

**It's okay to have lead in your lipstick
and answers to other beauty questions that you're dying to know**

Written by Perry Romanowski & Randy Schueller

Edited by Lily Elderkin

Copyright © 2013 by Brains Publishing

All rights reserved.

Published in the United States by Brains Publishing. www.brainspublishing.com

The authors have attempted to make this book as accurate and up to date as possible, but it may contain errors, omissions, or material that is out of date at the time you read it. Neither the author nor publisher has any legal responsibility or liability for errors, omissions, out-of-date material, or the reader's application of the advice contained in this book

First Smashwords edition

Book design: Y42K Book Production Services

<http://www.y42k.com/bookproduction.html>

Acknowledgements

Perry and Randy would like to thank ALL the members of the Beauty Brains community without whom this book would not be possible. (Especially the more prolific members of our Forum who help answer questions while asking a few of their own!) Thanks guys!

Introduction

Why should I read this book?

Read this book if you want to be a smarter shopper.

Smarter because you'll be able to spot over-hyped, over-priced beauty products. Smarter because you'll be able to shop for products you LOVE without worrying about which ingredient scare-story you should believe. Smarter because you'll be able to look your friends and family in the eyes and tell them "No, mineral oil in cosmetics does not cause cancer."

This book will change the way you think about beauty products

Being a smarter shopper, however, comes with a price. You like, many fans of our website, may find yourself turning into a "Beauty Brainiac." Symptoms of being a "Beauty Brainiac" include:

- Catching yourself reading the back of your shampoo bottle in the shower.
- Finding out who makes your favorite product and then checking to see if they make any other brands that have similar formulas for less money.
- Laughing out loud every time you hear someone talk about "chemical free" cosmetics.

Speaking of laughing, don't think that just because this book is written by chemists that it's filled with dry, scientific jargon. We're here to educate AND entertain. Don't believe us? Just check out the chapter on bizarre beauty ingredients. (Come on, be honest, aren't you DYING to know if bull semen is really good for your hair?)

Who are the authors?

We're the founders of The Beauty Brains, the #1 beauty science blog, and we've answered thousands of beauty questions over the past 7 years. In addition, we're veteran cosmetic product developers who worked on some of the most popular beauty products in the world. We've written dozens of science articles and books for Cosmetics & Toiletries, Gale Publishing, and the Marcel Dekker company. Our book, Beginning Cosmetic Chemistry is used in several college programs. Trust us, we know what we're talking about.

Perry Romanowski is a writer, cosmetic chemist, inventor, scientist, instructor, futurologist, and thought leader. He's also the founder of Chemists Corner blog and training program.

Randy Schueller is a writer, former Sr. Director of Hair and Skin Care R&D for Alberto Culver and Unilever and a member of the National Association of Science Writers.

Part 6: Does Anything Really Work?

If you've gotten this far in the book you may be thinking that the entire beauty industry is a scam and that nothing really works as well it should. That's not true at all! There are plenty of truly functional cosmetic technologies - you just have to know where to look. This chapter helps you understand what's been really proven to work to take care of your hair and skin.

Skin care/makeup questions

Does long lasting lip color really last long?

BA begs to know...I love Covergirl Outlast All Day lip color for the summer--I can boat, pool, eat, and have lovely fresh looking lips! When I put on the lipstick, I can't help but think of nail polish, because you have to let it dry. (It's safe, right?) How in the heck does it work? AND how does the top coat make it shiny and petroleum jelly remove it?

Most long lasting lip colors stay in place because the colorants stain the skin. That approach is fine, but it means that those products can only offer a limited number of shades, because not every lip color acts as a stain. Covergirl Outlast is different from other long-lasting lip colors, because it's a two part system consisting of a colorcoat and a topcoat. Let's take a look at each.

How Outlast lasts longer

As you can see from the ingredient lists below, the color coat contains colorants in a silicone and hydrocarbon base. The topcoat is made of sucrose polycottonseedate in a waxbase. The "magic" ingredient is the sucrose material, which is a cotton seed oil ester. It's an anti-transfer agent that helps keep the color from leaving your lips. Petroleum jelly is needed to remove the waxy topcoat so you can take off the color when you're ready.

