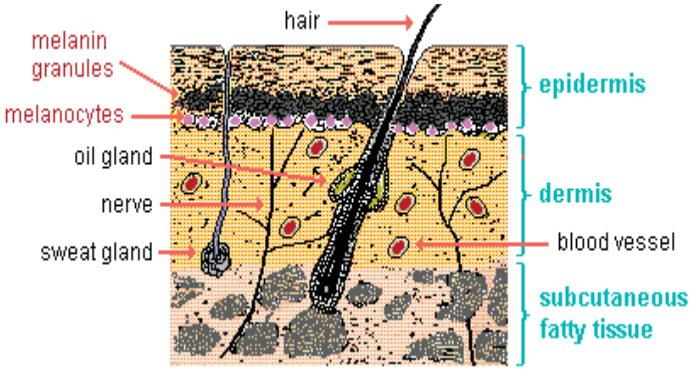
Skin Color Adaptation As Electrologists, and even more so if you use lasers in your hair removal practice, pigmentation is always an important issue. There are more differences in skin qualities than color from one race or pigmentation to the next. A firm and in-depth understanding of what pigment is, how it is created, its purpose, and how it responds to various stimuli, as well as some recent scientific information, will be discussed. We should gain an in-depth understanding of the various skin types and an appreciation for why great care should be taken when treating each of the varied skin colors.

Human skin color is quite variable around the world. It ranges from a very dark brown among some Africans, Australians, and Melanesians to a near yellowish pink among some Northern Europeans. There are no people who actually have true black, white, red, or yellow skin. These are commonly used color terms that do not reflect biological reality.

Variation in human skin coloration Sub-Saharan African, Indian, Southern European and Northern European

Skin color is due primarily to the presence of a **pigment called melanin**. Both light and dark complexioned people have this pigment. However, two forms are produced (1) **pheomelanin,** which is red to yellow in color, and (2) **eumelanin**, which is dark brown to black. People with light complexioned skin mostly produce pheomelanin, while those with dark colored skin mostly produce eumelanin. In addition, individuals differ in the number and size of melanin particles. The latter two variables are more important in determining skin color than the percentages of the different kinds of melanin. In lighter skin, color is also affected by red cells in blood flowing close to the skin. To a lesser extent, the color is affected by the presence of fat under the skin and carotene , a reddish-orange pigment in the skin.

Melanin is normally located in the lower epidermis, or outer skin layer. It is produced at the base of the epidermis by specialized cells called **melanocytes**.



Cross section of human skin

People with darker skin live in tropical latitudes (especially in no forested regions), where ultraviolet radiation from the sun is usually the most intense. Melanin acts as a protective biological shield against ultraviolet radiation. By doing this, it helps to prevent sunburn damage that could result in DNA changes and, subsequently, melanoma, a cancer of the skin.

Melanoma is a serious threat to life. In the United States, approximately 54,000 people get this aggressive type of cancer every year and nearly 8,000 of them die from it. Those at highest risk are European Americans, they have a 10 times higher risk than African Americans.

Ultraviolet radiation reaching the earth usually increases in summer and decreases in winter. The skin's ability to tan in summertime is acclimatization to this seasonal change. Tanning is primarily an increase in the number and size of melanin granules due to the stimulation of ultraviolet radiation.

Irish boy who is essentially unable to tan

While skin tanning is often most noticeable on light complexioned people, even those with very dark brown skin can tan as a result of prolonged exposure to the sun. Some Northwest Europeans have substantially lost the ability to tan as a result of relaxed natural selection. Their skin burns and peels rather than tans due to the fact that they produce a defective form of a skin protein (melanocortin-1 receptor or Mc1r) which is necessary for the production of melanin. They are at a distinct disadvantage in tropical and subtropical environments. Not only do they suffer the discomfort of readily burning, but they are at a much higher risk for skin cancer. The same is true of albinos.

