

## **Fungal Skin Problems that Appear Red, Circular and Thickened**

If you have slightly thick or hard, circular, red, slightly grainy spots, with well-defined edges, or folliculitis, and never ending hive like itching, wet your entire body and wash with an over the counter (OTC) antifungal shampoo, leaving it on for 5 to 10 minutes before rinsing off. Use a heater to warm your bathroom to 80 degrees so you can tolerate standing around wet for 10 minutes. After rinsing off, air-dry your body with the heater. Using a towel will tend to wipe off the medicine remaining from the shampoo. Afterwards, do not apply any oil based lotions – the fungus causing the circular sores is *malassezia*, which is lipophilic, which means it metabolizes fats and oils. Non-comedogenic lotions, like Cetaphil or CeraVe, are less oily but are not oil-free and will feed *malassezia*.

*Malassezia* (previously *pityrosporum*), can also cause tinea versicolor, which is characterized by asymptomatic hypopigmented or hyperpigmented oval, slightly scaly patches measuring 1–2 cm, usually found on the upper chest, neck, and back. Alternatively, you may have been diagnosed as having seborrheic dermatitis, *Pityrosporum* folliculitis,<sup>1</sup> eczema, or oily dandruff. In plain English, a *malassezia*-induced condition looks like red bumps and white flakes, and tinea versicolor looks like small giraffe-spots. Dermnet.com's website has many photos for comparison: <http://hardinmd.lib.uiowa.edu/dermnet/seborrheicdermatitis.html>

If you instead have psoriasis, which involves much larger, thicker, white or grayish irregular scaly patches (instead of red circular patches), primarily at your elbows or joints, an antifungal treatment probably will not be effective. However, if you have atopic dermatitis, which involves solid reddened papules (small eruptions resembling pimples) and vesicles (small blister-like elevations on the skin that contain tissue fluid) your itch and scratch cycle may have additional causative factors and an antifungal treatment may not be completely effective but could be helpful.

## **Over the Counter Anti-Fungal Shampoo Treatments for Malassezia**

An effective OTC shampoo is Hegor 150 (1.5% Climbazole), which is made in France and is available in the US only on eBay and will be shipped from Bulgaria. A new Climbazole shampoo from Alderma, Bioderma Sensibio DS Gel, is available on Amazon and ships from Portugal. Another new shampoo containing 0.5% piroctone olamine and 0.45% climbazole is made by Eucerin, is called DermoCapillaire Antidandruff Gel Shampoo, and is the subject of a 2013 medical research article.<sup>2</sup> However, hair has a pH of about 7, while skin has a pH of about 5.5, and so adding a small amount of Citric Acid to the shampoo, and then using as a body wash or facial wash, will lower the pH and increase the effectiveness of any Climbazole product.<sup>3</sup> If I had known this earlier I could have saved myself a lot of time.

While you are waiting three weeks for your shipment of Hegor 150, you can mail order OTC Nizoral (1.0% Ketoconazole) shampoo, which is available only online in the US – after 2011 it has not been sold in brick and mortar drug stores. Nizoral was approved in 1995 and is effective on *malassezia*, but less so than a Climbazole-based shampoo.<sup>4</sup> Both Climbazole and

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<sup>1</sup> Folliculitis can be bacterial or fungal or both. If both, treating only one will make the other worse. Both types appear the same, but trial and error treatments can reveal which one predominates at any given time.

<http://www.facingacne.com/killing-germs-wrong/> ;

<http://synapse.koreamed.org/DOIx.php?id=10.5021/ad.2011.23.3.321> ;

[www.scirp.org/journal/PaperDownload.aspx?paperID=26149](http://www.scirp.org/journal/PaperDownload.aspx?paperID=26149) .

<sup>2</sup> [www.scirp.org/journal/PaperDownload.aspx?paperID=26935](http://www.scirp.org/journal/PaperDownload.aspx?paperID=26935)

<sup>3</sup> [www.freepatentsonline.com/4867971.html](http://www.freepatentsonline.com/4867971.html) [www.iranjd.ir/download.asp?code=IJD09124982](http://www.iranjd.ir/download.asp?code=IJD09124982);

<sup>4</sup> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3100109/>; [adc.mef.hr/index.php/adc/article/download/887/588](http://adc.mef.hr/index.php/adc/article/download/887/588);

Ketoconazole work by slowly dissolving fungal cell walls. The only shampoo containing Climbazole sold in the USA is “Mustella Foam Shampoo for Newborns.” It probably contains too little Climbazole to be useful, but is sold at Target stores and online by many others.

A third alternative, 1.0% Butenafine Hydrochloride (Lotrimin Ultra) is also very effective on *malassezia* but didn’t know this until I had started compounding my own treatments, because it is an off-label use. Even so, in 2012 the FDA issued a Guidance calling for clinical trials of this drug on *malassezia*, so a positive outcome seems likely.

A fourth alternative is Selsun Blue (1.0% Selenium Sulphide) shampoo, which is sold by all drug stores. Selsun Blue is an out-of-date product that activates some of the body’s natural defenses against *malassezia*, but it does not dissolve the fungal cell walls, which is why other shampoos are recommended. However, the most useful aspect of Selsun Blue is that it is effective **only** against *malassezia* and can thereby provide a quick, easy to purchase, differential diagnosis. Use it daily for 3 or 4 days, stand in bright sunlight and scratch your scalp. If you see a small cloud of white flakes, you have an abundance of *malassezia*. Alternatively, after using any of these shampoos daily for 3 to 4 days, if your skin turns red in blotches, and flakes off slowly, you have an accurate diagnosis of numerous *malassezia* colonies on your skin.