Colorgirl Outlast ingredients

All-Day Colorcoat: Isododecane, Triethylsiloxysilicate, Dimethicone, Mica, Disteardimonium Hectorite, Propylene Carbonate, Propylparaben, Simmondsia Chinensis (Jojoba) Seed Oil, Camellia Sinensis Leaf Extract, Tocopherol Acetate, Flavor, (+/- CI 15850, CI 15985, CI 19140, CI 42090, CI 73360, CI 75470, CI 77491, CI 77492, CI 77499, CI 77891)

Moisturizing Topcoat: Sucrose Polycottonseedate, Ozokerite, Cera Alba, Tocopheryl Acetate, Tocopherol, Propylparaben, Propyl Gallate, Acetyl Glucosamine, Cocos Nucifera (Coconut Oil), Aloe Barbadensis Leaf Extract, Theobroma Cacao (Cocoa) Seed Butter, Butyrospermium Parkii (Shea Butter), Sodium Saccharin, Aroma.

The bottom line

Outlast does contain technology that's different from other lip colors. It's more of a hassle because you have an extra application step and it's harder to remove the color, but if all day color is what you're looking for, you should give it a try.

Will Visine help reduce skin redness?

Nelly says...I read on some other beauty website that a few drops of redness-reducing eyedrops can reduce redness and irritation from shaving. Any truth to this?

Visine (TM) is one of those products that seems to attract some wacky rumors. At one point, it was alleged that a few drops of Visine in someone's drink will induce diarrhea (not true), and it's also rumored to get rid of skin spots (it won't help with age spots or other pigmented spots). But there does appear to be some basis for using it to temporarily reduce skin redness.

How does Visine(TM) work?

The active ingredient, tetrahydrozoline hydrochloride, reduces eye redness by constricting the superficial blood vessels in the eye. It's also used to help reduce nasal congestion. There are a couple of patents that indicate that tetrahydrozoline hydrochloride (and similar compounds) actually reduces redness (<http://thebeautybrains.com/Yzyb7>) from rosacea and skin erythema. (Although it appears that penetration enhancers maybe required for maximum efficacy.) We couldn't find any information on how long the effect lasts, but when used in the eye the effect lasts for 4-8 hours. Keep in mind, however, that just because the US Patent and Trademark office has approved these patents does NOT mean that the FDA has cleared the drug for this use. There is a dark side to tetrahydrozoline hydrochloride...

Watch out for side effects

There are a number of potential side effects and contraindications for this drug (<http://thebeautybrains.com/cfyGy>). Over exposure can cause vomiting, seizures, difficulty breathing, blurred vision and can even induce coma. Some data suggest that the drug should not be used by pregnant or nursing mothers because of potential transmission to the fetus/infant. A drop or two in the eye once in a while is safe for most people. Slathering this stuff all over your face on a frequent basis is another thing altogether!

The bottom line

Given the potential side effects, we'd be very careful about using this product on skin. All drugs should only be used as directed. If you have prolonged skin redness, you're better off consulting with a dermatologist to identify and treat the underlying cause.

Are probiotics good for skin?

Susan asks...I have seen some skin lotions being sold with probiotics in them. I wonder if it actually improves the skin; maybe you could just put yogurt on your face?

According to a study published in the Journal of the Society of Cosmetic Chemists, (<http://thebeautybrains.com/3Chpb>) certain types of probiotics are good for skin!

The benefits of probiotics

Researchers studied one probiotic in particular, *Lactobacillus plantarum*, a gram-positive bacteria, and found that it produces antimicrobial peptides. When used at a concentration of 5%, these peptides have antimicrobial and anti-inflammatory properties and were shown to reduce skin erythema (redness), repair the skin barrier (help lock in moisture), and reduce bad skin bacteria (that lead to acne). At a concentration of 1%, the probiotic was ineffective, so low levels won't work.

The bottom line

The good news is that probiotics can really work if you use enough of the right kind. The bad news is that yogurt won't have the same effect, because it contains *Lactobacillus casei*, a different kind of probiotic. If you want to get the right kind (*Lactobacillus plantarum*) from natural food products, you'd have to rub sauerkraut, pickles, brined olives, or sourdough on your face. We say go with the sourdough.

Here's a secret - these 14 cosmetics are really drugs

As long time readers of the Beauty Brains already know, cosmetics, by definition, can only affect the appearance of the body. If a product affects the physiology of the body then it's a drug, not a cosmetic. So which cosmetics fall into the drug category?