It would be harmful if melanin acted as a complete shield. A certain amount of shortwave ultraviolet radiation (UVB) must penetrate the outer skin layer in order for the body to produce vitamin D. Approximately 90% of this vitamin in people normally is synthesized in their skin and the kidneys from a cholesterol-like precursor chemical with the help of ultraviolet radiation. The remaining 10% comes from foods such as fatty fish and egg yolks. Simple vitamin D is converted by our bodies into two sequential forms. The last form, commonly referred to as vitamin D_3, is needed for the intestines to absorb calcium and phosphorus from food for bone growth and repair. Calcium is also necessary in adults to maintain normal heart action, blood clotting, and a stable nervous system. Vitamin D plays an additional important role in promoting the production of cathelicidin, which apparently is an effective defender against fungal, bacterial, and viral infections, including the common flu.

Too much ultraviolet radiation penetrating the skin may cause the breakdown of folic acid (or folate, one of the B vitamins) in the body, which can cause anemia. Pregnant women who are deficient in folic acid are at a higher risk of having miscarriages and babies with neural tube defects. Because folic acid is needed for DNA replication in dividing cells, its absence can have an effect on many body processes, including the production of sperm cells. It may be that the ability to produce melanin was selected for in

our early human ancestors because it helped preserve the body's folic acid supply in addition to reducing the chances of developing skin cancer.

People who live in far northern latitudes, where solar radiation is relatively weak most of the year, have an advantage if their skin has little shielding pigmentation.

Nature selects for less melanin when ultraviolet radiation is weak. In such an environment, very dark skin is a disadvantage because it can prevent people from producing enough vitamin D, potentially resulting in rickets disease in children and osteoporosis in adults.

Contributing to the development of osteoporosis in older people is the fact that their skin generally loses some of its ability to produce vitamin D. Women who had prolonged vitamin D deficiencies as girls have a higher incidence of pelvic deformities that prevent normal delivery of babies.

The Inuit people of the American Subarctic are an exception. They have moderately heavy skin pigmentation despite the far northern latitude at which they live. While this is a disadvantage for vitamin D production, they apparently made up for it by eating fish and sea mammal blubber that are high in vitamin D. In addition, the Inuit have been in the far north for only about 5,000 years. This may not have been enough time for significantly lower melanin production to have been selected for by nature.

In the United States and other developed nations, milk is now usually fortified with vitamins D and A in order to prevent development of problems described above. However, the popularity of soft drinks and other alternatives to milk along with a decrease in the amount of time spent outdoors has led to a considerable rise in the rate of rickets disease. Not surprisingly, vitamin D deficiency is most acute in the winter in temperate and colder zones, especially among people of African ancestry.

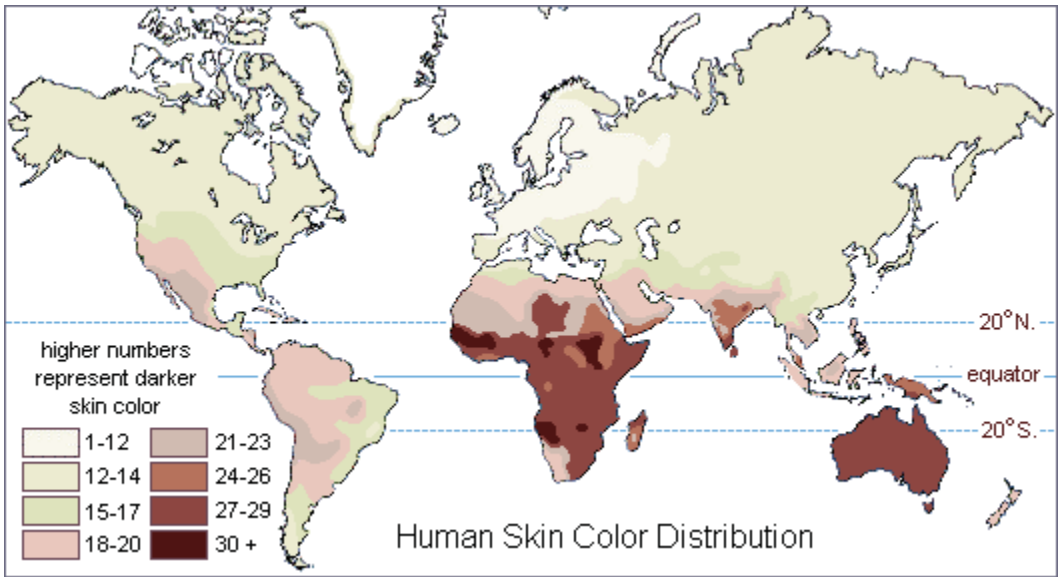
There is also a strong correlation between the amount of sunlight that children are exposed to and whether or not they will develop multiple sclerosis as adults. Most cases of this degenerative neural disorder are in the temperate regions of the world where the sunlight is rarely intense. Children growing up in tropical and subtropical regions rarely develop MS regardless of where their ancestors came from. This protection apparently continues for those who move to far northern or far southern regions after 16 years of age. What processes are responsible for this protection from MS and its possible relationship to skin color is unknown.

