

C5 Questions: Skin pigmentation

Questions: Skin Pigmentation

1. What is the purpose of eccrine glands. Where do you find them in skin?
2. In the context of skin cancer, why is scalp hair more than cosmetic?
3. Does melanin absorb in the visible or the UV, or *both* parts of the electromagnetic spectrum?
4. Are melanocyte numbers normal in albinism?
5. Name a gene which when mutated causes albinism.
6. What gene controls the ratio of eumelanin to pheomelanin?
7. What is the clinical significance of a high ratio of pheomelanin to eumelanin?
8. Why is melanin bundled into melanosomes?
9. What is the relation between constitutive and facultative pigmentation. Which works best?
10. How does the epidermis protect against UV?

Answers: Sunburn, DNA and cancer

1. The principal function of eccrine sweat glands is to lose heat via the protection of sweat, and the sweat evaporating. Eccrine sweat glands are epidermal in origin, but are mainly located in the dermis (with the duct) traversing the epidermis to the skin's surface.
2. The scalp receives more UVR than any other body site. Hair blocks UVR effectively.
3. Melanin absorbs in both the visible and the UV range.
4. Albinism is characterised by a failure of melanocytes to synthesise melanin — the number of melanocytes is normal. Contrast with vitiligo.
5. Mutations of tyrosinase cause a type of albinism. There are other genes affected in some types of albinism.
6. The MC1R— the melanocortin 1 receptor.
7. People with a high ratio of pheomelanin to eumelanin have red hair and are sun sensitive.
8. Melanin biosynthesis produces a range of toxic intermediaries, and so is confined within the safety of the melanosome, rather than the radicals produced being able to 'float free' in the cell and damage key macromolecules such as DNA.
9. Constitutive and facultative pigmentation are related to the extent that those with more constitutive pigmentation are able to tan more effectively.
10. In response to UV, the stratum corneum thickens, resulting in less penetration of UVR.