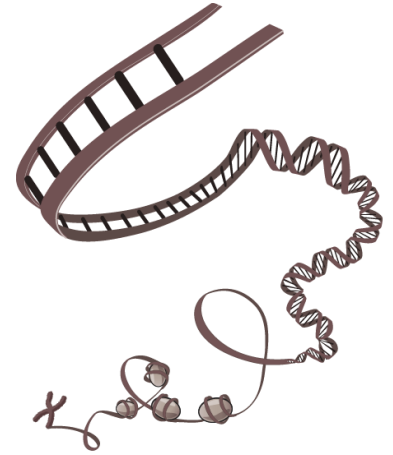
Epigenetics refers to markings on our DNA. These markings provide a “volume control” for the things that our DNA does.

## Why does it matter?

Previously, we thought that the way that our DNA and genes acted was determined by what we got from our parents. Genes are sections of DNA that perform a certain function and we get two copies of each gene – one from mom, one from dad. Epigenetics research has shown that some CHOICES that we make can impact how our genes behave. This happens because some actions can produce or change the epigenetic markings on DNA that can turn the activity of certain genes up or down.

## How does it work?

Our DNA is made up of 4 bases that are easily noted as 4 letters: A’s, C’s, G’s and T’s. The order of these letters in DNA gives instructions for what your body needs to do (like making proteins that let your blood clot to fix a cut on your finger, or making keratin to grow fingernails and hair). Imagine if you were reading a book. The DNA letters would be the words of that book. But let’s say that you got a really, really big cut and needed to close the wound fast. The instruction book is still there in the DNA – but the body would want to work harder to seal the cut and form the scab. If you had a way of highlighting and bolding the instructions for clotting, plus you made a note in the margins of the book to repeat those steps when finished, then you could “turn up the volume” on making blood clotting factors. These markings on the ‘letters’ of our DNA are referred to as “epigenetics”. In other words, epigenetic marks can change the activity of our DNA without changing the “letters” that make up our DNA.



### These have epigenetic effects!

- Food
- Air quality
- Stress
- Exercise
- Hugs
- Sleep
- Exposure to toxins

A Genetic Change	An Epigenetic Change
AT <b>C</b> GGGATT <b>C</b> AG	AT <b>C</b> GGGATT <b>C</b> AG
AT <b>A</b> GGGATT <b>C</b> AG	AT <b>C</b> GGGATT <b>C</b> AG

## Are these epigenetic marks passed on?

We’re learning more every day about how epigenetic effects occur and are maintained. Epigenetic marks can be passed from a mom to her baby during pregnancy. Research is currently studying whether epigenetic changes resulting from environment exposures are passed to future generations.

It’s not just genetics anymore, but also the impact of the environment and our choices that help determine our future. So for all of us and our future families, **nurture your nature!** Be nice to your genes!

### Learn more!

For more about epigenetics: Genetic Science Learning Center: <http://learn.genetics.utah.edu/>

For more about developmental origins of disease: OHSU Moore Institute for Nutrition and Wellness: <http://www.ohsu.edu/xd/education/schools/school-of-medicine/departments/the-moore-institute/>

### A Role for Epigenetics in Sleep

Each of your days is divided into the time you are awake and the time you are asleep. Even though the DNA in your cells is the same when you are awake and asleep, different chapters of the book are read during the day and during the night.

But what if you have a project due the next day that you kept putting off, and now you have to stay up very late at night to do the project. You probably notice that it’s harder than usual to do the project because you’re tired and not thinking clearly.

The reason is that your body is reading the book chapters for sleep because they are marked to be open, and you want it to use the book chapters for being awake, but they are marked as closed.