Women generally produce 3-4% less melanin in their skin than do men in all populations of the world. This is probably due to the fact that women have far higher calcium requirements during their reproductive years. Mate selection preference and other cultural practices may also be partly responsible for this gender difference in skin coloration.

Skin Color Distribution around the World

Before the mass global migrations of people during the last 500 years, dark skin color was mostly concentrated in the southern hemisphere near the equator and light color progressively increased further away, as illustrated in the map below. In fact, the majority of dark pigmented people lived within 20° of the equator. Most of the lighter pigmented people lived in the northern hemisphere north of 20° latitude.

Such a non-random distribution pattern of human skin color was predicted by Constantine Wilhelm Lambert Gloger, German zoologist. In 1833, he observed that heavily-pigmented animals are to be found mostly in hot climates where there is intense sunshine. Conversely, those in cold climates closer to the poles commonly have light pigmentation. The relative intensity of solar radiation is largely responsible for this distribution pattern.



(Data for native populations collected by R. Biasutti prior to 1940.)

There are exceptions to Gloger's rule in the animal kingdom. In some cases, these are due to the fact that the survival value of having a camouflaged body can be more important than the selective pressures of ultraviolet radiation. Among humans, mate selection preferences may counter some of the evolutionary trend in skin color predicted by Gloger. The Inuit case described earlier suggests that diet may also be a significant factor in some societies. In the United States today, milk is regularly fortified with vitamin D to reduce the likelihood of children having calcium deficiencies. Despite this effort, some segments of the population still have high rates of calcium deficiency, especially African Americans and the elderly.

Post-Inflammatory Hyperpigmentation in Brown Skin

There is always concern and consideration for hyperpigmentation. However, hyperpigmentation in brown skin is extremely problematic as well, and perhaps much more difficult to reverse. This segment is designed to give you a clear understanding of darker skin and hyperpigmentation issues you may encounter.

Skin pigmentation conditions can be a problem for all women (and men) with brown skin - people of Asian, African, Latin or Native American background. While the natural pigmentation in brown skin provides many advantages (sun protection and slowed signs of aging), it is also more highly susceptible to skin discolorations, which can cause distress in social situations, as well as psychological stress.

Melanin is the chemical that determines the color of skin. The more melanin there is in a person's skin, the darker that person's skin will be. Sometimes the cells that contain melanin are damaged or overstimulated. When this happens, the affected cells may begin to produce too much, or too little melanin. Too much melanin causes darker spots or patches, while too little causes lighter spots or patches.

These lighter or darker spots appear on the surface of the skin, and can be unsightly. Unfortunately, these skin color problems are much more visible and common in people with skin of color. There are many different conditions that can cause discoloration, but the most common are Post-Inflammatory Hyperpigmentation and Melasma.

Post-inflammatory hyperpigmentation (PIH)
Post-inflammatory hyperpigmentation (PIH) causes skin darkening and discoloration that show up as spots, or as large patches on a person's body. This is because cells that normally produce brown pigment evenly across your skin go into overdrive and produce too much melanin. This happens because of an inflammatory reaction in, or to an injury to, the skin. If the excess melanin is produced in the upper layer of skin (epidermis), the pigmentation color is a darker shade of brown. If the excess melanin is produced in the lower layer of skin (the dermis), a gray or blue discoloration becomes visible.

