

## Issues Melasma

Ms.Namrata Vyas<sup>1</sup>, Mr.Ravi R Patel <sup>2</sup>

<sup>1</sup>Department of Pharmaceutical Chemistry, Shree Swaminarayan College of Pharmacy,  
Swaminarayan University, Kalol, Gandhinagar, Gujarat, India, 382725

<sup>2</sup> Department of Pharmaceutics, Shree Swaminarayan College of Pharmacy,  
Swaminarayan University, Kalol, Gandhinagar, Gujarat, India, 382725

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### Abstract

Melasma is a common acquired condition of symmetric hyperpigmentation, typically occurring on the face, with higher prevalence in females and darker skin types. Multiple etiologies, including light exposure, hormonal influences, and family history, have been implicated in the pathogenesis of this disorder. Overall prevalence ranges widely at 1–50%, since values are typically calculated within a specific ethnic population within a geographic region. Histologically, melasma can display increased epidermal and/or dermal pigmentation, enlarged melanocytes, increased melanosomes, solar elastosis, dermal blood vessels, and, occasionally, perivascular lymphohistiocytic infiltrates. Various topical, oral, and procedural therapies have been successfully used to treat melasma

**Keywords:** Hyperpigmentation, Melasma, Pigmentary disorders, Skin of color,

## I. INTRODUCTION

### 1 Introduction

#### 1.1 HYPERPIGMENTATION

Hyperpigmentation is a common condition that makes some areas of the skin darker than others. “Hyper” means more, and “pigment” means color.

Hyperpigmentation can appear as brown, black, gray, red or pink spots or patches. The spots are sometimes called age spots, sun spots or liver spots.

The spots can occur in just one area of the body or all over. It can affect people of any race or ethnicity[1].

##### 1.1.1 causes

Skin gets its color from a substance called melanin, which is made by skin cells. When those skin cells are damaged or unhealthy, they can produce too much melanin. The melanin can clump, causing that area to appear darker.

**Many things can lead to hyperpigmentation:**

Adrenal disorders such as Addison’s disease, when the body doesn’t make enough of a hormone called cortisol.

- ✓ Genetics, such as a family with freckles.
- ✓ Hormone changes, such as during puberty or pregnancy.
- ✓ Injury to the skin (for example, acne, cuts or burns), which is sometimes called postinflammatory hyperpigmentation.
- ✓ Medications, such as oral contraceptives (birth control pills) and drugs that cause sensitivity to light.
- ✓ Melasma.
- ✓ Not getting enough of certain vitamins, such as B12 and folic acid.
- ✓ Sun damage (these spots are often called solar lentigines).
- ✓ Thyroid disorders.

### Types of hyperpigmentation include:

- Age spots, also called “liver” spots
- Melasma
- Post-inflammatory hyperpigmentation

#### Age Spot

Age spots, also called liver spots or solar lentigines

**Symptoms:** brown, tan, or black spots that appear on the skin with sun overexposure. Commonly, it appears on the face and hands or sun-exposed areas of the body.

Usually, older adults or those with extended sun exposure.

#### Melasma

It is also called chloasma or “the mask of pregnancy”.

**Symptoms:** large patches of darkened skin

It often appears on the forehead, face, and stomach.

Usually, women, people who are pregnant or taking birth control pills, and those with medium to darker skin

#### Post-inflammatory hyperpigmentation

Spots or darkened skin patches appear after an inflammatory skin condition, such as acne or eczema. It may appear anywhere on the body.

People who have had inflammation or an injury to the skin.

## 2 STATEMENT OF PROBLEM

Hyperpigmentation is often harmless, but associated with social stigma. A condition like Melasma is an acquired, chronic, recurrent hyperpigmentary disorder[2].

It usually affects the chronically photo-exposed cutaneous areas, especially the face and neck. On the face, the forehead, cheeks, temples, upper lip, chin or nose these are commonly involved. Mainly, lesions may afflict extensor arms and sternal region. Although these have been considered a starting condition, which usually has only aesthetic implication, melasma has been affecting self- image and self-esteem, with a negative impact on patient's quality of life.[3]

Melasma has a significant impact on the psychosocial well-being of the patient. Patients with melasma commonly report feelings of shame, low self-esteem, sadness, dissatisfaction, and decreased motivation to go out.



**Figure 1 Melasma disease condition**

### 2.1.1 Pathogenesis:

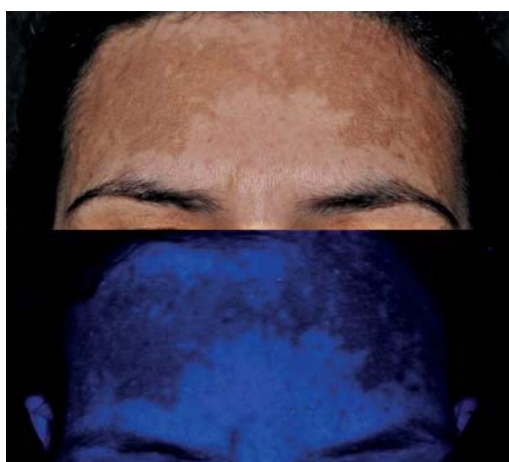
Studies have confirmed that both melanocytosis (increased number of melanocytes), as well as increased melanogenesis (increased production of melanin), are responsible for the hyperpigmentation in melasma. Research has been carried out on a histological study to evaluate the vascular characteristics of melasma. It had been found that vascular endothelial growth factor was increased in Injured skin in melasma signifying increased vascularization. It has clinical implications and indicates the need to proper treatment options to target the vascular component in melasma[4,5].

