

# Today's Goals

- Figure out if skin color acquired or inherited;
- And how tanning works.

# Revisit 1.2 Acquired Vs. Inherited Traits

## Case 2:

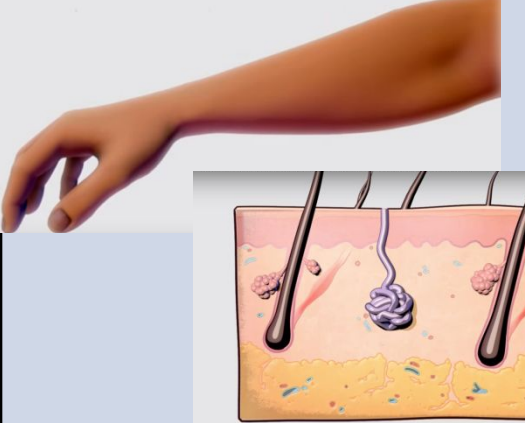

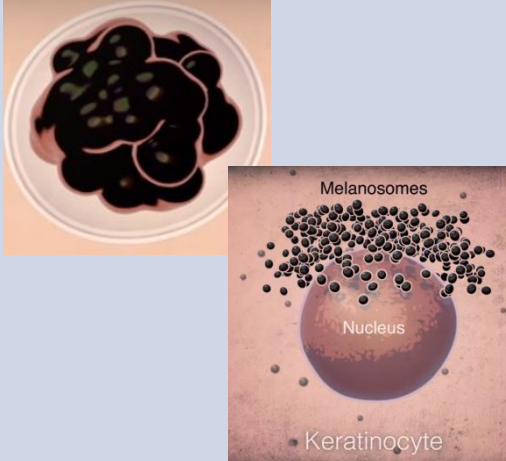
A woman lays out in the sun everyday keeping her skin tan. All of her children are born without a sun tan.

Is skin color acquired or inherited?



# How does tanning work?

- Watch the [HHMI How We Get our Skin Color animation](#)
- Zoom in and describe what is happening at each level.

Trait	Cellular	Molecular
 <p>The photograph shows a human arm with a tan. The diagram below it shows the skin layers: Epidermis, Dermis, and Hypodermis. It also depicts hair follicles and sweat glands.</p>	 <p>A microscopic view of a melanocyte, a cell responsible for producing melanin. The cell is labeled "Melanocyte".</p>	 <p>A microscopic view of melanosomes, which are organelles that store melanin. The image shows a cluster of melanosomes and a keratinocyte, which is a cell in the epidermis. Labels include "Melanosomes", "Nucleus", and "Keratinocyte".</p>