Although PIH can occur in all skin types, it is more common in people of African, Asian, Latin, and indigenous Indian background, and can affect men and women equally. Areas of the skin affected by PIH correspond with areas of previous inflammation or injury. When dark changes in your skin's color remain after the underlying problem has gone away, you have PIH. The most common causes are injuries such as scratches, burns, cuts, or bruises. Rashes of any type can cause PIH (examples of which include eczema, psoriasis, pityriasis rosea, lichen planus, and fungal infections). Ordinary conditions such as acne or pimples are a very common cause of PIH in individuals with brown skin. PIH can also be caused by injury to the skin resulting from sunburns, surgery or cosmetic procedures such as chemical peels, dermabrasion lasers and cryotherapy (liquid nitrogen treatments).

Treatment
If you suspect that you may have PIH, it is important to search for the underlying cause and treat that cause. For example, when the discoloration is caused by a problem such as acne, the acne must first be eliminated or treated before PIH can effectively be treated. Every time a new pimple develops and then resolves, a new area of PIH will develop. It is crucial to minimize all new outbreaks with appropriate medications to make a treatment for the PIH be effective.

It is also important to know that PIH will, in many cases, fade over time on its own.

Hydroquinone
For patients with PIH, the most common way to return the skin to its natural glowing complexion is through use of products containing Hydroquinone, a chemical lightening agent that is applied directly to the dark mark. Your dermatologist can determine if hydroquinone is appropriate for your skin. Many dermatologists consider hydroquinone to be the best treatment for PIH.

Hydroquinone works by blocking an enzyme that is responsible for the production of the pigment melanin. By blocking the formation of melanin, the dark area will lighten. However, it is important to realize that you may need to use the hydroquinone medication for up to 6 months before clearing of the dark marks is seen.

Hydroquinone products can be purchased over the counter at 1% to 2% concentrations, or by prescription at 3% to 4% concentrations. The prescription products are stronger and hence more effective than the over-the-counter varieties. (See chart below) In either case, the hydroquinone product should be carefully applied to the dark marks, avoiding normal-appearing skin, once or twice a day.

One scientific study demonstrated that 80% of individuals who used a 4% hydroquinone product combined with glycolic acid had an improvement in their PIH after 3 months. Some of these products are combined with other agents or medications such as sunscreen, glycolic acid, retinol, vitamins C and E and tretinoin (Retin A) or cortisone to improve the effects.

4% Hydroquinone Products:

Alustra™
Claripel™
Epiquin Micro
Eldoquin Forte™
Eldopaque Forte™
Glyquin XM™
Glyquin®
Lustra®
Lustra-AF™
Solaquin Forte®

Possible effects of hydroquinone products include redness, irritation and possible burning of the skin. It is also possible for your normal skin tone to become lighter in a ring around the dark discoloration.

Retinoids
For patients with PIH related to acne or pimples, prescription retinoids are another commonly used treatment for both the acne and PIH. Retinoids are derivatives of vitamin A and include Retin-A, Differin, and Tazorac. All retinoids are effective in the treatment of acne. For the treatment of PIH, Retin-A has been studied in individuals with brown skin. For these patients with acne and PIH, the retinoid is applied to the acne and PIH prone areas nightly. Retinoid are to be used sparingly in brown skin. A small green-pea size amount is enough to cover the entire face. It is important to realize that this treatment can take up to 40 weeks for the dark marks to fade completely. Like many of the other treatments for PIH, retinoids can cause irritation, dryness and peeling of the skin.

Azelaic acid is another prescription treatment for both acne and PIH. It has anti-inflammatory, anti-bacterial, and skin lightening properties. A small amount of this cream is applied to the acne and PIH prone skin once or twice daily.

It is particularly useful for individuals who are unable to tolerate the hydroquinone products. Improvement in the dark marks can be seen after 6 months. A scientific study comparing the lightening ability of azelaic acid and hydroquinone for the pigmentation problem, melasma, found both forms of therapy to be effective when used for a total of 24-weeks. Azeleic acid has the potential of producing the side effects of skin irritation, burning, itching and redness.

