

3. How does epigenetics apply to cancer cells?
4. How could this information be used in cancer treatments?

THE EPIGENOME LEARNS FROM ITS EXPERIENCES

1. True or False. Cell signals play a role in shaping gene expression only during development.
2. What molecule is primarily responsible for carrying cell signals to DNA?
3. What are the two functions of gene regulatory proteins?
4. Are epigenetic tags passed to daughter cells?

EPIGENETICS & INHERITANCE

1. What can be passed on to offspring besides just the DNA code?
2. How does “reprogramming” work?
3. How does this apply to epigenetics?
4. Describe two examples of epigenetic inheritance. Include one human and one non-human example.
5. How can epigenetics affect evolution?

IDENTICAL TWINS: PINPOINTING ENVIRONMENTAL IMPACT ON THE EPIGENOME

1. Often, the physical characteristics of genetically identical twins become increasingly different as they age, even at the molecular level. Explain why this is so. (use the terms "environment" and "epigenome")
2. Name 3-4 environmental factors that influence the epigenome.
3. What is an imprinted gene?
4. With the environment affecting the epigenome so much, how do scientists study how the environment and genes interact?

LICK YOUR RATS

1. Explain how a high-nurturing mother rat shapes her pup's epigenome, and what that pup's response to stress will be.
2. In rats, does licking by the mother activate, or deactivate her pup's GR gene?

3. Explain how cortisol and the GR protein work together in the brain to relax a rat pup. You may draw a diagram.
4. The rat nurturing example shows us how parental behavior can shape the behavior of their offspring on a biochemical level. Relate this to humans and think about the personal and social implications. Record your thoughts.

NUTRITION & THE EPIGENOME

1. Explain how the food we eat affects gene expression.
2. How can the diets of parents (include BOTH parents!) affect their offspring's epigenome?

EPIGENETICS & THE HUMAN BRAIN

1. Describe at least 2 connections between epigenetics and human behavior.
2. Are there any social implications we need to be aware of as we learn more and more about what affects human behavior? If so, what kinds?