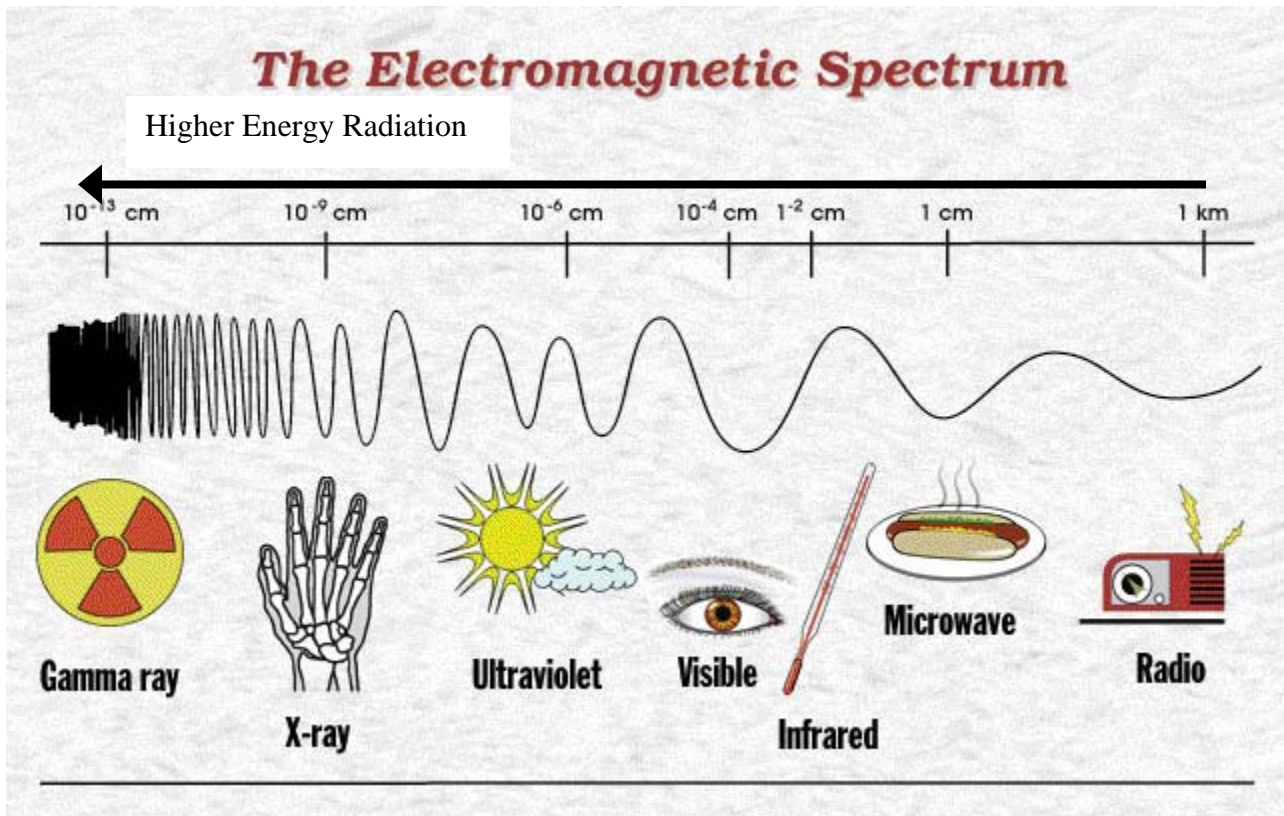


Bacterial Mutation Lab

Ultra violet light is a kind of radiation that can cause genetic mutation. There are different kinds of UV light that have different degrees of harmful effects. The shorter the wavelength of the radiation, the higher the energy of the radiation and thus the more harm the radiation can inflict. X-rays are another type of radiation that is more harmful than UV light due to its higher energy making it more efficient at entering the body and inflicting harm.