A fifth and very much last place alternative is Head and Shoulders, a heavily promoted 1950’s shampoo that contains 1% or 2% zinc pyrithione, which is **not** an effective antifungal treatment for oily dandruff or for inflammatory *malassezia* skin conditions. Zinc pyrithione might be an anti-seborrheic, and it might improve the elasticity of the skin, but its super-effective marketing campaign is the only reason anyone would buy it.

Aloe Vera gel appears to be an effective solvent on the biofilm formed by the protein, fat and polysaccharide bonds resulting from the interaction of *malassezia* and the skin.<sup>5</sup> Little scientific evidence explains why Aloe Vera is effective, but it is confirmed by my own experience and in, “A Double-Blind, Placebo Controlled Trial of an Aloe Vera Emulsion in the Treatment of Seborrheic Dermatitis,” J. Dermatol. Treatment, 1999, 10, 7-11, Vardy, 1999, where improvement occurred for 60% of the patients using Aloe Vera, compared with only 20% of the control group. See also, <http://www.e-ijd.org/viewimage.asp?img=IndianJ Dermatol 2006 51 2 145 26942 1.jpg>.

Also consider applying Selsun Blue Deep Cleansing (3% salicylic acid) shampoo or Hibiclens (4% Chlorhexidine Gluconate) occasionally, as fungi are capable of working with other microbes to create symbiotic biofilms, but be careful to keep Hibiclens away from your nostrils, eyes, and ears. Full body application is an off label use of Hibiclens. Selsun’s salicylic acid is a terrible shampoo because it makes hair straw like. Do not use any topical salicylic acid product if you have dark skin, as it can cause dark skin spots from a concentration of melanin.<sup>6</sup>

If you have a bacterial skin infection, instead of a fungal skin condition, topical 2% Bactroban (mupirocin 2%) cream can be mail ordered from Thailand at a cost of about \$25 for 30 grams, or topical 2% fusidic acid cream (*aka* sodium fusinate, Fudil or Fucidin) can be mail ordered from Thailand at a cost of \$50 for 60 grams. Fucidin is not sold in the USA, because it is bogged down in an attempt by one manufacturer, Cempra, to obtain a law from the US Congress whereby Cempra has 5-years of exclusivity to sell fusidic acid tablets.<sup>7</sup> Some say that

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[www.ncbi.nlm.nih.gov/pubmed/18492152](http://www.ncbi.nlm.nih.gov/pubmed/18492152)

<sup>5</sup> Here’s an excellent interview with an American doctor who explains biofilms and why medical science ignored them until recently: <http://bacteriality.com/2008/04/13/wolcott/>

<sup>6</sup> [http://neurolex.org/wiki/Category:Salicyclic\\_acid#tab=Basic](http://neurolex.org/wiki/Category:Salicyclic_acid#tab=Basic)

<sup>7</sup> [cid.oxfordjournals.org/content/52/suppl\\_7/S542.full.pdf](http://cid.oxfordjournals.org/content/52/suppl_7/S542.full.pdf)

Fucidin is the most effective topical drug against gram positive bacteria, because it is soluble in both oil and water. Gram positive bacteria are like staph bacteria, and are the most likely kind that anyone would become infected with if they haven't been hospitalized recently, because gram negative bacteria (other than cholera) are usually found only in hospitals. Oral antibiotics can cause *malassezia* conditions to become much worse.<sup>8</sup>

Nevertheless, if your doctor took a skin scraping with a razor blade and looked at it under a microscope to accurately diagnose *malassezia*,<sup>9</sup> as most veterinarians are trained to do, and then prescribed 2.5% selenium disulphide, please consider other alternatives. Some doctors are poorly informed about *malassezia* because it is difficult to culture and study, and the human body has numerous micro biota. However, DNA genome sequencing on *malassezia* began in 1995 and was accurately concluded in 2005. Much medical research has been published in the last ten years and new perspectives on *malassezia* have become widely distributed. Nizoral 2.0% prescription shampoo would be an acceptable but overpriced choice, because Hegor 1.5% Climbazole costs only \$16 for a 150 ml bottle, is OTC, smells better, and is more effective. The FDA and the EU have licensed up to 2.0% Climbazole in OTC shampoos.

If you have skin irregularities that are not responsive to Ketoconazole or Climbazole, try Lotrimin AF (1.0% Clotrimazole) to see if your skin responds although this is an off-label use.<sup>10</sup> Clotrimazole up to a 10% concentration is authorized by the FDA for vaginal use against *candida*, so it is presumably safe to use anywhere on your skin. Some report that prescription Stieprox shampoo (Ciclopirox Olamine 1.5%) is effective but it isn't sold in the US and the manufacturer's Product Monograph shows that ketoconazole shampoo is more effective.<sup>11</sup> Likewise, some report that Nystatin is effective, but it is intended to be used for the treatment of cutaneous candidiasis, so I have not used it.<sup>12</sup>

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<sup>8</sup> <http://www.facingacne.com/killing-germs-wrong/>; <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3162261/>; <http://www.scirp.org/journal/PaperDo...?paperID=26149> ; <http://archpedi.jamanetwork.com/data/Journals/PEDS/12008/POA30545.pdf>

<sup>9</sup> <http://www.youtube.com/watch?v=ugeMsyEDJaw&list=PL3C73E5E59E40107E&index=36>

<sup>10</sup> <http://journals.usamvcluj.ro/index.php/veterinary/article/view/3950>

<sup>11</sup> [www.stiefel.ca/pdf/stieprox\\_shampoo\\_pm.pdf](http://www.stiefel.ca/pdf/stieprox_shampoo_pm.pdf); See, page 10 of Steifel's Monograph.

