



the science of dark spots

What causes dark spots? Sometimes – in response to a variety of internal or external triggers – the skin produces irregular amounts of melanin, which leads to an uneven distribution of pigment at the skin's surface. **This overproduction is the root cause of dark spots.** This next section investigates the triggers that lead to hyperpigmentation, the anatomy of a dark spot, and how best to treat them.

what causes dark spots?

Though melanin naturally protects our cells, the skin occasionally overproduces melanin. This overproduction of melanin is what causes dark spots, also known as hyperpigmentation. Here are some of the top dark spot triggers:

UV rays

Unprotected sun exposure is the best-known trigger for melanin production (think about the tan you get from a day at the beach). It's also the leading cause of dark spots; much of the hyperpigmentation we treat is the result of sun exposure. Fortunately, UV-induced hyperpigmentation is widely considered to be the easiest type to treat.

pollution

Airborne particulate matter (PM) and polycyclic aromatic hydrocarbons (PAHs) can both become lodged in the skin's deeper structure. This oxidizes the surrounding tissue – leading to free radical damage and triggering an inflammatory response that results in hyperpigmentation.

free radicals

Collectively known as Reactive Oxygen Species (ROS), free radicals are oxygen-derived molecules with unpaired electrons, which makes them highly reactive and able to damage macromolecules such as lipids, proteins and nucleic acids. The free radicals produced by keratinocytes can overstimulate melanocytes, resulting in hyperpigmentation.

hormones

During pregnancy, we often see melasma, also known as chloasma or “the mask of pregnancy,” on the face. This can be either temporary or permanent, and is caused by hormonal shifts during pregnancy. Even medications such as birth control can induce hormonal dark spots.

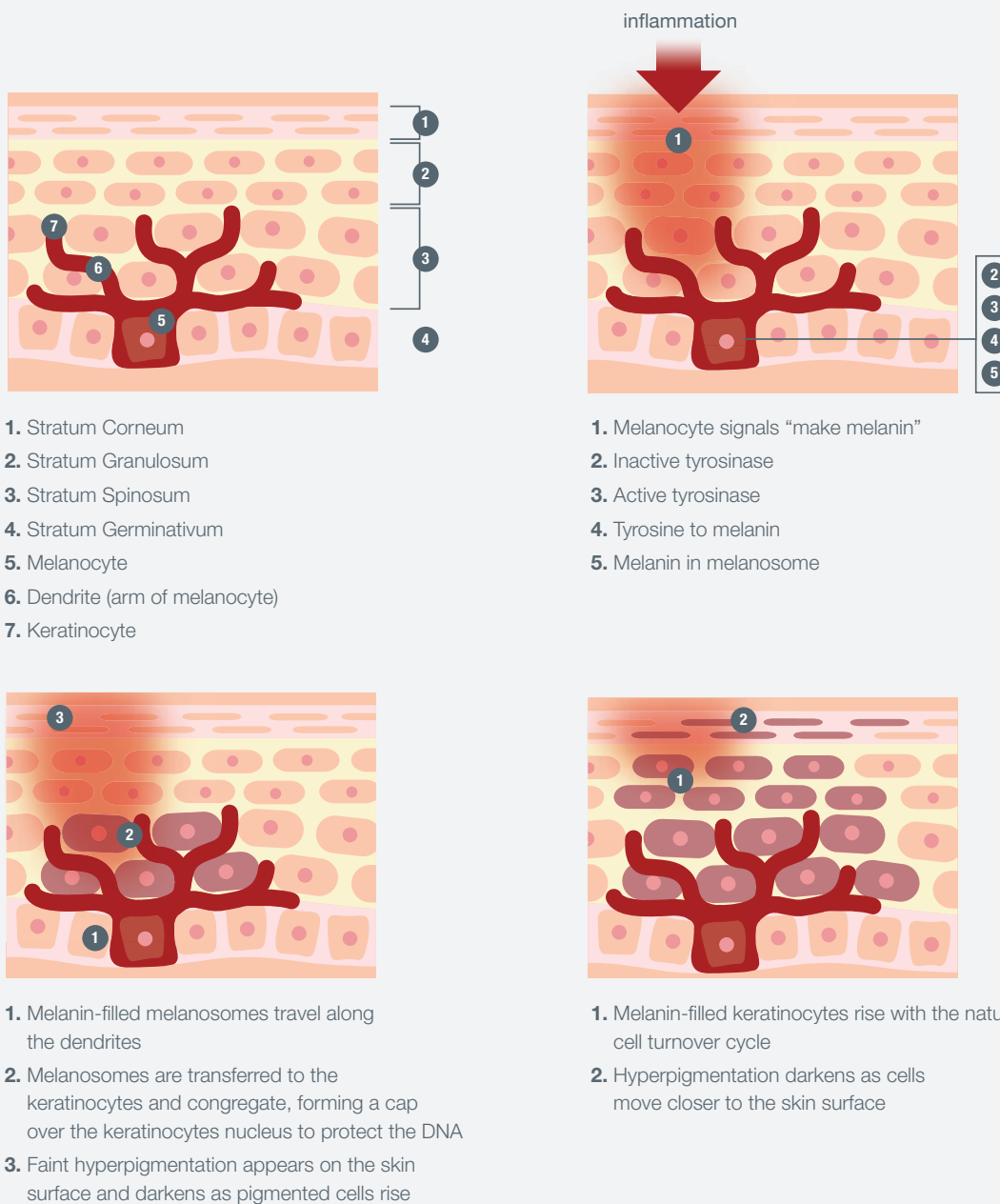
stress

Adrenocorticotrophic hormone (ACTH) is normally produced and secreted by the anterior pituitary gland, often in response to biological stress. Chronic, long-term stress can manifest on the skin as hyperpigmentation. This type of “stress” pigmentation has a tendency to start on the outer periphery of the face and spread inward.

inflammation

Any trauma to the skin, whether it’s a wound, breakout, or even the result of a medical procedure such as resurfacing or laser hair removal, can cause melanocytes to be damaged or overstimulated, resulting in post-inflammatory hyperpigmentation (PIH). Darker skin types are particularly susceptible to this type of hyperpigmentation.

how inflammation causes a dark spot



types of dark spots

There are several different types of dark spots; just as hyperpigmentation has a variety of different causes, it can appear in a number of different ways. Here's an overview of the most common types of hyperpigmentation:



melasma

Melasma is caused by hormonal changes that can impact melanin production. These changes often develop during pregnancy or when using birth control, and result in areas of hyperpigmentation that most commonly appear on the forehead, cheeks and upper lip. These dark spots often look like patches or a mask, and may also be symmetrical. Note that hormonally-induced hyperpigmentation is difficult to treat, as hormones are physiological and influence the skin 24 hours a day.



sun spots

Sun spots are related to excess exposure to UV rays over time, and are widely considered to be the most common type of dark spots. They generally appear as dark spots on areas that are typically exposed to the sun, such as the hands, neck, chest and face.



post-inflammatory hyperpigmentation (PIH)

Any form of trauma with associated inflammation, whether from acne lesions, infections, injuries or over exfoliation, can result in PIH. The longer the tissue remains inflamed, the more intense the hyperpigmentation can become. Some inflammatory diseases such as psoriasis or eczema may also result in hyperpigmentation. This form of pigmentation can generally be treated quite successfully if the inflammatory triggers have subsided.