OTC Monographs

In the US, these kinds of products are called "Over The Counter drugs." The Food and Drug Administration issues Over The Counter (OTC) monographs that dictate which ingredients can be used in these products and what claims they can make. Check out the list below to learn which of your cosmetics are actually drugs.

- Anti-acne products
- Toothpaste & anti-cavity products
- Topical anti-fungal
- Anti-microbial products
- Antiperspirant
- Astringents
- Corn & Callus removers
- Dandruff products
- Hair growth / hair loss
- Nailbiting products
- Psoriasis
- Skin bleaching
- Sunscreen
- Topical analgesic
- Wart remover

Why is Gold Bond lotion good enough for stylists?

Renée asks... I'm a stylist, and I just started in a new salon. I noticed that everyone uses Gold Bond hand cream after shampooing clients' hair. I always thought that was kind of a crappy, low grade product. Shouldn't they be using a better hand cream?

Gold Bond is kind of the gold standard when it comes to protecting your hands from detergent over-exposure. That's because it contains 5 times the minimum amount of skin protectant that's required by law.

The best skin protectant ingredient

The OTC (Over The Counter drug) monograph requires that a formula contain 1% or greater of dimethicone to be considered a true skin protectant product. Since dimethicone is relatively expensive, many companies will skimp on how much they use. But Chattem, Inc, the makers of Gold Bond, use 5% dimethicone in this product, which is MUCH higher than the concentration used by many other creams and lotions. In addition, they include petrolatum, another outstanding moisture barrier ingredient. Together these two ingredients help lock moisture in the skin so it can heal itself.

To be honest, we're a little surprised to see that it also contains menthol, which, on one hand, can give a cooling effect, but, on the other hand, can irritate raw skin. If you like the way it feels, it must be working for you. In any case, this is an inexpensive product that really works – there's no need to spend more money on expensive brands.

Gold Bond Medicated Body Lotion ingredients

Active: Dimethicone 5% Menthol 0.15%

Inactive Ingredients: Water, Glycerin, Stearamidopropyl PG Dimonium Chloride Phosphate, Petrolatum, Aloe Vera (Aloe Barbadensis) Leaf Juice, Cetearyl Alcohol, Stearyl Alcohol, Distearylidimonium Chloride, Cetareth 20, Propylene Glycol, Steareth 21, Steareth 2, Tocopheryl Acetate (Vitamin E), Disodium EDTA, Imidazolidinyl Urea, Propylparaben, Methylparaben, Triethanolamine, Fragrance

The bottom line

When a cosmetic is OTC drug it will tell you how much active ingredients it contains. This information helps you pick the best product. In this case, a higher level of dimethicone creates a better skin barrier.

Which retinol product is right for me?

Rebecca asks... Is OTC retinol as good as prescription? Are they effective in the same way RX retinol is? What OTC retinol has the most effective % of retinol in the ingredients list?

This is a great question, because “retinol” is easily confused with “retinoic acid,” a similar chemical that goes by a couple of different names. They both belong to a family of chemicals known as retinoids. Here’s the scoop on how to keep them straight.

Not all retinoids are the same

Retinoic acid (also known as Retin-A, tretinoin and sometimes by brand names like Accutane) is a prescription drug used to treat acne. While it is primarily known for its anti-acne properties, dermatologists noticed that it can also even out complexion and reduce fine lines and wrinkles. This makes it one of the most valuable anti-aging ingredients. However, retinoic acid is not available in any cosmetic. It can only be purchased with a prescription from your doctor.

Retinol is NOT a prescription drug. It is the alcohol form of retinoic acid. That means it’s chemically related and does have some similar skin refining properties; however, it is not nearly as effective as the acid.

Another problem with retinol is that it is not very stable and is easily oxidized. That means that exposure to oxygen, light, or even other ingredients in the same formula can render this ingredient even less effective.

How much retinol should I look for in cosmetic products?

You asked which over-the-counter product has the most retinol. Actually, a better question to ask is which cosmetic product has done the best job of stabilizing retinol in their formula. In the last few years, new technologies have been developed to allow formulators to stabilize retinol by encapsulating it with inert materials. If a product uses this kind of technology, their product will be more effective: a product with 2% retinol that is not encapsulated may be less effective than a product with 0.5% retinol that is encapsulated.

