THE SCIENCE AND EVOLUTION OF SKIN COLOR

adequate vitamin D synthesis. Lighter skin allowed more UVR to be absorbed and over time genes for light colored skin began to dominate and genes for darker skin began to disappear from these northern populations.

(8) Another theory proposes that people in northern climates still had enough vitamin D from the combination of Sun exposure as well as from their food sources. However, when agriculture developed, human diets changed dramatically and food no longer provided adequate amounts of vitamin D. To compensate for this, lighter skin developed to allow for more vitamin D synthesis. (9) In all races, women are, on average, lighter skinned than the men. Women evolved to have lighter skin to maximize their ability to synthesize vitamin D which is needed for the proper absorption of calcium from the diet. Women require calcium more then men because calcium is needed for pregnancy and lactation (the production of breast milk). Calcium is vital for building the bones of the fetus and baby. Without adequate calcium, the fetus can develop disorders like spina bifida, which is a defect in spine development. The difference between male and female skin color doesn't emerge until puberty which is when females become capable of bearing children.

Article Questions

- What is melanin? Describe the two main types of melanin. Melanin is a pigment found in the skin, eyes and hair. One type is called eumelanin and it is brownish-black and is the main substance that determines skin color. The other type is called pheomelanin and it is pinkish-red and is found in red hair, lips and nipples.(1)
- Why do people with albinism lack melanin?
 They cannot make an enzyme called tyrosinase which is needed to make melanin.(2)
- How do melanocytes contribute to skin color? They produce melanin.(3)
- 4) How do keratinocytes contribute to skin color? They absorb melanosomes (which contain melanin) from melanocytes to help distribute the pigment over the skin's surface.(3)
- 5) What causes the difference in pigmentation between people with darker skin and people with lighter skin?

The melanocytes of people with darker skin are producing more melanin. (They do not have more melanocytes.) (3)

6) In what situation is having a lot of melanin useful and in what situation is having less melanin useful?

Having more melanin is useful in hot climates with a lot of direct sunlight. Melanin protects against the damaging effects of UVR. Having less melanin is useful in colder climates with less direct sunlight or when food sources are lacking in vitamin D. Less melanin results in more vitamin D production.(5,7,8)

7) In a population of humans, why are the women less pigmented then the men? Women are less pigmented to promote more vitamin D synthesis. Vitamin D is needed for proper calcium absorption which women need during pregnancy and lactation. Calcium is vital for the growth of bones in the fetus and baby.(9)