Different genes involved in several biological pathways were found to be affected. These include Wnt pathway modulation genes, Which involved in prostaglandin synthesis and fatty acid metabolism. Lipid metabolism is the most affected biological process in melasma. Lipid metabolism genes, such as peroxisome proliferator-activated receptor alpha (PPAR), arachidonate 15- lipoxygenase, PPAR gamma coactivator 1 alpha, type B (ALXO 15B), diacylglycerol o-acyltransferase 2-like 3 were found to be downregulated. This process is caused by chronic UV exposure. Another change seen in melasma skin is thinning of the stratum corneum (SC) as found in skin biopsies that show ridge attening and epidermal thinning. stratum corneum thinning coupled with disturbed lipid synthesis is responsible for the impaired SC integrity and a delayed barrier recovery rate seen in melasma skin. Prolonged UV exposure which induced dermal inflammation and fibroblast activation may upregulate stem cell factors in the melasma dermis, which causing increased melanogenesis.

The above findings, which emphasized the need for proper treatment options that has been targeting pathogenetic factors in melasma.

### 2.1.2 Diagnosis:

Differential diagnoses of melasma include freckles, solar lentigo, toxic melanoderma, Riehl's melanosis, post-inflammatory hyperpigmentation, friction melanosis, ochronosis (endogenous and exogenous), cutaneous erythematosus lupus. In patients with higher pigmentation, pigmentary demarcation lines (PDL) may confuse the diagnosis of melasma. A study were conducted with 1033 women at a hospital in Saudi Arabia which found that 14% of the women had PDL, In another study in Texas (USA), which were found that 79% of black women had at least one PDL[6].



**Figure 2: Comparison between photography with visible light top and with the use of Wood's lamp bottom highlighting the limits of melasma**

Histologically, melasma is characterized by epidermal hyperpigmentation. The number of melanocytes is not increased. Melanocytes, which are getting hypertrophied and show a greater number of dendrites and cytoplasmic organelles, that indicates higher metabolic activity. Increased amount of melanin are present in all layers of epidermis. In the dermis, there is a moderate mononuclear infiltrate, presence of mast cells, which increased vascularity and elastosis. There are no differences in dermal pigmentation between the skin with melasma and the adjacent healthy skin.

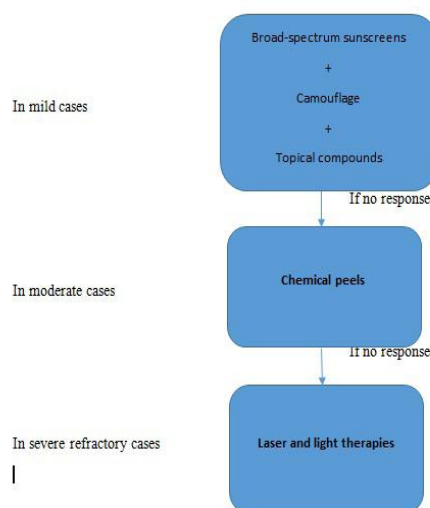
### 2.1.3 Treatment:

To achieve the most effective and suitable treatment and procedure for the patients which suffer from melasma, there are determination of the severity of melasma is important. Additionally, most of studies suggest that the melanin pigments and blood vessels should be targeted for obtaining the effective treatment of melasma. The melanin production is inhibit by different therapeutic modalities at variable stages through a variety of mechanisms.

There are several important mechanisms of medication and modalities which are used to treat melasma in which one of the major mechanism is Inhibition of tyrosinase[7].

The tyrosinase is a glycoprotein inside the membrane of melanosomes which catalyzes several oxidative reactions that required for the melanin synthesis from tyrosine. Major whitening agents have a tyrosinase-reducing effect resulting in the inhibit total melanin production, such as kojic acid, arbutin and different kinds of vegetal or herb extracts. These agents are mainly classified as competitive, uncompetitive, mixed type and non-competitive

inhibitors. Most of these agents has shown reversible inhibition of the enzyme[8].



**Chart 1: Therapeutic guidelines of Melasma**

## II. Conclusion

Melasma is an acquired, chronic, recurrent hyperpigmentary disorder (High occurrence of melanin in the skin) which usually has only aesthetic implications but affects self-image and self-esteem, with a negative impact on the patient's quality of life. To achieve the most effective and suitable treatment and procedure for the patients which suffer from melasma, there are determination of the severity of melasma is important. Additionally, most of studies suggest that the melanin pigments and blood vessels should be targeted for obtaining the effective treatment of melasma.

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