The bottom line

Do your homework before spending a lot of money on a retinol containing face cream. Look for some reassurance that the product uses encapsulating technology to protect its precious ingredient.

Which is better, a Dove bar or a regular bar of soap?

Jackie asks...Does dove really hydrate the skin better than regular old soap? I love the scent and the creamy lather...so I probably won't stop using it even if it isn't any better, but I still would like to know if I am being ripped off by another advertising gimmick.

As far as we're concerned, a Dove bar (or even a Haagen-dazs bar) is never a rip off. Oh wait, you're talking about soap...

Dove is not a true soap (and that's good!)

Dove is what is called a "syndet" bar. That means it's a mix of synthetic detergent and soap. True soap (saponified fatty acids) can be very drying to skin, whereas modern surfactants, like Sodium Lauroyl Isethionate (SCI for short) are much less drying/irritating. As you can see from the list below, SCI is the primary ingredient in a Dove bar.

Dove Bar ingredients

Sodium Lauroyl Isethionate, Stearic Acid, Sodium Tallowate or Sodium Palmitate, Lauric Acid, Sodium Isethionate, Water, Sodium Stearate, Cocamidopropyl Betaine or Sodium C14-C16 Olefin Sulfonate, Sodium Cocoate or Sodium Palm Kernelate, Fragrance, Sodium Chloride, Tetrasodium EDTA, Tetrasodium Etidronate, Titanium Dioxide.

The bottom line

If you're comparing Dove to a "regular" soap bar, then yes, it's better for your skin.

Can peptides stop facial wrinkles?

Vicky asks...Which peptides in face creams are most effective in communicating with facial muscles to cause shortening of them and therefore firming the face?

According to at least one study, acetyhexapeptide-8 is capable of reducing wrinkles associated with facial muscles.

How peptides work

This peptide allegedly works similarly to botulinum toxin, aka Botox (™), by inhibiting what is known as the SNARE complex, which results in reduced muscle contractions. But unlike Botox (™), this peptide does not irreversibly destroy a key protein – its effect is temporary. Acetyhexapeptide-8 is also supposedly able to relax the collagen and elastin matrix by altering calcium ion uptake.

The bottom line

We're skeptical, because we don't know the type and concentration of acetyhexapeptide-8 used in any given product. Still, there seems to be at least some scientific basis for using this peptide to fight facial wrinkles.

What is Topical Botox?

Karen is curious...What is a topical Botox(tm)? Does it work the same way as injectable Botox(tm)? So far, how many "In-vivo" studies have been done to check the efficacy?

Topical Botox(tm)? Yeah, right. That's right up there with anti-wrinkle lotions that work like lasers, hair growth products, Bigfoot, and the Easter Bunny. Wait a minute...what's that? There's a peer reviewed, placebo-controlled study that says this might actually work?

Promising test results for topical Botox

A 2010 study conducted by Dermatology Research Institute, LLC, Coral Gables, Florida, sponsored by Revance Therapeutics, Inc., Newark, California, found botulinum toxin type A (also known as Botox(tm)) significantly decreased lateral canthal lines (LCLs also commonly known as crow's feet) when applied from a topical gel.

It's a small study (n=36 adults), but it certainly looks promising: the results, which were statistically significant at the 99% confidence interval, showed that 50% of the panelists had a decrease in LCLs by 2 units or more on a 10 unit scale compared to a placebo control (after 8 weeks). What does all that mean? Unlike so many studies on cosmetic products, this one was done with in vivo (on real people, not just in a test tube in the lab); it was done with a proper control (tested against a gel that did NOT contain the toxin); and the results were statistically significant (which is indicative that the results will be repeatable).

Stylist.com interviewed a dermatologist (<http://thebeautybrains.com/bneqA>) who commented on the study and raised concerns, such as the fact that the effect is much less than you will see from injectable Botox(tm), and that it's likely to only work on crow's feet, because it's easier for the toxin to penetrate the thin skin around the eyes.

The bottom line

Topical Botox(tm) is apparently more reliable than Bigfoot or the Easter Bunny, which is more than you can say for a lot of anti-aging products. It will be interesting to see if further testing leads to a commercially viable product.

When is it worthwhile to spend more on pressed powder?

Jennifer just wants to know...Are all pressed powder makeup products the same, or are some brands worth spending more money on?