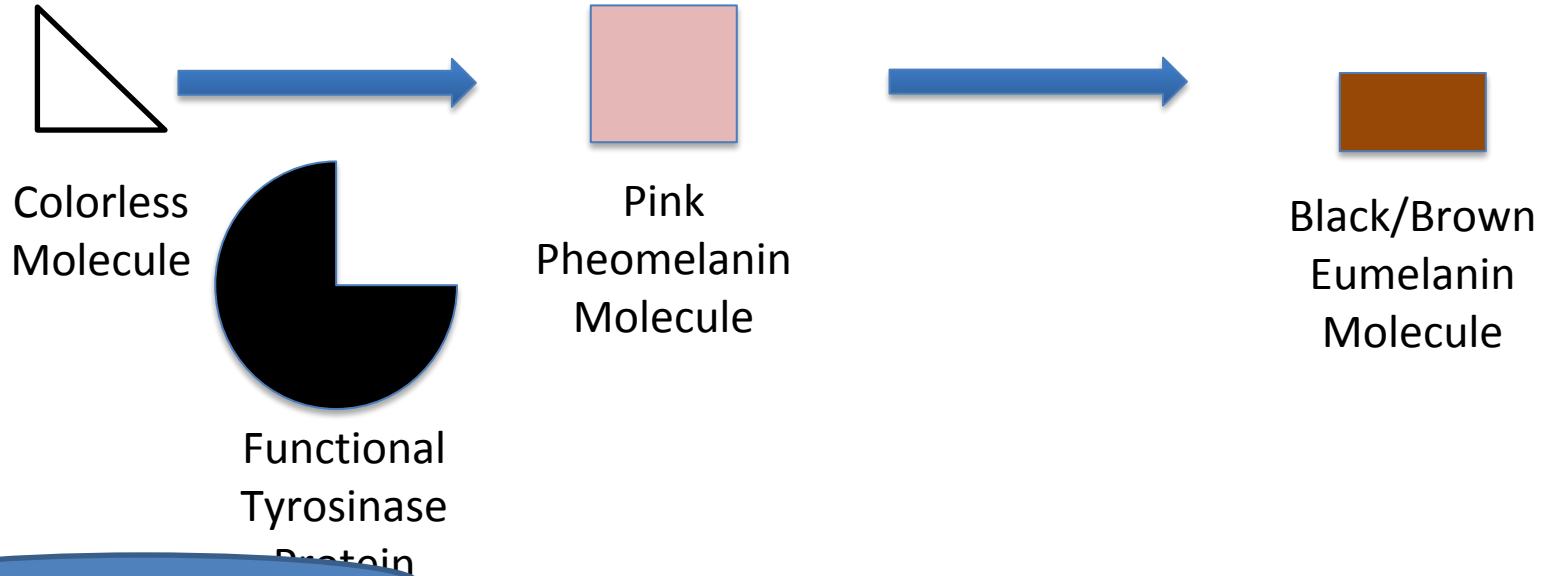
# Is skin color acquired or inherited?

What we notice ...

What we wonder ...

What have we already figured out?

# Regulator Proteins Influence Skin Color



**cAMP Regulator Protein**

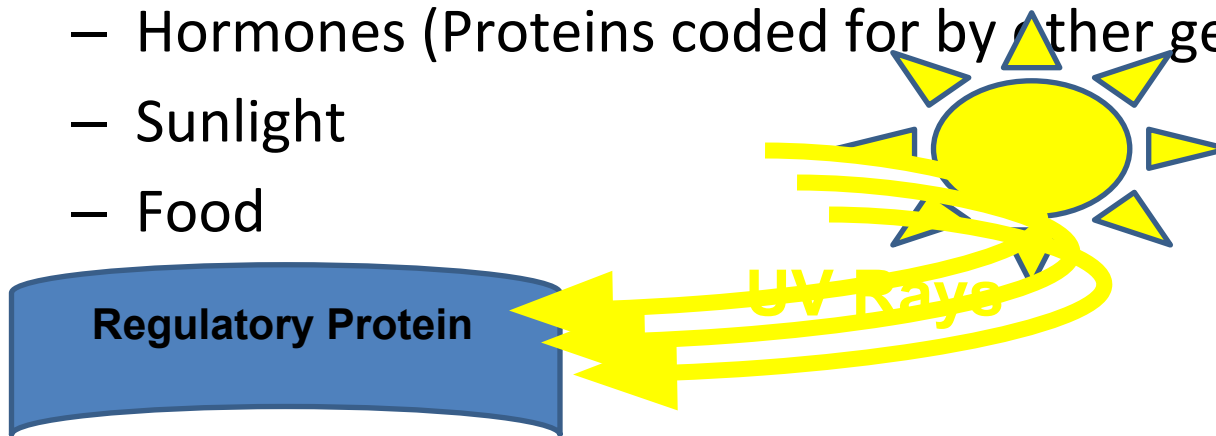


**Regulatory Region**

**MC1R DNA Sequence**

# Environment can turn on Regulatory Proteins

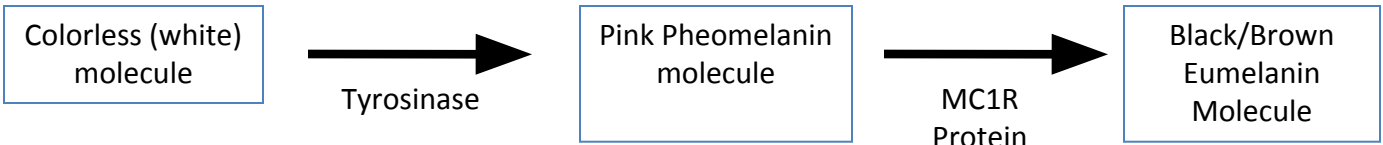
- Regulatory proteins are turned ON or OFF by signals detected by the cell
- Signals can include...
  - Hormones (Proteins coded for by other genes)
  - Sunlight
  - Food