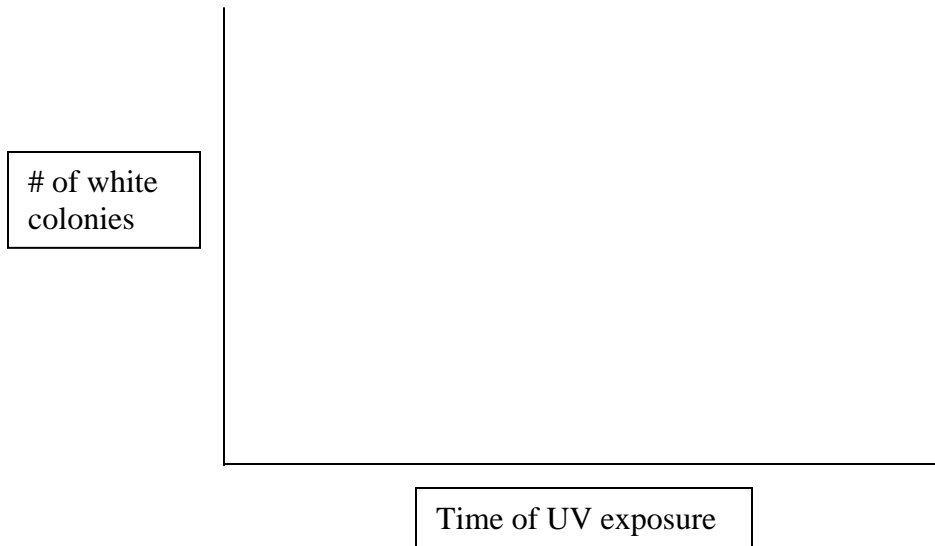


UV light also affects other organisms. UV light can cause mutations in bacteria that lead to a visible change in their appearance. In our case the *Serratia*, known to grow red, when exposed to UV light will grow white.

Day 1.

Today you will inoculate 3 plates of nutrient agar with *Serratia marsescens*. One of the plates of bacteria will be a control not exposed to UV light. The other 2 plates you will expose to UV light for various amounts of time.

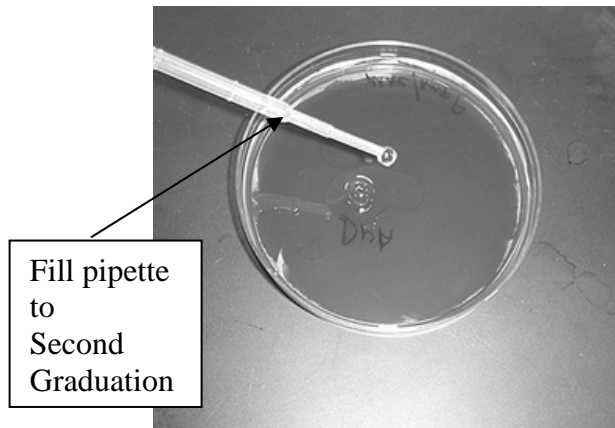
What do you expect to see with increased exposure to the UV light? Draw your prediction on the graph.



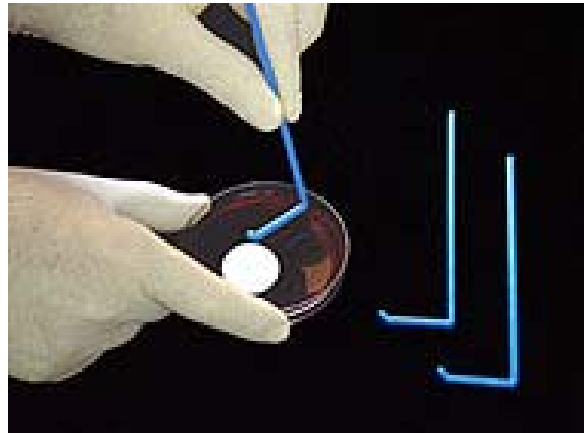
Do you expect to see any white colonies without any exposure to UV light? Why or why not?