While we stress the importance of looking at ingredients to understand the quality of a product, there are situations where the ingredients don't tell the full story. Sometimes HOW the ingredients are put together can be tremendously important to the quality of the finished product. You don't see this in simple mixtures, like shampoos, but you do see it on more complex products, like pressed powders. Case in point: a recent article in *Cosmetics & Toiletries* revealed that the quality of a powder cosmetic products depends in part on how the powders are pulverized.

Pulverizing powders

The powders used in cosmetics can form agglomerates, or clumps. These clumps prevent the powder from having a smooth application. To avoid these clumps, powders are processed to break them into tiny particles. This is commonly done using a piece of equipment called a "Hammer Mill", which basically slams metal hammers against the powder's surface to break the pieces apart. Most manufacturers use this type of equipment.

However, a more advanced process, known as "Jet Milling," can break the particles into even smaller sizes and make them more spherical. Not surprisingly, Jet Mills cost more and are not as readily available as Hammer Mills. That means if a company wants to make a higher quality powder, they either have to invest in more expensive equipment, or they have to use a contract manufacturer that owns this specialized grinder. In either case, the use of jet milling to create a softer-feeling product results in an increased price. Therefore, it's unlikely you'll see this used in bargain products.

The bottom line

While in many (most?) cases, it's not worth spending more on expensive products, there are some exceptions. If you value elegant feel characteristics, you may want to spend more on your makeup to ensure you're getting a jet milled product. You can do a quick test to see if you like the feel of a powder by running your finger over its surface.

Is “Better Than False Lashes” mascara really better?

Karen asks...I recently read about a new Too-Faced product called "Better Than False Lashes." It uses a tube of mascara and a tube of nylon fibers. Has anyone tried this? It sounds interesting. Too-Faced promotes it as an alternative to false lashes, not as an alternative to your current mascara. Whatever. Are there any ingredients in these two products (the two tubes) that are different from other mascaras? Are there any ingredients that would make it an improvement on other mascaras?

We love to write about products with technology that differentiates them from other products. Better Than False Lashes is one of those.

How mascara works

Typical mascaras are wax-based, so they just provide a goopy thickening layer on top of your lashes. The activating mascara and top coat of Better Than False Lashes, like Blinc's Kiss Me mascara, is based on acrylic polymers, which are like hair styling gel ingredients. These polymers form a "shell" around each lash. (That's how Blinc mascara makes those little tubes.) The Flexistretch layer consists of nylon particles that give a textured effect. The combination of the two will give you an effect that is different from a regular wax based mascara.

One caveat - some people, especially contact lens wearers, have had problems with nylon fiber products, because pieces break off and get caught under the lens, resulting in eye irritation.

Better Than False Lashes Ingredients

Activating Mascara and Top Coat: Water/Aqua/Eau, Acrylates Copolymer, Propylene Glycol, Paraffin, Ozokerite, Phenyl Trimethicone, Hydrogenated Vegetable Oil, Glyceryl Stearate SE, Stearic Acid, PVP, Glycol Montanate, Cera Alba/Beeswax/Cire d'abeille, Triethanolamine, Silica, Magnesium Aluminum Silicate, Hydrogenated Palm Acid, Stearyl Stearate, Synthetic Wax, Nylon-66, Phenoxyethanol, Methylparaben, Ethylparaben, Propylparaben, Butylparaben, Isobutylparaben, Sodium Dehydroacetate, Black 2 (CI 77266).

Flexistretch Nylon Fibers: Nylon-66, Dimethicone, Paraffinum Liquidum/Mineral Oil/Huile minérale, Phenoxyethanol, Methylparaben, Ethylparaben, Butylparaben, Propylparaben, Isobutylparaben, Titanium Dioxide (CI 77891).

Can I use baby shampoo to remove make-up?

Laura would love to learn...Can I use baby shampoo to wash my face/remove make-up effectively? I have read on beauty blogs that you can basically just wash your face with baby shampoo (the tear-free ones) to remove even stubborn eye make-up...Is that true? We could save some serious money this way.

The Beauty Brains LOVE questions about saving money on beauty products!