Regulatory Region

Coding Sequence

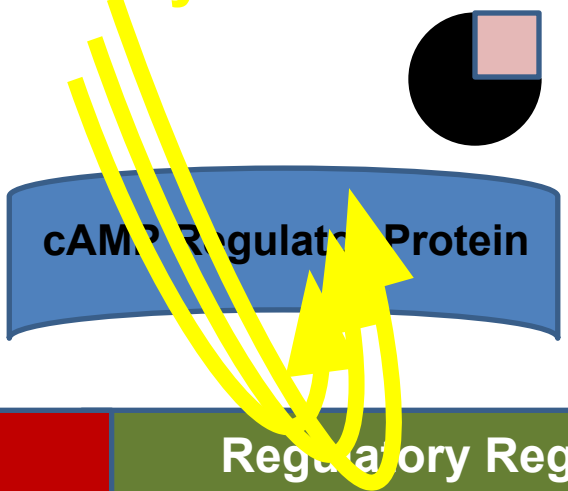
pathway



Molecule cartoons

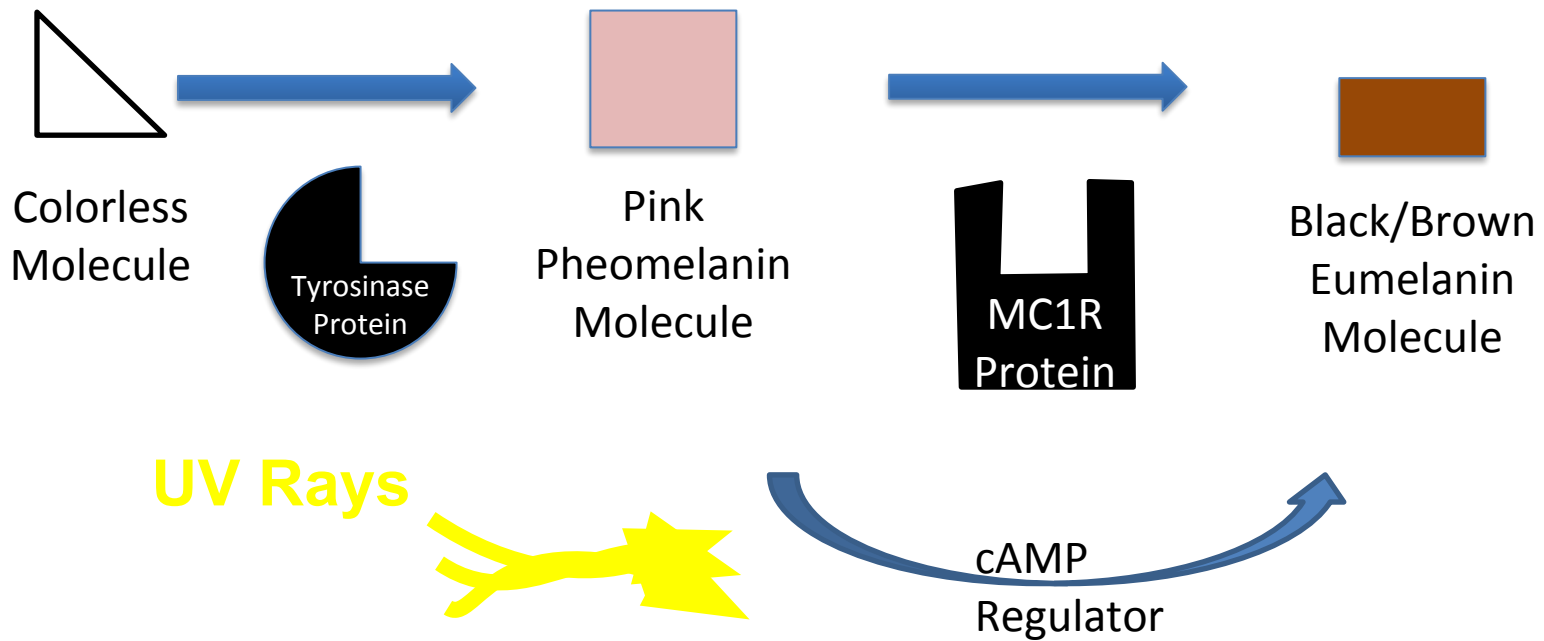


UV Rays



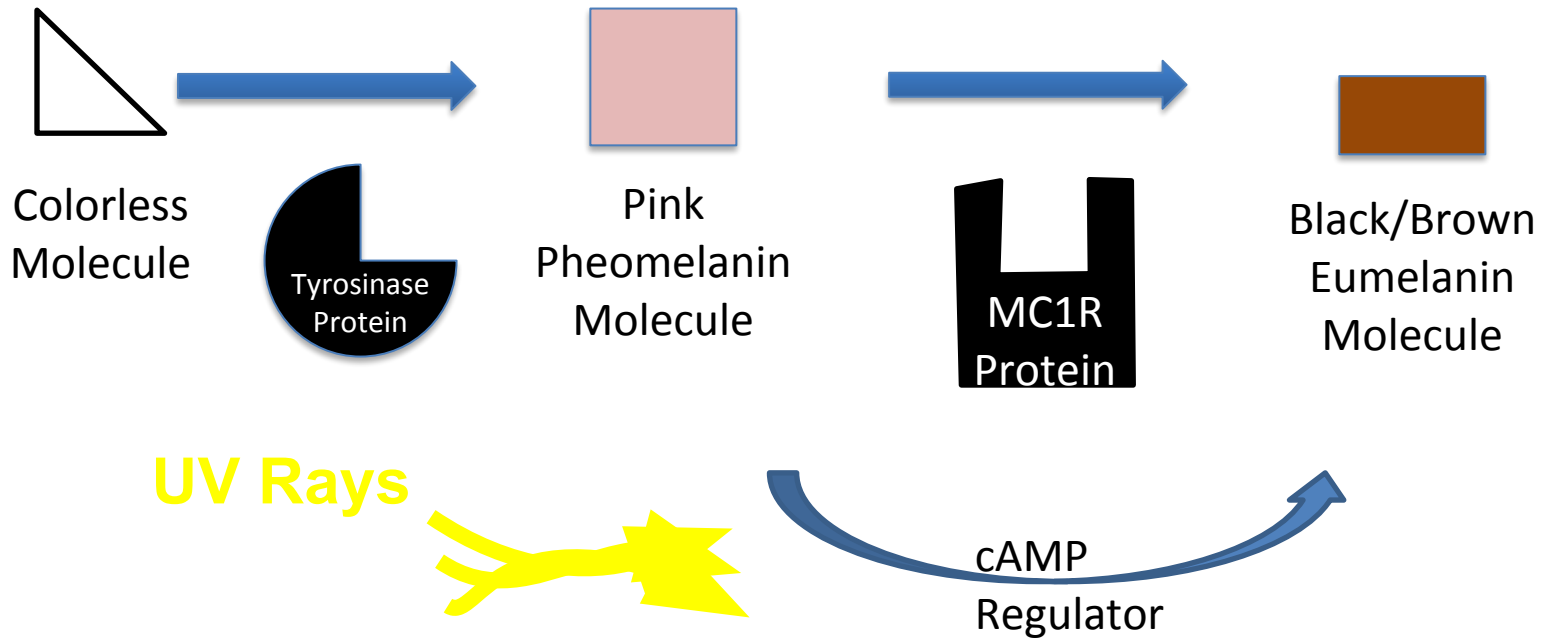
# More Eumelanin = Darker Skin

## More Pheomelanin = Lighter Skin



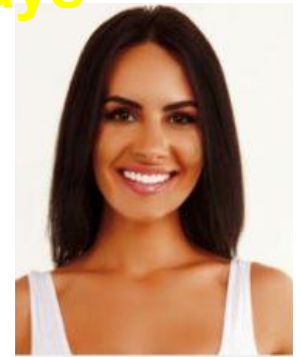


# Skin Color is determined by Genes and Environment



# Use our gene model to explain why...

- Some people tan:



- Some people burn:



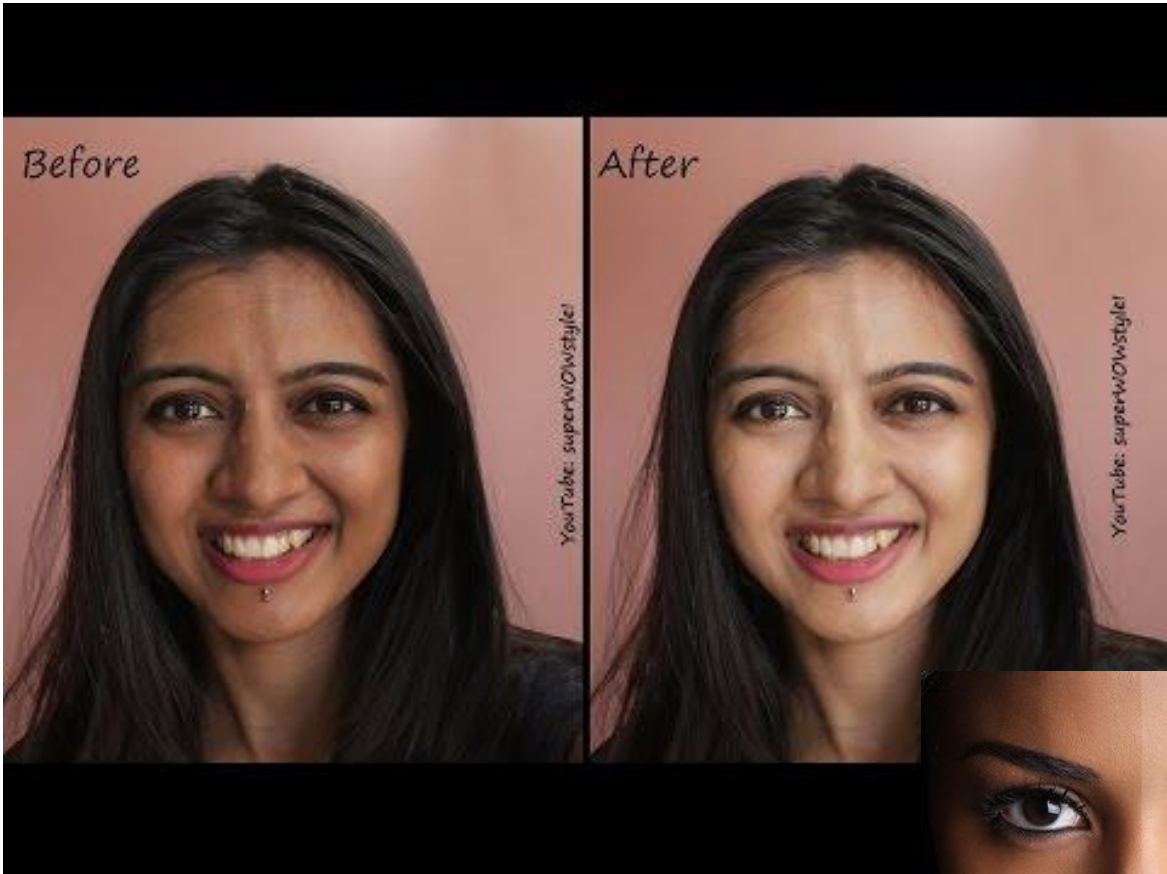
# Summary of Genes and the Environment

Environment can ...

- Cause mutations in DNA;
- Turn genes on and off;
- And determine whether traits are harmful or helpful.

How do genes and the environment  
interact to affect mental health?

# Explore further - How do skin lightening creams work?



# What about sunless tanner?

