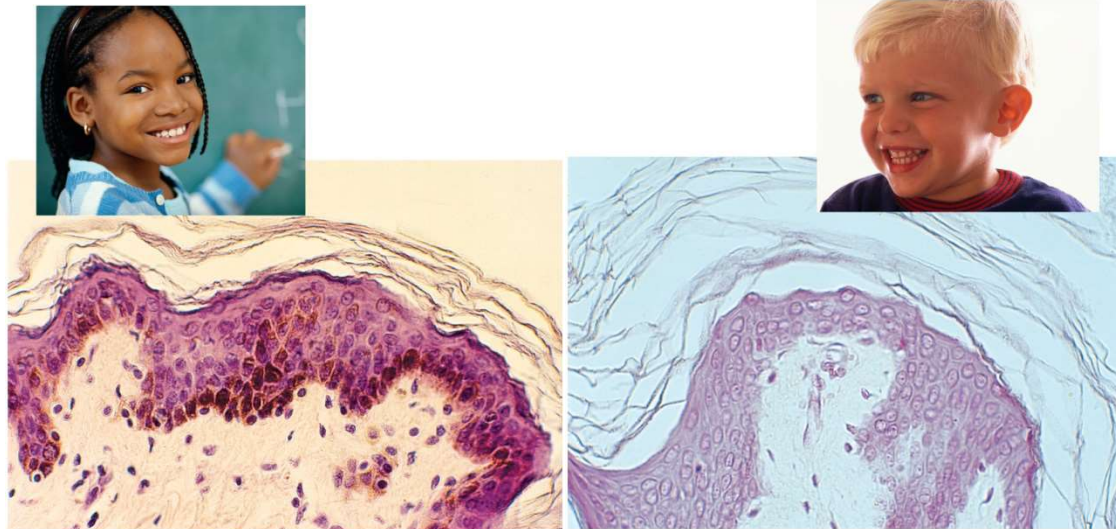


Chapter 5.3

Skin Color



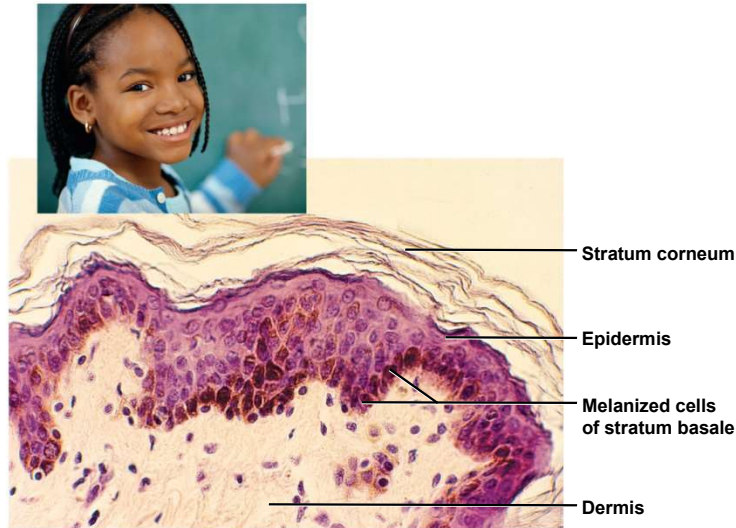
Skin Color

- **Melanin** – most significant factor in skin color
 - produced by melanocytes // secreted by melanocytes and reabsorbed by other cells
 - accumulate in the keratinocytes of stratum basale and stratum spinosum
 - eumelanin – brownish black
 - pheomelanin - a reddish yellow sulfur-containing pigment
 - mixture and concentration of pigment molecules determine actual skin color