<sup>12</sup> To test for *candida* skin rash as opposed to *malassezia*, the use of Nystatin, 2% Clotrimazole (sold as Lotrimin AF), or raw coconut oil for a week should be enough time to see improvement of a *candida* rash. Nystatin or raw coconut oil rapidly treat *candida* rashes, but coconut oil is used as a growth medium for *malassezia* yeast in labs so it will increase the growth rate of *malassezia*: [journal-phytology.com/article/viewfile/6390/3245](http://journal-phytology.com/article/viewfile/6390/3245); and,

Corticosteroid lotions in theory will reduce itching, but they may cause skin atrophy when used for long periods of time, and always contain oils that will feed *malassezia*. Plus, the histamine rebound after ceasing its use makes the itching much worse. While intense itching is one of the most irritating symptoms of a *malassezia* skin condition, in my opinion no one should ever treat it with a topical corticosteroid.<sup>13</sup>

### Alternatives Taken Internally

Ketoconazole 200mg tablets were once considered effective against *malassezia* but as of August, 2013, are no longer allowed by the FDA or in the EU because of liver impairment. <http://www.fda.gov/downloads/Drugs/DrugSafety/UCM362592.pdf> Lotions with ketoconazole are not affected by the FDA's decision. Perhaps oral antifungal drugs such as bifonazole and itraconazole are alternatives, <http://www.e-ijd.org/article.asp?issn=0019-5154;year=2011;volume=56;issue=5;spage=515;epage=516;aulast=Das>. Itraconazole was reported safe in one study: <http://www.jpad.org.pk/April-June-2011/6.%20Original%20article%20Safety%20of%20itraconazole%20in%20seborrhoeic%20dermatitis.pdf>. Fluconazole tablets (*aka* Diflucan) are barely effective against *malassezia*.<sup>14</sup>

### Treatment Outcomes

All the treatments described here are also useful for dry dandruff, but dry dandruff is merely an annoyance. The same fungus that causes dry dandruff also causes the irritating dermatitis that is seen as itchy red patches all over one's body, but the inflammation must be treated, because the inflammatory skin reaction also causes a histamine response, which is basically the body trying to calm down the sensation of itching. Histamine also stimulates the adrenal glands, causing a release of adrenaline and noradrenaline, which is part of our primitive "fight or flight" reaction to stress, and can be harmful to healthy functioning because constant itching causes the immune system to work overtime.

At first, some parts of your skin may appear to turn a red, purple or magenta, which results from your body recognizing that there are fungal foreigners, to which the body's first healing reaction will be inflammation, which is normal. **Do not be dismayed by patches of skin redness** – your body is healing, although it may take weeks or months to become normal.

During the course of this treatment your skin will begin to flake off in small white flakes or in larger white plaques up to 1/4 of an inch. You may ultimately flake off a large portion of the superficial outer layer of your skin, because the fungal plaque or biofilm is composed mostly of proteins and sugars in your own skin. Most of the fungal skin plaques are stiff and less flexible than normal skin, and so the skin may crack and bleed around the plaques. The skin that rubs off may be papery white or surprisingly brown, dark grey or even black, apparently from years of environmental dust being incorporated into a biofilm on the skin.

If you have a flu-like symptoms or slight fever for no apparent reason, it may be a Herxheimer Reaction to the byproducts of the fungus dying off in large numbers. Do not scratch the sores – gently rub off the dead skin. All of the foregoing should occur with progressively less itchiness. The daily treatment may take weeks or months depending on the level of involvement between the fungus and your immune system, which varies from person to person.

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skin condition caused by a fungus, but it is treated with terbinafine (OTC Lamisil), and is different from seb serm induced by malassezia, because tinea capitis is contagious and can cause hair loss.

<sup>13</sup> [cornetis.pl/pliki/DK/2004/1/DK\\_2004\\_1\\_7.pdf](http://cornetis.pl/pliki/DK/2004/1/DK_2004_1_7.pdf)

<sup>14</sup> [www.ncbi.nlm.nih.gov/pubmed/17645378](http://www.ncbi.nlm.nih.gov/pubmed/17645378)

When your skin has softened and the flaking stops, you can change over to twice a week shampoo treatments. However, the condition is seasonal – when the weather becomes colder, the sebaceous glands appear to produce a different quality of oil and then the itching and red patches flare up, apparently because the body in a cooler temperature is able to recognize the fungal colonies that were hiding from the immune response during warm weather.<sup>15</sup> In fact though, recent studies connect seb derm to low Vitamin D levels.<sup>16</sup>

### **An Effective Antifungal Lotion can be Purchased**

It is legal to buy and import Nizoral (2% Ketoconazole) cream from India without a prescription, for your own use only,<sup>17</sup> at a price of \$14 for a 20ml tube, when purchasing six tubes at a time, for a total cost of \$84 for 120 ml of cream. As it takes about 12ml of lotion to cover my entire body, commercial Nizoral cream was not a viable treatment, because the tubes are tiny, the cream spreads very poorly, and I did not have a small response to *malassezia* – it was a large problem all over my entire body that required many months of treatment. Nevertheless, if your doctor prescribes Nizoral 2% cream consider buying Taro 2%, a cheaper generic available with a prescription from many online US pharmacies.

