

The Cause and Treatment of Hyperpigmentation (Brown Spots)

Science:

The skin has many different types of skin cells. The cells responsible for skin color are melanocytes. These cells are located at the bottom of the epidermis (the upper structure of the skin, above the dermis) and are able to inject pigment into the surrounding skin cells in packets known as melanosomes (the lighter your natural skin color, the less prominent the melanosomes are). The melanocytes do this when signaled by an enzyme called Tyrosinase. This enzyme is switched "on" through a variety of stimulatory factors, each person more or less sensitive to each. These stimulating factors are; UV radiation from the sun or sun beds, burns or injury to the skin from any source, irritation from acids or other skin preparations, oral and topical medications such as birth control pills or antibiotics, etc.

For instance, a tan is a normal reaction to the sun. The sun stimulates the skin (you see this as redness or sun burns) and the skin produces Tyrosinase as a result. This enzyme then signals the melanocytes to inject melanosomes into the surrounding cells and over the next two to three days a tan develops. This is the body's way of protecting the deeper layers of skin – the dermis. In fact melanin acts as the body's own SPF factor by absorbing UV radiation! All tans fade eventually, and this occurs naturally over a period of 4 to 6 weeks. For people with Hyperpigmentation though, the skin has become dysfunctional and does not dissipate the pigment normally. For these people, any slight stimulation can lead to big pigmentation problems. The basal layer sometimes simply cannot stop producing melanin in certain areas and keeps overproducing melanin. A person is left with cosmetically displeasing regions of discoloration as a result.

So the goal is to limit what is causing the stimulation to the melanocytes to produce excessive melanin (dark pigment) in the first place (stop future pigmentation formation) and to assist the body in pulling the pigmented skin cells to the surface and away. This process can take up to 8 weeks if the pigment is at the lower reaches of the epidermis. Sometimes melanin can be deposited into the dermis, through trauma or excessive inflammation, and is not possible to improve with skin care regimes. A physician is required to perform the many techniques available to reach these areas of resistant pigment.

There are four main causes of the various degrees of hyperpigmentation

1. **Genetic disposition** – darker skin will develop more hyperpigmentation
2. **Sun exposure** – all skin types are vulnerable to sun induced pigmentation
3. **Oral & topical medications** – certain medications can stimulate and induce pigmentation.

4. **Biological effects** – pregnancy can stimulate the skin and lead to Melasma

1.) **Genetic disposition** – dark skinned individuals simply have more melanocytes (skin cells that produce the dark pigment) in the basal layer of the skin. These cells are also very reactive to any stimulation source like sun exposure, sensitizing topical preparations, or skin injury. Milder skin care regimes are thus suggested until the skin can be gauged for its exact reaction potential.

2.) **Sun exposure** – the main cause of chronic hyperpigmentation. UVA and UVB radiation from the sun is very stimulating to the skin structures which naturally produce pigment. Excessive and chronic sun exposure leads to excessive discoloration.

3.) **Oral and topical medications** – certain medications like birth control pills and oral antibiotics (see your doctor for a complete list) can stimulate discoloration of the skin. The skin's sensitivity to medications varies with each person and with each person as they age. What was not a problem one day could become a problem as the body ages and becomes more sensitive. If you are on a medication known to sensitize the skin, be especially careful of sun exposure, sun protection usage, and be aware of the proper skin care regime to follow in order to limit hyperpigmentation.

4.) **Biological effects** – pregnancy and aging can alter the body and in some cases lead to skin dysfunction. As mentioned above the skin becomes more sensitive to MSH and Tyrosinase and can develop hyperpigmentation. Melasma (pregnancy mask) is a common development for women after pregnancy. The release of hormones has signaled distinct areas on the face to produce pigmentation (usually on the cheeks, forehead, and upper lip).

Made Simple:

1. **Sun avoidance and sun protection**

- Avoid peak hours of sunshine when the UV radiation is highest (10am – 4pm). Move activities indoors, or to earlier / later times of the day or at night. Wear a hat, sunglasses, protective clothing, and most importantly – sun protection factor of at least SPF 15. Sun protection must be applied ½ hour before sun exposure and every 1.5 hours to maintain the highest level of protection. Sun protection must be re-applied after heavy perspiring or swimming. You can never apply too much sun protection or apply it too often.

2. **Topical skin lightening ingredients** – to prevent future pigmentation

- Kojic acid – natural substance derived from different fungi and organic substances (such as soy and mushrooms) that inhibit tyrosine synthesis and melanin production in the skins basal layer.

- Arbutin – natural substance from bearberry extract that inhibits tyrosine synthesis and melanin production in the skin's basal layer.
 - Licorice – natural substance that inhibits tyrosine synthesis and melanin production in the basal layer of the skin.
 - L-Ascorbic acid (Vitamin-C) – scavenges and neutralizes damaging free radicals, which can stimulate and induce melanin formation in the basal layer of the skin.
3. **Topical exfoliation and stimulation ingredients** – to expedite the progression of pigmented cells to the surface and ultimate removal.
- Retinol (Vitamin-A) – works by promoting the rapid loss of pigment via increased epidermopoiesis (skin proliferation, turnover), and easing penetration of bleaching ingredients into the skin.
 - AHA's and BHA's – exfoliate and stimulate the skin in reducing the build up of dead skin (stratum corneum) on the surface. Pigmented cells in this layer are removed, unveiling healthier cells below.
 - Papain and Bromelain Enzymes – these enzymes have advanced exfoliation effects upon the stratum corneum. Exfoliation removes pigment in the upper layers of the skin, unveils healthier cells below, and eases the penetration of bleaching ingredients into the skin.
4. **Clinical treatments and home care products** – High strength AHA and BHA clinical treatments as well as home care products can expedite the skin lightening effects via the aggressive increase in epidermopoiesis (skin proliferation, turnover), and exfoliation of the surface build up of stratum corneum.
- **The Biophora 12% Lactic Peel** – for sensitive skin
 - **The Biophora 30% Glycolic Peel** – for normal skin
 - **The Biophora 20 / 30% Salicylic Peel** – for expedited results
 - **Bioactive Cleanser** – Exfoliating, pH balanced cleanser designed to remove oil, dirt, debris, and available pigmented dead skin cells on the surface of the skin and out of the pore.
 - **Bioactive Solution & Bioactive Solution Extra Strength** – 3 and 5% Glycolic acid, 0.75% Salicylic, Kojic acid, for advanced exfoliation of the pigmented skin surface and skin lightening actions.
 - **Bioactive Gel & AHA Active Gel** – 8 and 15% Glycolic acid, 0.75% Salicylic acid, Kojic acid, Arbutin, Licorice, for even more advanced exfoliation of the pigmented skin surface and skin lightening actions.
 - **Enzyme Exfoliating Mask** – Papain and Bromelain digestive enzymes, soft exfoliating granules (Diatomaceous Earth) used occasionally for deep, advanced, enzymatic exfoliation of the skin surface and pore follicle.
 - **Antioxidant Moisturizer & DermaRich Moisturizer** – Vitamin-E and A enriched for antioxidant purposes, Beta Glucan for skin immunity boosting effect, Allantoin, Sodium Hyaluronate for moisture infusion

- **Night Protection** – Cosmetic silicone (Cyclomethicone and Dimethicone) designed to prevent moisture loss and keep the skin's own moisture intact.
- **L-Ascorbic acid Vitamin-C** – Strong, stable antioxidant for skin lightening, skin preservative and restorative actions.
- **Daily Protection SPF 30** – Antioxidant rich, broad-spectrum sun protection to prevent environmental damage and skin pigmentation.