Epigenetics

Changing the Phenotype without changing the Genotype

*EQ: How can identical twins separated at birth end up looking different?*

**Genome**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If the genome is a paragraph then epigenetics acts like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Epigenetics is literally “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” that determines \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

*Epigenetics is the study of gene expression (which genes get turned “on” or “off” and that make up our traits).*

Gene expression is controlled by

* Methyl Groups that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and tell a cell \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Histones that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Your genome is the same throughout your life and does not change while your epigenome \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and can be hereditary (passed down through generations).

Epigenome changes through your life due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 Examples include:

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Some epigenetic changes can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or passed down through generations.

**Google Utah Learn Epigenetics and click on the first link for the University of Utah**

1. **Read the Section “Epigenetics and Inheritance”**
2. What is epigenetic inheritance and what does it mean?
3. What is reprogramming and why is it important to development?
4. Give 3 examples of organisms and the traits that pass on epigenetic information to future generation.
5. What must be done to prove epigenetic inheritance?
6. **Go to the “Lick your Rats” Interactive explorer**
7. How does the mother rat’s behavior change the baby rat as an adult?
8. How can anxiety be a benefit for a rat?
9. What happens to the baby rats DNA when mom rat is nurturing?
10. Fill in the table for the differences seen between low- nurtured and high- nurtured rats.

|  |  |  |
| --- | --- | --- |
|  | High Nurtured Rats | Low Nurtured Rats |
| Mom Rat Behavior  |  |  |
| GR gene in DNA  |  |  |
| Hippocampus cells in Brain  |  |  |
| Adult Rat Behavior  |  |  |