3 types of makeup removers

There are three basic types of makeup removers. The first is the oil based type that remove makeup based on the principle that like dissolves like (i.e., oily stuff will dissolve oily stuff). These are typically mineral oil based. Then there's the "oil free" type, which work the same way but are based on silicones instead of mineral oil. And finally, there's the water based type that are weak solutions of mild surfactants (detergents). And guess what, that's exactly what a baby shampoo is! Here are a few examples to illustrate the point:

Makeup remover and baby shampoo ingredients

Lumene Sensitive Touch Gentle Eye Makeup Remover \$5.99 for 3.4 fl oz (\$1.76/oz)

Water, Disodium Cocoamphodiacetate, Polysorbate 20, Methylpropanediol, Glycerin, Sodium Chloride, Hydroxyethylcellulose, Polyaminopropyl Biguanide, Citric Acid, Linum Usitatissimum (Linseed) Extract

Maybelline Maybelline Expert Eyes 100% Oil Free Eye Make-Up Remover \$4.49 for 2.3 fl oz (\$1.95/oz)

Water, Propylene Glycol, Polysorbate 20, Boric Acid, Sodium Trideceth Sulfate, Disodium Lauroamphodiacetate, Hexylene Glycol, Isopropyl Alcohol, Phenylethyl Alcohol, Chlorhexidine Digluconate

Walgreens Baby Shampoo \$3.99 for 20 fl oz (19 cents/oz.)

Water, Cocamidopropyl Betaine, PEG-80 Sorbitan Laurate, Sodium Trideceth Sulfate, PEG-150 Distearate, Fragrance, Polyquaternium-10, Tetrasodium EDTA, Quaternium 15, Citric Acid, Yellow 10, Orange 4

The bottom line

The types of detergents used in these products are similar, and in some cases identical, to baby shampoo, yet the baby 'poo costs a LOT less. You might have to dilute the shampoo a little bit, but as long as you mix it up fresh each time, you should be fine.

(And here's another secret money saving tip: you can use baby wipes to remove makeup too.)

Can soap really kill germs?

Minnie must know...I often get contact dermatitis on my hands from soaps (liquid, soapbars or even the "mild" ones). I understand a good hygiene is necessary to prevent spreading of bacteria and virus, but how effective really is soap (surfactants) when it comes to killing germs in the first place? Is there an effective alternative that is not so irritating/dehydrating? In other words, what surfactant is the mildest on the market, and does it work on germs?

A quick literature review, courtesy of PubMed, should help answer your question.

Do you need soap?

According to a research paper entitled "The effect of handwashing with water or soap on bacterial contamination of hands" (<http://thebeautybrains.com/2u5i6>), water alone won't cut it (at least not for bacteria of fecal origin). The researchers found that not washing hands resulted in a 44% contamination rate. Washing with water alone dropped the contamination level to 23%, and washing with non-antibacterial soap showed only 8% contamination. So clearly, even regular soap is much better than rinsing with water alone.

Do you need antibacterial soap?

Okay, so you do need to use soap to control bacteria. But do you need special antibacterial soap? Another study (<http://thebeautybrains.com/MzbiJ>) found that that "although differences in efficacy between antimicrobial and non-antimicrobial soap were small, antimicrobial soap produced consistently statistically significantly greater reductions" (Ref. 2) When it comes to keeping your hands free from bacteria, it looks like soap is a MUST have and antibacterial soap is NICE to have.

The bottom line

If surfactant mildness is your concern, look for a hand soap (okay, actually, it's detergent, not soap) based on an ingredient called "Sodium Cocoyl Isethionate (or SCI for short). This is one of (if not the) mildest surfactant on the market. We've blogged before about how it's used in the mildest body washes and shampoos. You can use hand sanitizers, but those are often alcohol based and may be drying to your skin.

Is stage makeup better than regular makeup?

Becky asks...I'm always on the lookout for a cosmetic product that is both better and cheaper than what I'm already using. Looking around on the internet, I read about color cosmetics and skin care lotions, made for stage and film, from brands like Graftobian, Ben Nye, Kryolan, Cinema Secrets, and Mehron. I'm tempted to try them. Has anyone had any experience with this kind of product? Also, are stage cosmetics made any differently from other makeup? Is there any reason why someone shouldn't wear them as everyday makeup?

Based on the ingredients used in stage makeup, it looks like the answer is “sometimes not different at all,” “sometimes a little different,” and “sometimes a lot different.” How’s that for a definitive response? Well, at the risk of over-elaborating, let’s review a few examples from Mehron makeup, one of the self-proclaimed leaders in theatrical cosmetics.