### **Compounding an Antifungal Lotion**

You can legally buy and import Ketoconazole powder from China only for your personal use, and compound a lotion similar to Nizoral 2% or Taro 2% cream, using a 98% Ketoconazole powder (cosmetic grade) at a price of \$120.00 for 25 grams. *See*, footnote 17.

Home compounding of a final product of 8 ounces of 2% Ketoconazole lotion requires a digital scale accurate to at least 1/10<sup>th</sup> of a gram, and 16 grams of 99% Isopropanol purchased from a chemical supply store, mixed with 4.0 grams of Ketoconazole powder, and warmed in a beaker or jar on the stove in a water filled pan to 150 degrees to dissolve the powder. A rubber-stoppered 50 ml Erlenmeyer flask is perfect for mixing, heating and pouring. Allow the solution to cool slightly, and then add it to 200 ml of Cetaphil lotion in the original lotion container.

Twenty-five grams of US-made Climbazole can be purchased OTC at a local chem lab supply store for \$94. An effective 0.5% Climbazole **body** wash can be compounded with 400 ml of Dove body wash, 2.0 grams of Climbazole, and 3.8 grams Citric Acid to reduce the final pH to 3.4. A **face** lotion with no more than 0.5% Climbazole was authorized by the FDA in 2007 and by the EU in 2009, so an all-over Climbazole body lotion would be compounded at no more than 0.065% Climbazole. (*See*, Scientific Committee on Consumer Safety, Addendum SCCS 1506/13 to the Opinion on Climbazol, issued on 26 February 2013.)<sup>18</sup>

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<sup>15</sup> [cmr.asm.org/content/25/1/106.full](http://cmr.asm.org/content/25/1/106.full)

<sup>16</sup> [http://ssm.mu-varna.bg/index.php?option=com\\_k2&view=item&id=347:ssm-2013-v45175-78&tmpl=component&print=1&Itemid=238](http://ssm.mu-varna.bg/index.php?option=com_k2&view=item&id=347:ssm-2013-v45175-78&tmpl=component&print=1&Itemid=238) Here's more information about potential sources of Vitamin D: <http://ods.od.nih.gov/factsheets/VitaminD-HealthProfessional/> A fair summary is that we should eat wild salmon three times a week, be out in the sunshine 20 minutes a day, and take Vitamin D supplements.

<sup>17</sup> [www.fda.gov/downloads/ICECI/.../UCM074300.pdf](http://www.fda.gov/downloads/ICECI/.../UCM074300.pdf); *see*, page 9-13 of the FDA Regulatory Procedures Manual - August 2012 Chapter 9 Import Operations and Actions. *Also see*, <http://www.fda.gov/forindustry/importprogram/importpolicyandinformationbyproduct/default.htm>

<sup>18</sup> To measure such a tiny amount of Climbazole, use an tubeless-tire aluminum valve cap that by measurement holds 0.2 ml of water. Climbazole has a density of 0.76mg/ml, which results in the valve cap holding 0.152 grams of Climbazole, which will make 234 ml of lotion at 0.065% concentration. To measure small amounts of Citric Acid, I found that an ordinary tire valve stem cap, or an inner tube valve stem cap from a bicycle, filled full with water, is 0.38 ml by volume, which would be 0.63 mg of CA, because CA has a density of 1.66 mg per ml.

My experience is that a 0.5% Climbazole based body wash with 0.9% Citric Acid to lower the pH, combined with use of a 0.065% Climbazole lotion to which 0.3% Citric Acid is added, is ten times more effective than any Ketoconazole based lotion and body wash. Climbazole is also about ten times less expensive in than Ketoconazole, because Climbazole is used in relatively small concentrations.

At this time, Climbazole based skin lotions are not sold anywhere in the world. My reason for compounding a Climbazole skin lotion is that a shampoo when used as a body wash is a very poor delivery system. Hair acts like a textile and absorbs part of any shampoo applied to it, but body washes are not absorbed by the skin as much as a lotion.

### **Using the Compounded Lotion**

Around the eyes use the commercially available Nizoral 2% cream, or a home compounded lotion without any essential oils. Eyelid skin is very thin and essential oils evidently penetrate to the inside and will make your eyes bloodshot. Two months after using commercial 2% Ketoconazole cream I was amazed to discover my eyebrows and eyelids were entirely covered in many layers of sticky, white, papery skin plaques that slowly flaked off for ten more months.

No one can predict exactly where the fungal colonies create thickened plaques or biofilms until **after** the affected skin turns flaky white or inflamed red, so the lotions are applied over the entire body. I use about 3.5 ounces of lotion per week, or 12ml per day, so you may want to begin treatment with a medicated shampoo, and then use compounded lotions only if you are still experiencing flaky white or inflamed red skin after two months of using a commercially available shampoo as a body wash.

