Skin biology video 3: pigmentation

Variation in pigmentation across different body sites largely reflects differences in UVR exposure, but even at birth there are differences in melanin pigmentation and skin colour between some body sites. For instance, the outside of the forearms are darker than the inside, even in newborns. But most of the striking variation within a person (as seen in the images in the video) is due to difference in UVR exposure.

Vitiligo is believed to be an autoimmune disorder in which melanocytes are destroyed — are at least lose their markers and function, within discrete areas of skin. It is associated with some other autoimmune disorders such as pernicious anaemia. There are other types of vitiligo (see edderm101).

Albinism is a group of autosomally recessive inherited disorders in which reduced amounts of melanin are synthesised. There are various types, due to mutations in different genes. The phenotypes vary considerably. In contrast with vitiligo, the melanocytes are present in albinism, they just don't synthesise 'normal' amounts of melanin.

Constitutive pigmentation is 'what you are born with' Or we imagine what would be there with no UVR exposure. **Facultative pigmentation** is the change in skin pigmentation in response to UVR exposure — otherwise known as tanning.

Melanocytes are **neural crest derived cells** that migrate into skin around the end of the first trimester. Sometimes this process is disturbed, resulting in areas of hypopigmentation at birth.

Melanin biosynthesis is more complex than portrayed here. Melanin has been likened to plastic: there are lots of different types. The basic structure is based on **polymerisation of tyrosine**, and although we can class it into the two types, **eumelanin** (brown/black) and **pheomelanin** (red/yellow), this is a gross (but useful) simplification.

The **ratio of eumelanin to pheomelanin** is important for hair colour. Those with red hair has a high pheomelanin: eumelanin ratio. Those with black hair have a low pheomelanin: eumelanin ratio. If you have very little of either melanin, you have blonde hair. If you are lucky enough still to have hair :-(

Fitzpatrick scale. This is an ordinal system describing how well somebody tans compared with how well they burn. The archetypal red headed Celt, with freckles, and who does not tan, would be skin type 1. Somebody with deep olive skin, who rarely burns, would be skin type 4. It is clinically a very useful shorthand for a patient's phenotype.

Why is melanin blue in the scrotum picture? Blue light is scattered more than other colours, so is 'bounced back' [scattered] to the viewer. The non-blue light is less scattered and is

absorbed by the melanin instead. If you want to understand more, go to Wikipedia under the ‘Tyndall effect’.