**1.8 Human Albinism in Different Environments Name: \_\_\_KEY\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hr: \_\_\_**

**Directions:** Watch [“The Biology of Skin Color”](https://www.youtube.com/watch?v=hFw8mMzH5YA&feature=youtu.be) (2:25-5:36) by HHMI Biointeractive and read “The Known Health Effects of UV” by the World Health Organization. Use this information to determine if the TYR Mutation that causes Human Albinism is harmful in two different environments.

**Environment 1 - Australia, a country with a lot of direct sunlight**

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|  | **Humans with dark skin pigmentation.** | **Humans with Albino trait (has TYR Mutation)** |
| **Organisms**  How does the the trait appear *in this environment*? Is it harmful? | Skin has some pigment (some have darker skin than others). This trait is **helpful** in this environment. | Skin does not have pigment, it may appear white. In this environment it could lead to a sunburn.  This trait is **harmful** in this environment. |
| **Cells**  What do you think is going on inside the cells *in this environment*? | Cells are producing more melanin in response to the sunlight. Folate is protected and helps with neural development. | Cells cannot produce melanin in response to the sunlight. Folate is not protected and hinders neural development. |
| **Molecules**  What do you think is happening on the molecular level *in this environment*? | The melanin is forming a cap around the cells protecting the Nucleus and the DNA from mutations that can be caused by UV rays. | Without the melanin as protection, UV rays can reach the DNA in the nucleus and cause mutations. This could lead to skin cancer. |

**Environment 2 - Norway, a country without a lot of direct sunlight**

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|  | **Humans with dark skin pigmentation.** | **Humans with Albino trait (OCA1 type albinism)** |
| **Organisms**  How does the the trait appear *in this environment*? Is it harmful? | Skin has some pigment (some have darker skin than others). This trait is could be **harmful** in this environment. Without vitamin D a child could get rickets, and have soft bones. | Skin does not have pigment, it may appear white. In this environment it could lead to a sunburn.  This trait is **helpful** in this environment. |
| **Cells**  What do you think is going on inside the cells *in this environment*? | Cells produce dark colored melanin even without the sun. Bone cells may not have very much calcium due to lack of vitamin D. | Cells do not produce melanin. Vitamin D increases calcium absorption from the food into Bone cells. |
| **Molecules**  What do you think is happening on the molecular level *in this environment*? | There is very little sunlight and the little UV radiation that there is is blocked by the melanin. As a result very little vitamin D is produced. | The little UV radiation that is available enters the body and stimulates the production of vitamin D. |

**Conclusion:**

Does the environment determine if the TYR albinism mutation is harmful?

Yes, the environment determines if the TYR albinism mutation is harmful. It is more harmful in environments with a lot of sunlight.