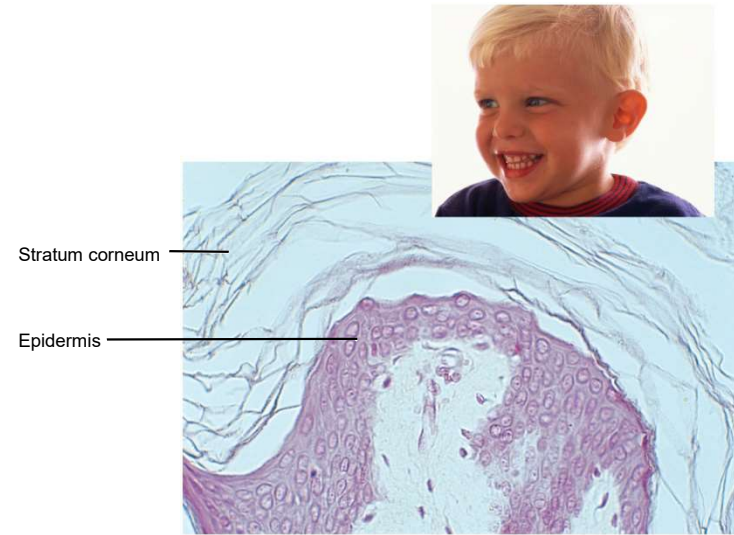
Skin Color

- People of **different skin colors** have the **same number of melanocytes**
 - **dark skinned people**
 - **produce greater quantities of melanin**
 - melanin granules in keratinocytes more spread out than tightly clumped
 - melanin breaks down more slowly
 - melanized cells seen throughout the epidermis
 - **light skinned people**
 - melanin clumped near keratinocyte nucleus
 - **melanin breaks down more rapidly**
 - little seen beyond stratum basale
- Amount of melanin also **varies with exposure to ultraviolet (UV) rays of sunlight**

Other Factors in Skin Color



(a) Dark skin



(b) Light skin

- **hemoglobin** - red pigment of red blood cells $////$ adds reddish to pinkish hue to skin
- **carotene** - yellow pigment acquired from egg yolks and yellow/orange vegetables $///$ concentrates in stratum corneum and subcutaneous fat

Abnormal Skin Colors

- **cyanosis** - blueness of the skin from deficiency of oxygen in the circulating blood
 - airway obstruction (drowning or choking)
 - lung diseases (emphysema or respiratory arrest)
 - cold weather or cardiac arrest
- **erythema** – abnormal redness of the skin due to dilated cutaneous vessels /// exercise, hot weather, sunburn, anger, or embarrassment
- **pallor** – pale or ashen color when there is so little blood flow through the skin that the white color of dermal collagen shows through /// emotional stress, low blood pressure, circulatory shock, cold, anemia

Abnormal Skin Colors

- **albinism** – genetic lack of melanin that results in white hair, pale skin, and pink eyes /// have inherited recessive, nonfunctional tyrosinase allele
- **jaundice** - yellowing of skin and sclera due to excess of bilirubin in blood /// cancer, hepatitis, cirrhosis, other compromised liver function
- **hematoma** – (**bruise**) mass of clotted blood showing through skin

Evolution of Skin Color

- skin color – one of the most conspicuous sign of human variation
- results from combination of evolutionary selection pressures /// especially differences in exposure to ultraviolet radiation (UVR)
- UVR has two adverse effects:
 - causes skin cancer
 - breaks down folic acid needed for normal cell division, fertility, and fetal development
- UVR has a desirable effect /// stimulates synthesis of vitamin D necessary for dietary calcium absorption
- populations native to the tropics and their descendants tend to have well-melanized skin to screen out excessive UVR
- populations native to far northern or southern latitudes where the sunlight is weak, tend to have light skin to allow for adequate UVR penetration

Evolution of Skin Color

- ancestral skin color is a compromise between vitamin D and folic acid requirements
- women have skin averaging about 4% lighter than men /// need greater amounts of vitamin D and folic acid to support pregnancy and lactation
- high altitude and dry air increases skin pigmentation /// e.g. Andes, Tibet, Ethiopia
- UV radiation accounts for up to 77% of variation in human skin color
- other exceptions:
 - migration, cultural differences in clothing and shelter
 - intermarriage of people of different geographic ancestries
 - darwinian sexual selection – a preference in mate choice for partners of light or dark complexion