Glycolic acid
Glycolic acid products are available over the counter and are also used as a treatment for PIH. These products work by gently exfoliating (removing) the upper-most layer of the skin and the dark marks with it. There are many products that contain glycolic acid. These include cleansers, lotions, gels, toners and creams. The concentration of glycolic acid contained in the products range from 5 to 20 percent. Products with the lower concentrations can be purchased in drugstores, but the products containing the higher concentrations must be prescribed by an MD. Glycolic acid products should be considered medications, so it is important to consult to determine if glycolic acid is appropriate for your skin. You will usually be instructed to wash with a glycolic cleanser and then follow-up with a glycolic acid cream, gel, or lotion. You will probably need to use the glycolic acid containing products for 3-6 month before seeing an improvement in the dark marks. You will see another benefit in your skin after only a few weeks - the glycolic acid treatments will leave your skin smooth and soft! Because glycolic acid can sometimes lead to skin irritation, it is important to keep an eye on your skin's appearance while using these products.

Chemical Peels are a more intensive treatment used in cases of more persistent PIH or to hasten the lightening effects of the topical prescription products. Peels work by exfoliating the upper-most layer of your skin and the dark area with it. There are many different types of peels and they are usually solutions that the dermatologist applies to the skin. The peels that are used most often to treat PIH in brown skin are the alpha-hydroxy acid (glycolic acid) or beta-hydroxy acid (salicylic acid) peels.

Microdermabrasion is a cosmetic procedure in which fine crystals are sprayed onto the skin's surface to gently sand away the upper-most layers of the skin. As with chemical peels, microdermabrasion works by exfoliating the upper- most layer of your skin and the dark area with it.

Topical corticosteroid (cortisone) creams, both over-the-counter and prescription varieties, are used for a variety of skin disorders. Unfortunately, some individuals with brown skin have used these creams for the treatment of PIH. The creams are inappropriately applied to the skin and in many instances are applied for a prolonged period of time. This leads to damaging side effects. The side effects include permanent thinning of the skin, permanent redness of the skin from overgrowth of blood vessels, the appearance of rashes on the skin and uncontrollable outbreaks of pimples.

Topical cortisones should not be used for the treatment of PIH unless under the direct supervision of a dermatologist.

Examples of corticosteroid creams obtained in beauty supply stores that should NEVER be used for PIH.

Protein Plays Important Role in Increased Skin Pigmentation That Can Help Protect Against Harmful UV Exposure Science Daily (Aug. 18, 2007) - Researchers have identified a protein that plays an important, early role in the increase of protective skin pigmentation after exposure to ultraviolet (UV) radiation. The protein, called SOX9, is a transcription factor known to participate in embryo development and to be expressed in many adult tissues including the heart, kidney, and brain. Transcription factors control when and where genes (and hence the proteins encoded by those genes) are expressed.

This study, led by investigators in the National Cancer Institute (NCI), part of the National Institutes of Health, confirms the importance of SOX9 to adult skin cells and is the first to show that a protein in the SOX family can be regulated by UV radiation. The results appear in the August 13, 2007, Proceedings of the National Academy of Sciences.

Melanin is a pigment produced in the skin that helps protect cells from cancer-causing UV rays. Specialized cells called melanocytes produce the melanin, which is then transported to other epidermal cells (called keratinocytes) that make up the majority of the skin. Melanoma, a cancer of melanocytes, is the most deadly of the skin cancers, and its incidence is rising in the United States.

UV radiation from the sun or other sources, such as tanning parlors, can cause many types of damage to the skin and has been associated with a process that leads to many types of skin cancers. Individuals with lighter skin incur greater damage from UV and thus have significantly higher risk for skin cancer.

"Increased pigmentation of the skin from UV is thought to help minimize the damage from UV," said NCI Director John E. Niederhuber, M.D. "This research on SOX9 not only gives us important insights into the intricate mechanism our body uses to protect itself from ultraviolet rays, but also into cellular pathways that might contribute to the origins and spread of melanoma."

After showing that melanocytes in normal human skin express SOX9 under normal conditions, the investigators exposed normal human melanocytes to UV radiation, and compared the levels of SOX9

between radiated and non-radiated cells. They found that levels of SOX9 increased within two hours after UV exposure, and continued to increase until eight hours after exposure.

