The role of human pigmentation and the Kleresca® bronzing effect

Introduction to human skin pigmentation

Have you ever wondered why people have different skin, hair, or eye colour? It is due to individual differences in pigmentation. In order to explain this further, we need to dig into the subcellular level and talk about the important role of melanin.

Melanin is the natural pigment that gives human skin, hair, and eyes their colour. It is produced by cells called **melanocytes**, and the process is called **melanogenesis**[1].

Melanogenesis

Melanocytes are located in the basal layer of the skin's epidermis and they produce **melanosomes**, vesicles that synthesize and carry melanin. They move along the dendrites, to reach the keratinocytes once the synthesis is completed[1,2]. The keratinocytes are the main cells in the epidermis, and each melanocyte interacts with 30 to 40 keratinocytes thanks to the dendrites (extensions) that they have (**Fig. 1**).

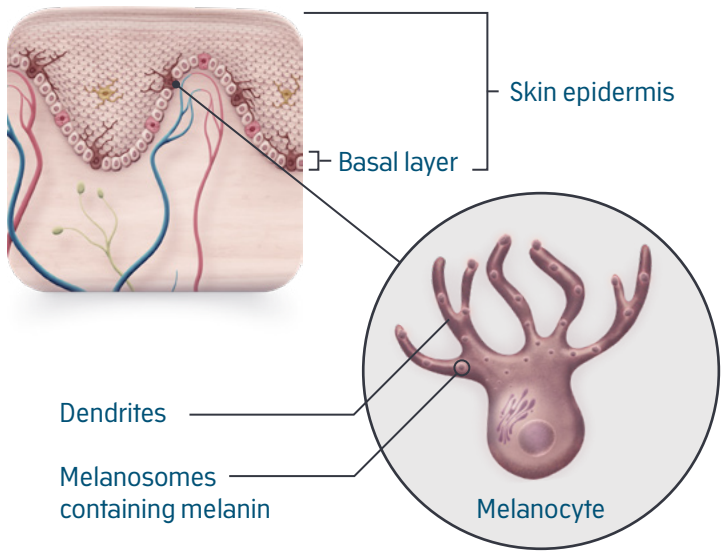

Figure 1. *Melanocyte cell producing melanin and their location in the skin's epidermis*

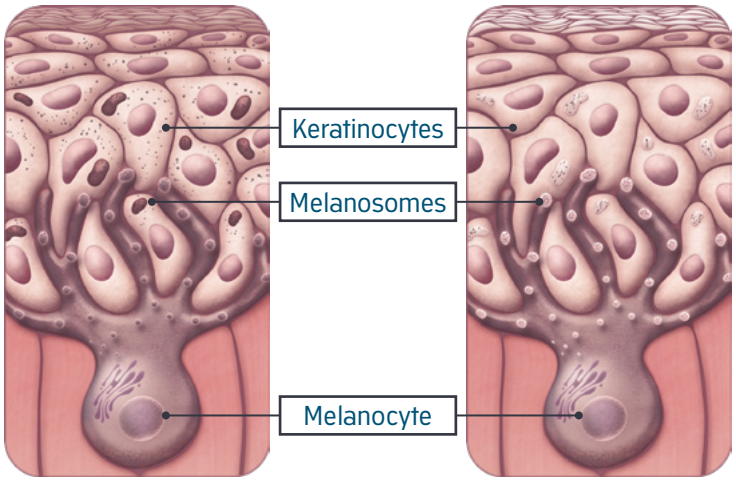

Figure 2. *Differences in pigmentation depending on skin type*

Diversity in humans

Melanin defines an important human phenotypic trait (physical appearance) and it has a critical role in photoprotection due to its ability to absorb UV radiation[2].

The number of melanocytes is relatively constant in different ethnic groups, but what varies is the size and number of melanosomes, the amount and type of melanin, and its distribution in keratinocytes (**Fig. 2**)[1].

There are two types of melanin, and human pigmentation is typically a mix of both[2,3]:

- **Eumelanin:** brown-black or dark, predominant in people with dark skin and hair.
- **Pheomelanin:** red or yellow, found mainly in individuals with red hair and fair skin.

One way to classify the skin is by using the Fitzpatrick scale[3]. This scale differentiates between six categories depending on UV sensitivity and resistance and the amount of epidermal melanin present in the skin (**Fig. 3**).

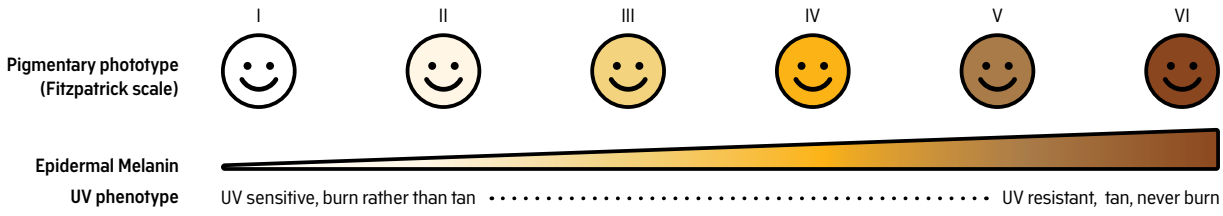

Figure 3. *Fitzpatrick scale*

Immediate vs delayed pigmentation

UV RADIATION[2]

UV is the most important external factor in the regulation of melanogenesis because it is the main stimulus for acquired pigmentation (tanning). When we are exposed to UV, it triggers an increase in melanogenesis as this is the skin's response to protect the hypodermis (bottom layer of the skin) from the harmful, damaging UV light.

Eumelanin is dark and absorbs most of the UV light. This prevents the UV light from passing through the skin layer and acts as a natural sunscreen.

EFFECT OF UV VS EFFECT OF VISIBLE LIGHT[4-6]

The tanning effect will be different depending both on the source of light and on skin type. We can differentiate between two types of induced pigmentation, more evident in individuals with dark skin and hair.

- **Immediate pigmentation:** Appears 5 - 10 minutes after exposure and it is **transient**. It lasts for a few minutes up to a few weeks in some cases (the darker the skin type, the longer it lasts). It is due to changes in pre-existing melanin and redistribution of melanosomes to epidermal upper layers, meaning no new melanin is produced It is mainly triggered by visible light.
- **Delayed pigmentation:** Occurs 3 to 4 days after exposure and is long lasting up to a few months. This happens due to the increased level of epidermal melanin (mainly eumelanin) and the formation of new melanin. It is mainly triggered by UV light.

KLERESCA® BRONZING EFFECT

It is well known that an expected outcome of a Kleresca® treatment is the so-called 'bronzing' effect. Due to the intensity of light used during the treatment, some patients may experience transient pigmentation after being exposed to the LED blue light and the fluorescent light energy (FLE).

The Kleresca® bronzing effect can vary depending on the skin type of each individual. Some might see an overall tanning of the treated area, others might see a darkening effect in already pigmented areas like freckles, melasma or solar lentigines[7].

Figure 3. *Patient affected by melasma with skin type Fitzpatrick III. Transient nature of bronzing after Kleresca® Acne Treatment.*

Are you interested in learning more about the skin and the benefits of Kleresca® FLE treatments?
Visit our **Academy** to find a lot of useful information.

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