Also consider that shaving gels contain oils and lanolin, which is like throwing gasoline on a fire if you are already suffering from *malassezia* skin reactions.<sup>19</sup> *Malassezia* is an unusual fungus, in that is lipid dependent, which should be kept in mind when evaluating any treatment. For example, shave before you shower, and add some Nizoral shampoo to the shave gel. Five unusual but useful observations follow: “Roll A Lotion” will effectively apply lotion to the middle of your back; if the skin on your lips is peeling drink through a straw; *malassezia* has been reported to cause a loss of hearing that resolved on treatment with vinegar and Clotrimazole powder;<sup>20</sup> *malassezia* has been reported to colonize silicone in medical catheters so replace the silicone nose pads on your eye glasses; and, research in Saudi Arabia reported that *malassezia* colonized soft contact lenses after one week of use, even with daily use of a multipurpose disinfectant.<sup>21</sup>

### **Pharmaceutical Alternatives**

It is legal to buy thirty 200 milligram Ketoconazole Nizoral tablets from India for \$65, for personal use only. Thirty of these pills yield 5.0 grams of pharmaceutical grade Ketoconazole. However the tablets are rock hard and it takes an hour to pulverize 18 of these tablets into 3.6 grams of Ketoconazole powder, and the tablets include an additional 40% binder by weight that does not dissolve in ethanol. Based on the problem with the binder,

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<sup>19</sup> However, Nivea Sensitive Shaving gel, and Nivea Sensitive Post Shave Balm, have Piroctone Olamine, which is somewhat effective against *malassezia*. [onlinelibrary.wiley.com/doi/10.1111/j.1468-2494.2010.00623.x/pdf](http://onlinelibrary.wiley.com/doi/10.1111/j.1468-2494.2010.00623.x/pdf)

<sup>20</sup> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2889660/>. Surprisingly, and before I found this research, I noticed I had reduced my TV volume by 10% and had better hearing acuity after the plaques in my ears flaked off.

<sup>21</sup> <http://www.academicjournals.org/AJMR/PDF/Pdf2012/21June/Salih%20and%20Asiri.pdf>

pharmaceutical tablets don't work in a lotion. As discussed above, Ketoconazole causes liver damage when taken internally and isn't a sensible treatment for a chronic, topical, skin condition.

### Natural Alternatives

Xylitol (also called pentose, pentitol, polyalcohol, and polyol) is soluble in water at a ratio of 1.69 to 1, and is a naturally-occurring 5-carbon sugar alcohol, which bacteria and yeast cannot metabolize. First made in Finland from birch trees, Xylitol tastes and looks like sugar but will not ferment like sugar, has 40% fewer calories, reduces ear infections, and prevents cavities.<sup>22 23</sup> In addition, *malassezia* biofilms may have a symbiotic relationship with *S. epidermis* biofilms, because it is the primary bacterial constituent on people with dandruff, instead of *propionibacterium acnes* which is prevalent on people without dandruff.<sup>24</sup>

Traditional Chinese Medicine and acupuncture will diagnose *malassezia* dermatitis as internal damp heat and invasive external wind, and will advise a yin replenishing diet. Interestingly, on the final day after three months of once a week acupuncture treatments, I noticed odd 1-inch magenta colored patches in the crook of each elbow and began to investigate, and ultimately discovered everything I've written here. Please keep in mind that I'm not a health care professional but felt compelled to investigate because there is too much marketing of ineffective products.

### Malassezia in Nature

*Malassezia* is the only member of the Mycota kingdom that is able to metabolize oils. All *malassezia* subspecies that colonize people are lipid dependent, and as such, will not grow in culture media unless oil is added. (*Malassezia pachydermatis* is lipophilic rather than lipid dependent, but is thought to cause dermatitis only in dogs and mammals other than humans.) *Malassezia's* dimorphic nature, existing as both yeast cells (budding bottle-shaped cells) and a much larger hyphae form, can be seen under a microscope at 100x by placing some methylene blue (10% KOH) on a slide, as further explained in the video cited at footnote 8.

*Malassezia* prefers skin that is rich in secreted oils, such as the scalp, face, lips, chest, and especially the back. *Malassezia* is normally present on everyone's skin, that is, it's commensal. The reaction that some people have to *malassezia* is not completely understood by medical science, but it is thought to be an immunodeficiency as the fungus co-opts the host's immune reactions so that the host's skin does not recognize the fungus as an invader, which allows the fungus to create a plaque of keratin to further shield itself inside the skin. In much simpler terms, it's a skin allergy. Some researchers call it a "shag carpet of proteins and sugars" in which fungus grows without being detected. *Malassezia* also interferes with the body's immune system by modifying various interleukins, in order to trick the body to not recognize the fungus as a foreign object, an aspect of medical research that holds promise for the future.

All mammals – dogs, cats, rhinoceroses, and even sea lions to name a few of the documented cases over the last hundred years – can potentially suffer from an inflammatory skin reaction to *malassezia*. However, just like people, most of the individual members of any particular mammal species do not suffer an inflammatory skin reaction to *malassezia*, so the problem of skin flare ups continues to puzzle researchers. That other mammals in widely varied

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<sup>22</sup> [https://www.jstage.jst.go.jp/article/josnurd/49/1/49\\_1\\_67/article](https://www.jstage.jst.go.jp/article/josnurd/49/1/49_1_67/article)

<sup>23</sup> [repositorium.sdum.uminho.pt/bitstream/1822/9459/1/Gomes\\_CM.pdf](http://repositorium.sdum.uminho.pt/bitstream/1822/9459/1/Gomes_CM.pdf);

[http://www.medscape.com/viewarticle/768025\\_3](http://www.medscape.com/viewarticle/768025_3)

<sup>24</sup> <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0058203>

environments likewise react to *malassezia* tends to refute beliefs that diet or modern environmental toxins are at fault for the inflammatory reaction that some humans experience. The condition is probably genetic.