The investigators next attempted to pinpoint the cellular mechanisms responsible for the increased levels of SOX9 after UV exposure. They chose to examine a cell-signaling pathway, called the cAMP pathway, that is known contribute to the regulation of human pigmentation and mediate the production of melanin. Both treatments led to increased levels of SOX9. However, those increases could be prevented by a cAMP inhibitor, indicating that the cAMP pathway plays a critical role in the increased levels of SOX9 after UV exposure.

When the investigators exposed normal human melanocytes to a protein called ASP, which inhibits the formation of melanin, the levels of SOX9 declined. Knowing which other genes may be involved in pigment production will be important for future research efforts.

"The most novel part of this study was the fact that we identified a new transcription factor that may be the earliest responder to stimulation of pigmentation such as seen in the tanning reaction following UV exposure," said Vincent Hearing, Ph.D., chief of the NCI's Center for Cancer Research's (CCR) Pigment Cell Biology Section and senior author of the study. "SOX9 is likely one of the first factors that's activated to start the chain of events that eventually leads to increases in skin pigmentation."

Skin Pigmentation Disorders: Causes and Symptoms

The Malpighian layer of the skin is composed of both the stratum basale and stratum spinosum. It is named after Marcello Malpighi.

Scientists are still studying the reasons why skin pigmentation disorders occur. In some cases there are tangible causes, such as sun exposure, drug reactions, hormones imbalance or genetic inheritance. In other cases, it is not as clear. Drug reactions, hormone imbalance or genetic inheritance. In other cases, it is not as clear. Albinism is an inherited recessive trait and has many different forms, but most people who have this condition have pale skin, hair, and eyes. Melanin also creates eye color, and serves as a filter that prevents too much light from entering the eye. Since they lack melanin in their eyes, many people with albinism also have visual impairment. With little skin pigmentation, they also sunburn easily and are more prone to skin cancer.

Melasma, also known as Chloasma – patchy hyperpigmentation often found in pregnant women - Linea nigra. The hypopigmentation spots associated with vitilgo sometimes form where a person has been cut or injured. Research has shown that the light patches associated with vitilgo do not contain melanocytes, the type of skin cells that create melanin. Some scientists believe vitilgo may be caused by an autoimmune disorder. It also has been linked to other conditions such as hyperthyroidism (too much thyroid hormone) and Addison's disease, which affects the adrenal gland.

Hyperpigmentation can be caused by many factors, from too much sunbathing to drug reactions or poor nutrition. Wounds and scars also can develop darker patches of skin. A psychological syndrome gives people with lichen simplex chronicus to develop a compulsive need to scratch, which causes dark, leathery skin to form. This can lead to permanent scarring and infection if untreated. Scientists believe lamellar ichthyosis is caused by genetics.

The mask caused by melasma may be related to pregnancy hormones, and usually disappears after a woman gives birth. Birthmarks, moles, and aging spots usually are harmless. Some moles, however, can change in size, color, texture, or start bleeding, which could indicate possible skin cancer.

Birthmarks and Other Abnormal Skin Pigmentation
Skin is just like the humans who wear it, it's not perfect. If everything went as planned, the body would produce just enough melanin and blood vessels would behave.

But that's not the case. There are birthmarks and other pigmentation disorders that affect many people. We've included some of the most common abnormalities here. Remember: never self- diagnose! If you think you have one of these skin pigmentation abnormalities, make sure you visit a physician to receive an official diagnosis.

Birthmarks
As might be expected, this type of abnormal skin coloration will appear at birth or in just a few weeks following birth. It's important to remember that most birthmarks are non-cancerous, though a physician should examine your child if he or she is born with abnormally colored skin or develops birthmarks shortly after birth.

Certain birthmarks described below can pose health risks.

Pigmented Birthmarks
The discoloration of the skin will appear smooth and flat. These spots are known by several names, including Mongolian spots - bruised or bluish in color, typically appearing on buttocks; cafe-au-lait spots - light brown; and typical moles, which are also called nevi. Moles should be monitored for bleeding, color, shape or size changes, or itching.

Macular Stains
These appear anywhere on the body, appearing as mild red marks, but they are not elevated. Macular stains are the most common type of vascular (from blood vessels) birthmark. These marks can come in two forms:

Angel's kisses may appear on the forehead and eyelids, but will typically disappear early in childhood.