Directions for Day 1

1. Obtain 3 plates.
2. Write your name on the bottom of the plate and the time of UV exposure in permanent marker.
3. The micro-test tube your group gets contains a culture of *Serratia* bacteria. You will transfer some of the bacteria to each plate and then use a spreader to spread the bacteria across the agar.
4. Perform the next steps quickly after removing the lid so you do not contaminate your plate. **DO NOT place the lid down or talk over the open plate!**
 - a. Using a sterile pipette, draw up the bacteria until the second graduation on the pipette.
 - b. As shown below, release the bacteria culture onto the center of the plate.
 - c. Use a sterile "blue" spreader to **gently** spread the bacterial culture across the entire plate.



Fill pipette to Second Graduation



DO NOT TEAR or RIP the agar. Press GENTLY to spread the bacteria.

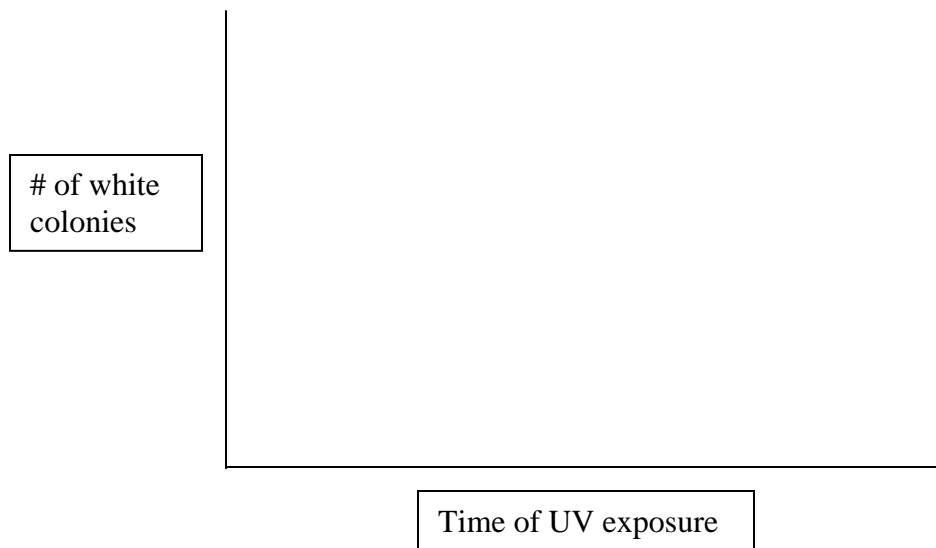
- d. Place the lid back over the plate. Dispose of your pipette and spreader in the appropriate location designated by your teacher.
 - e. Repeat the above steps with the next plate.
 - f. Let the culture dry no longer than 5 minutes
5. Expose your plates of bacteria to the ultraviolet light for the designated time.
 - a. Remove the lid of the plate and put the plate under the UV lamp. **Do not look directly at the lamp or expose your skin to the UV light for any longer than necessary.**
 - b. After the exposure time is complete, replace the lid of the plate and then place your plates, “upside down” in the location designated by your teacher. The bacteria will need 48 hours to grow before we check your plates again.

Day 2 Directions

1. Obtain your plates. **Do not open your plates at any time!**
2. Count the number of white colonies on each plate. Record data from your group and class data in the table provided.

Exposure Time	# of white colonies
0	
30 seconds	
1 minute	
3 minutes	
5 minutes	
10 minutes	
15 minutes	

Graph averages of data



How did results compare to your expectations?

Explain how UV light caused the bacteria to grow a different color using the gene to protein idea (gene→protein→trait).

Did you notice any changes in the overall number of bacteria that were present on plates exposed to UV compared to your no treatment controls? What does this tell you about other effects of UV light on bacteria?

If UV light has such an affect on bacteria, do you think these same kinds of changes are happening in your skin when you are exposed to UV light? What changes occur over time due to UV light exposure?