The condition is far too complicated to explain to people who ask, “What is that spot on your face?” I simply say, “I have a genetic condition where my skin produces an excess of keratin.” This isn’t true but it moves the conversation along and appears to satisfy the inquiry. Finally, the condition is infectious to the host but not contagious to other humans or mammals, except for premature babies, persons with HIV/AIDS or using catheters on dialysis, or with suppressed immune systems. Good luck!

### **Calendar of treatments used:**

June 4, 2012 to Aug. 9, 2012 -- Selsun Blue 1% shampoo; Aug. 13, 2012 to Oct. 26, 2012 -- Nizoral 1% shampoo.

August 27, 2012 to present -- Nizoral 2% ointment, commercially prepared, eyes and lips.

October 26, 2012, to January 5, 2013 -- Hegor 1.5% shampoo.

November 3, 2012 to December 3, 2012 -- compounded Ketoconazole 2% lotion. December 4, 2012 to January 4, 2013 -- compounded Ketoconazole 1% lotion, with 0.3% lemongrass and essential oils.

January 5, 2013 to March 12, 2013 -- compounded Ketoconazole 1.5% face lotion, no essential oils (named NEO), and compounded Ketoconazole 1% body lotion (KETO) with essential oils.

March 12, 2013 to present -- compounded KETO lotion modified to 1.0% Ketoconazole and 0.06% Climbazole, (renamed KLIO) with 0.4 ml of VetMix and 0.3 ml RoseMix for body use. On May 14, 2013, all Ketoconazole was deleted from the KLIO body lotion and 0.65% Climbazole is the sole active ingredient, plus 0.4% Propolis. On June 10, 2013, added 0.15% Citric Acid (soluble in water) and 1.0 gram of Salicylic Acid (0.5% SA) to KLIO lotion. SA dissolves in 1ml of Glycerin and 2ml of Isopropanol, after heated in water bath to 130 degrees, so it will not precipitate out of 200ml of KLIO lotion. On July 15, 2013, KLIO body lotion modified to delete all SA, with 0.3% Citric Acid, results in a measured pH of 3.4. A low pH is very important.<sup>25</sup> On July 24, 2013, 2.0% Aquaphor added to KLIO body lotion, and 1% Aquaphor to NEO face lotion. On July 31, 2013, 0.22% Farnesol added to the previous components of KLIO body lotion. On August 3, 2013, the flaking eyebrow skin plaques were finally gone. On October 20, 2013, I changed from Cetaphil to compounded **MCT lotion** as the base for KLIO lotion, stopped compounding NEO lotion, and deleted farnesol and Aquaphor. *See*, pages 9-10.

February 20, 2013 to present -- CLIO body wash compounded at 1.0%, reduced later to 0.5% Climbazole, plus 0.5% Salicylic Acid, and 0.08% Citric Acid, having a measured pH of 5.5, for use as body wash only. Shampoo is simply 0.3% Climbazole and 2% Xylitol with no reduction of the pH. On July 15, 2013, deleted all SA from CLIO body wash, and substituted 0.95% Citric Acid, with a measured pH of 3.4. On July 31, 2013, added 2.0% Xylitol and 2 drops Farnesol<sup>26</sup> to the previous components of CLIO body wash.

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<sup>25</sup> <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3100109/> ; [adc.mef.hr/index.php/adc/article/download/887/588](http://adc.mef.hr/index.php/adc/article/download/887/588); [www.ncbi.nlm.nih.gov/pubmed/18492152](http://www.ncbi.nlm.nih.gov/pubmed/18492152)

<sup>26</sup> Farnesol is a very functional essential oil (EO) because the aroma is about 80% less powerful than any other EO. At 0.22%, farnesol’s aroma is nearly imperceptible in Cetaphil body lotion.

On November 12, 2013, I stopped using Dove body wash as a base and switched to compounded **MCT body wash** as the base for CLIO, and deleted farnesol. *See*, page 11.

## Xylitol

On August 19, 2013, I realized an aesthetic and effective leave-on hair gel can be made with 100 ml of Aloe Vera gel, 5 ml of Hegor 150 shampoo, and 4 grams of Xylitol. I actually used 0.07 grams of Climbazole powder dissolved in 1 ml of Isopropanol and added 10 ml of NEO lotion instead of Hegor 150, but my mix is equivalent to 1 part in 20 dilution of Hegor 150. Both hair gel mixes are just barely over the EU guidelines for a full body leave-on product, so they are safe as a scalp product. On January 9, 2014, I modified the hair gel to increase the pH because my hair was becoming “crunchy” or strawlike, and I so added 1.0% bicarbonate of soda, plus 1.0% hydrolyzed collagen. The pH is now 7, which is the normal pH of hair. Collagen (7 oz. from Vitamin Shoppe costs \$16) adds a soft shine but 1.0% may be a bit “heavy” for fine hair and 0.6% may work better.

