DMV INTERNATIONAL

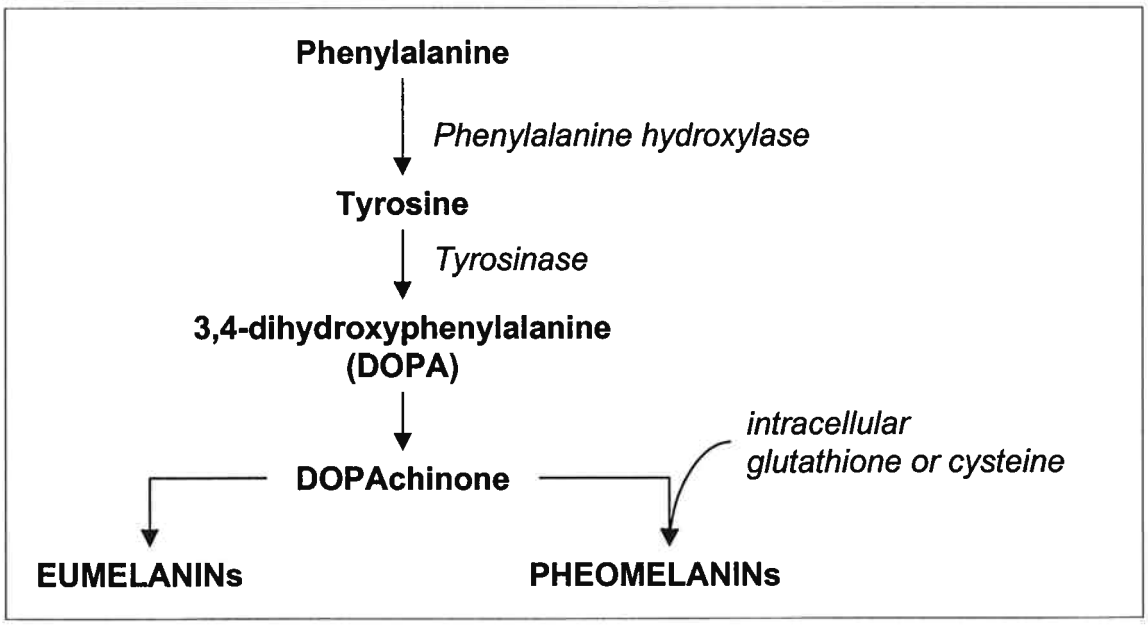
Skin whitening

The skin color is determined by several factors such as the content of melanin and carotenoid pigments, the number of blood vessels in the cutis, the colour of blood in them. By far the most decisive factor though, is the concentration and admixture of the types of melanines in an individual's melanocytes. The melanocytes are the body's cell-factories producing melanine.

Melanins are synthesized in membrane bound cellular organelles called melanosomes from the amino acids tyrosin. The enzyme tyrosinase is required in these early steps. After the tyrosinase steps, the pathways to produce black/brown (eumelanin) and amber/red pigments (pheomelanin) diverge and involve many other enzymes.

- Eumelanin is primarily responsible for the color seen in skin, hair and eyes. In general, eumelanin is genetically controlled. The exception to this genetic control is the tanning reaction that occurs with the exposure to UV light.

- Pheomelanin in fair skinned individuals often adds an orange or red hue to the hair. These people also often have green eyes and freckles.
  The formation of pheomelanin is regulated by the ratio between glutathione and intracellular cysteine



The variation of the skin pigmentation is strongly influenced by the amount and the composition of the melanin in the epidermis. Skin pigmentation is one of the most evident racial characteristics. African, Caucasian and Oriental phenotypes differ in the ratio between eumelanin and pheomelanine. Whereas African skin contains much more eumelanin than

pheomelanin, Oriental skin similar amounts of the two pigments and Caucasian skin more pheomelanin than eumelanin.

Common skin whitening products mostly contain tyrosinase inhibitors to lower the production of DOPA, the precursor for the two melanins eumelain (black) and pheomelanin (yelow/red).

An other approach that is well known in Asia is the modulation of the ratio between eumelanin and pheomelanin. Intracellular thiols like glutathione or free cysteine are able to modulate the proportion of the different melanin types in favor of pheomelanin leading to a lighter pigment [1,2]. In vitro, a higher cysteine concentration in the culture medium resulted in a higher pheomelanin production [3].

Cysteine peptides stimulate the glutathione production in the liver naturally and may shift the melanin synthesis towards to the production of the lighter pigment pheomelanin.

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