Stork bites will appear on the back of the neck and can last into adult years, these marks are often mild. No treatment is necessary.

Hemangiomas are caused by many tiny blood vessels bunched together and vary in severity. Typically, this birthmark can be just that, a mark, or it can grow larger and larger until treated. Hemangiomas can grow very rapidly through the first year of a child's life. There are two types of hemangiomas: strawberry hemangiomas, which are slightly raised, red birthmarks and can appear anywhere, on the body; or cavernous hemangiomas, which are a deeper birthmark characterized by a bluish color. Most Hemangiomas will go away on their own; roughly 50% resolve by age five and 90% by age nine.

Reasons to treat hemangioma include problems with functions (such as sight, eating, hearing or defecation), ulceration or pain. Hemangiomas can be treated in different ways, each of which carries its own risks.

Corticosteroid medication, which can be injected or taken orally, is one option for treating hemangiomas. Risks associated with corticosteroid medication include high blood pressure, high blood sugar, poor growth, or cataracts. If corticosteroids fail, there are other medications that may be an option. Certain Hemangiomas can also be treated with lasers to stop them from growing. Risks associated with that treatment include ulceration and scarring.

In some cases, a hemangioma can also be removed with surgery. Other times, a combination of these

approaches is the most beneficial treatment.

Port Wine Stains
Port wine stains are caused by abnormal development of blood vessels (capillaries) and last a lifetime. The port-wine stain (also known as nevus flammeus) appears as a flat, pink, red or purple mark, and occurs on the face, trunk, arms, or legs.

If you or your child has a port wine stain present on eyelids, this is thought to pose an increased risk of glaucoma, an eye disease associated with increased pressure in the eyes that can lead to blindness if it's not treated.

Physicians have tried many ways to treat port wine stains, including radiation, tattooing, freezing, dermabrasion, or sclerotherapy. Laser treatment with a V-Beam Perfecta for Port-wine Stains is currently the best method that destroys capillaries in the skin without causing damage. Port wine stains may be seen in certain medical disorders, including Sturge-Weber Syndrome, with symptoms that include port wine stains on the face, vision problems, convulsions, mental retardation and perhaps even paralysis; and Klippel-Trenaunay Syndrome, which may include symptoms of many port wine stains, varicose veins and/or too much bone and soft tissue growth. Each of these syndromes is very rare.

Skin Pigmentation Disorders / Albinism
Albinism, an inherited disorder, is caused by the absence of the pigment melanin and results in no pigmentation in skin, hair, or eyes. In albinos, their body has an abnormal gene which restricts the body from producing melanin. There is no cure for albinism, and individuals should use a sunscreen at all times because they are much more likely to get sun damage and skin cancer. This disorder can occur in any race.

Melasma (also known as chloasma) is characterized by tan or brown patches on the cheeks, nose, forehead, and chin. Although this condition is typically termed the "pregnancy mask," men can also develop this condition. Melasma may go away after pregnancy but, if it persists, can be treated with certain prescription creams and some over the counter skin care products. Remember to consult your physician or dermatologist for a proper diagnosis of this condition before you choose to treat it yourself.

If you have melasma, use a sunscreen at all times because sunlight will worsen your condition.

Pigmentation Loss as a Result of Skin Damage
If you've had a skin infection, blisters, burns or other trauma to your skin, you may have a loss of pigmentation in the affected area.

The good news with this type of pigment loss is that it's frequently not permanent, and cosmetics can be used to cover the area.

Vitiligo is a pigmentation disorder in which melanocytes (the cells that make pigment) are destroyed. As a result, white patches of skin appear on different parts of the body. The cause of vitiligo is not known, but some possible causes include physical trauma or certain diseases such as diabetes. There is no cure for vitiligo, but there are several treatments, including psoralens (light-sensitive drugs) used in combination with ultraviolet A light treatment.

Conclusion
Since the skin is the largest organ of the body, the information and discussions available are infinite. Professionals are well advised to make the study of Skin and Hair as well as the varied organs and glands that affect it a lifelong study. New discoveries and treatments are developed daily. In order to stay in tune

with advancements in Skin Care, a continuous study is well advised for anyone in any practice which affects the skin and or hair of their clients.