On August 12, 2013, I made a Xylitol-based nasal spray, with 15 ml distilled water, 4% Xylitol, 1% citric acid, 1% sodium bicarbonate, 1% sea salt, and 1.7 mg Aloe Vera (about 10%), poured into an empty Nostrilla bottle with a screw off cap. I was aiming for a pH of about 7.6 but it measured at 8.1. On August 17, 2013, I made a Xylitol-based eye redness relief fluid with 15 ml distilled water, 4% Xylitol, 0.3% sodium bicarbonate, and 1.5 mg Aloe Vera gel. Refrigerate these sprays, because Aloe Vera will oxidize (turn brown) at room temperature and the pH will go up.

## MCT Oil (Medium Chain Triglyceride) Lotion

On October 6, 2013, I learned that *malassezia* grows by consuming oils or fatty acids only with carbon chain lengths of C11 to C24, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1198797/>, and this study seems very credible because of the analytic procedures used. (I previously relied on an Abstract that stated *malassezia* consumed oils from C10 to C24, but I’ve discarded that theory.)

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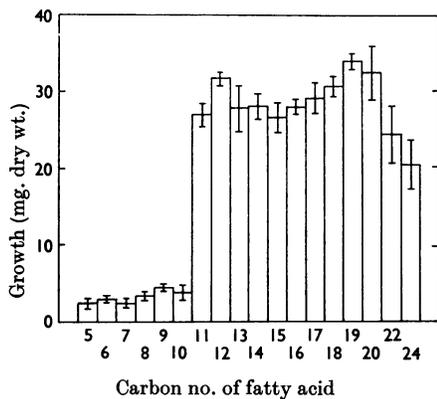


Fig. 1. Growth of *P. ovale* in 25 ml. of peptone-glucose broth with 25 mg. of individual fatty acids in ascending series of chain length. Sodium taurocholate (1%) was added to each flask. Growth is expressed as mg. of dry defatted cell residue after 72 hr. growth at 37°.

Then I learned that MCT oil is composed only of C8 and C10 oils, and that MCT oil is sold by health food stores. On October 20, 2013, I made a lotion with MCT oil. The purpose of making an MCT lotion is to moisturize skin but not feed *malassezia* yeast. Of course, it remains necessary to incorporate active ingredients into any lotion because natural sebum oil remains as a food-source for this yeast, but an MCT lotion will not make the problem worse.

This MCT lotion looks and feels like Cetaphil, but doesn't have any ingredients that are food grade to *malassezia*. Pure MCT oil has a carbon range of only C8 to C10, which is unique. Pure MCT oil also called caprylic/capric oil and can be ordered from many sources – it's shiny, has no smell, is colorless, and didn't make my skin break out in a rash like coconut oil, even though MCT oil is vacuum-distilled from coconut oil, where the C8 and C10 oils are lighter so they distill out first and leave behind the C12 and longer oils.

Product	%	Vol.	2x Vol.
<b>1. MCT Oil – heat phase 1 to 160 F</b>	15.0%	37.5 g	75 g
Cetareth 20 (emulsifier)	0.3%	1.1 g	2.2 g
Cetearyl Alcohol (thickener)	2.0%	5.0 g	10.0 g
Glyceryl Stearate (emulsifier)	2.2%	3.9 g	7.8 g
<b>2. Calendula Extract in VG</b>	0.2%	0.5 ml	1.0 ml
Climbazole (in 2ml Isopropanol)	0.065%	0.16 g	0.32 g
Propolis	0.2%	0.5 ml	1.0 ml
Sodium Sulfate (biofilm solvent adjunct)	0.1%	0.3 g	0.6 g
Phenoxyethanol (preservative)	0.3%	0.75 ml	1.5 ml
dl-Panthenol (B5 vitamin)	1.0%	2.5 g	5.0 g
Hydrolysed Collagen (add at 120 F)	0.3%	0.75 g	1.5 g
Pectinase Ultra SP-L (enzyme, add below 120 F)	0.2%	0.5 g	1.0 g
<b>3. Distilled Water – heat phase 3 to 160 F</b>	70%	175 g	350 g
Vegetable Glycerin (VG, surfactant)	2.0%	5.0 ml	10.0 ml
Sepiplus 400 (thickener). (Combine with VG & 2 ml Isopropanol, mix, then add PG & Ethoxy, heat to 120° F, stir, add 20 ml water, stir. Add final amount of water.)	0.15%	7 drops	15 drops
Ethoxydiglycol (Ethoxy, surfactant)	1.0%	2.5 ml	5.0 ml
Propylene Glycol (PG, surfactant)	1.0%	2.5 ml	5.0 ml
Citric Acid (reduce pH to 3.5)	0.25%	0.6 g	1.2 g
Xylitol (biofilm solvent)	2.0%	5.0 g	10.0 g
Heat, then mix part 1 & 3, stir, cool, add 2, shake.	98.27%	251.06ml	503.12ml

Ingredients that are weighed are showed in grams, or if measured by volume (in a syringe) are shown in ml. If **any** proportions in the oil phase (part 1) are modified in the slightest amount, it will be necessary to re-calculate the emulsifier percentages by entering the HLB numbers and percentages of each oil, into the calculator found at [http://www.al-nasir.com/www/PharmCalc/mob\\_exec\\_calc.php?ID=hlb](http://www.al-nasir.com/www/PharmCalc/mob_exec_calc.php?ID=hlb) , and you will need to know the HLB numbers of the oils used, which can be determined by reviewing the information at [www.lotioncrafter.com/pdf/Emulsions\\_&\\_HLB\\_System.pdf](http://www.lotioncrafter.com/pdf/Emulsions_&_HLB_System.pdf) The percentages listed in the table are not exact and don't add up to 100, but are provided so anyone can formulate new lotions with other ingredients.

This MCT lotion is minimalist, so anything that's water soluble or alcohol soluble could easily be added to the active ingredients (part 2) or substituted into the water phase (part 3). In addition, while Citric Acid makes the Climbazole more effective against *malassezia*, anyone with super sensitive skin should reduce the Citric Acid by half so the pH would be about 5.5, the skin's normal pH.

All the ingredients listed in part 1 and part 3 (except MCT oil) are available from LotionCrafter -- a couple years' worth of lotion ingredients costs about \$80.00. Whole Foods sells MCT oil. I made test batches with 20% and 25% MCT oil but those were too oily, whereas a 15% MCT oil lotion soaked into my skin, and didn't look shiny or feel greasy. MCT lotion is easy to make – the only complication is that Sepiplus 400 is much too sticky to measure through eyedropper -- I use a piece of thick wire, part of a coat hanger, to measure the drops. 1 ml and 5 ml plastic syringes are free from any pharmacist. Ingredients measured by volume are listed in ml's and ingredients weighed are listed in grams.

Heat the oil phase and the water phase in two covered, separate, Pyrex bowls, on a stove in pans with 2" of water. Heat both phases to 160° F and hold for 20 minutes, and then pour the oil phase onto the water phase, stir for 5 minutes, and with a funnel pour the hot lotion into a 400 ml or larger plastic bottle and shake it occasionally, during the next 15 minutes or so while the lotion cools. Allow four hours for the lotion to reach its final consistency.

### MCT Oil (Medium Chain Triglyceride) Body Wash

Product	%	Vol.	50% Vol.	2x Vol.
<b>1.</b> MCT Oil – heat <b>phase 1</b> to 160 F	2.0%	5.0 ml	2.5 ml	10.0 ml
BTMS 25 (emulsifier)	1.0%	2.5 g	1.25 g	5.0 g
Cetearyl Alcohol (thickener) 15.5	1.9%	4.75 g	2.37 g	9.5 g
Ceteareth 20 (emulsifier) 15.2, 45%	0.1%	0.37 g	0.18 g	0.7 g‘
Glyceryl Stearate (emulsifier) 3.6, 55%	0.1%	0.43 g	0.21 g	0.9 g“
<b>2.</b> Calendula Extract in VG	0.2%	0.5 ml	0.25 ml	1.0 ml
Climbazole (in 3x Isopropanol)	0.3%	0.75g	0.375g	1.5 g
Propolis	0.2%	0.5 ml	0.25 ml	1.0 ml
Phenoxyethanol (preservative)	0.5%	1.25 ml	0.6 ml	2.5 ml
dl-Panthenol (B5 vitamin)	1.0%	2.5 g	1.2 g	5.0 g
Hydrolysed Collagen, add at 140 F	0.6%	1.5 g	0.75 g	3.0 g
Pectinase Ultra SL-P, add below 120 F	0.2%	0.5 g	0.25 g	2.0 g
<b>3.</b> Distilled Water – heat <b>phase 3</b> to 150 F	77.5%	193 g	96 g	385 g
Vegetable Glycerin (VG, surfactant)	3.0%	7.5 ml	3.75 ml	15.0 ml
Polyglucose/Lactylate (PL, surfactant)	8.0%	20.0 ml	10.0 ml	40.0 ml
Sodium Sulfate (hard water conditioner)	0.6%	1.5 g	0.75 g	3.0 g
Sodium Chloride (hard water conditioner)	0.8%	2.0 g	1.0 g	4.0 g
Citric Acid (reduce pH to 4.7)	0.3%	0.8 g	0.4 g	1.6 g
Xylitol (biofilm solvent)	2.0%	5.0 g	2.5 g	10.0 g
Heat, then mix part <b>1</b> & <b>3</b> , stir, cool, add <b>2</b> . Mix by rotating bottle during cool-down.	100.30%	250.35 ml	125.09 ml	500.70 ml

After cool down, add 2.5% Decyl Glucoside (secondary surfactant) to increase foaming. I first compounded this on November 12, 2013. For fragrance, add 1 drop black pepper essential oil and 1 drop food grade orange oil. On January 11, 2014, climbazole was decreased to 0.1%.

On December 26, 2013, I discovered that “Pectinex Ultra SP-L” is a very effective pectinase at a 0.2% concentration in lotion, shampoo, and body wash. My reasoning is that pectinase is an enzyme, and the -ase ending means it dissolves pectin, which is a polysaccharide. The stratum corneum includes a fair amount of polysaccharides. Pectinase is an effective treatment because malassezia’s closest living relative is corn smut, a plant-pathogen fungi, and plant cells are held together primarily with pectin, so malassezia’s evolutionary forerunner had the ability to dissolve pectin in order to get a toe-hold into plant cells. Therefore, some type of fungal pectinase is a likely building block for malassezia’s biofilm-forming function on human skin, and Pectinex Ultra is acting like a surfactant to the fungal pectinase, in the same way that soap-oils dissolve grease. Do not heat it over 120 F, because it will de-nature.

On January 11, 2014, I added 0.6% collagen as a thickener. After a day, the body wash swelled nearly 2x, appears to be slightly foamy, and is much less thin.