Stage makeup composition

Not different

Let’s look at the Velvet Finish Primer used to provide a smooth base for makeup application.

This product uses ingredients that are identical to those in Smashbox and other makeup primers. You know what else? Monistat bikini chafing gel makes a good makeup primer, because it uses the same ingredients! So, there’s no benefit in buying special stage makeup primer.

A little different

What about more traditional makeup, like eyeshadow and lipstick? Here are two more Mehron examples. If you’re a fan of reading ingredient lists (see below), these chemicals should be familiar. That’s because they’re the same basic ingredients used in every lipstick and eyeshadow. In the case of stage makeup, though, some ingredient levels are increased to improve longevity. While it’s worth it for performers to ensure that eyeshadow doesn’t crease, you may not like the way the product feels (or looks like up close). Unfortunately, the only way to know for sure is to try it for yourself.

A lot different

Greasepaint is a good example of a stage makeup that’s extremely different than drug store products. Foundation Greasepaint contains pretty standard ingredients, but the oil phase is heavier than a traditional foundation. It’s designed to deliver a heavy coating of pigment so that other colors can be applied on top of it (think “clown face”). It’s also specially formulated not to crack or crease. You’d never wear anything this heavy or pigmented like that in your private life. (Okay, maybe you do, but we promise not to judge.)

Velvet Finish Primer Ingredients

Cyclomethicone, Dimethicone, Dimethicone Crosspolymer, Ascorbic Acid (Vitamin C), Aloe Barbadensis (Aloe Vera) Leaf Extract.

Eye shadow Ingredients

Talc, Zinc Stearate, Magnesium Carbonate, Nylon-12, Octyl Palmitate, Dimethicone, Capric/Caprylic Triglyceride, Propylene Glycol, Diazolidinyl Urea, Methylparaben, Propylparaben. May Contain: Titanium Dioxide (CI 77891), Ultramarines (CI 77007), Iron Oxides (CI 77489), D&C Black #2 (CI 77266), FD&C Blue #1 Lake (CI 42090), Chromium Oxide Greens (CI 77288), FD&C Yellow #5 Lake (CI 19140), Mica.

Lipstick Ingredients

Castor Oil, Pentaerythrityl Tetracaprylate/Tetracaprate, Hydrogenated Castor Oil / Sebacic Acid Copolymer, Candellila , C10-30 Cholesterol / Lanosterol Ester, Microcrystalline Wax, Ceresin , Carnauba , Aloe Barbadensis Leaf Extract, Tocopheryl Acetate (Vitamin E), Methylparaben, Propylparaben. May Contain: D&C Red 6 Lake (CI 15850), D&C Red 7 Lake (CI 15850), Mica.

Foundation Greasepaint Ingredients

Mineral Oil, Ozokerite, Petrolatum, Lanolin, Isopropyl Lanolate, Sorbitan Sesquioleate, Fragrance. May Contain: Titanium Dioxide (CI 77891), D&C Red 7 Lake (CI 15850), D&C Red 6 Lake (CI 15850), Ultramarines (CI 77007), D&C Yellow 5 Lake (CI 19140), Chromium Oxide Green (CI 77288), Iron Oxides (CI 77489), Aluminum Powder (CI 77000), Mica (CI 77019), Talc.

The bottom line

Stage makeup is formulated with the same pallet of ingredients as regular cosmetics. In some cases, the formulas are exactly the same as drug store products. In other cases, they are amped up to be more crease resistant and sweat proof, to stand up to the rigors of performing. If you experiment, you might find some stage makeup that you like better than your regular brands. But stay away from greasepaint unless you want to end up looking like a clown.

Orange Juice and Alcohol – A New Skin Protector

We've generally been critical of the "beauty from within" trend in the cosmetic industry. There is little evidence that taking products like vitamins and herbal extracts will have any noticeable effect on the condition of your skin. Certainly, having a well-balanced diet can ensure you have healthy-looking skin, and if you are malnourished it's going to wreak havoc on your skin, but there is little evidence that when healthy people take supplements they can improve their skin.

But this doesn't mean what you eat can't have a significant impact on your skin.

Screwdriver for skin

Here's a study reported on in Dermatology Times (<http://thebeautybrains.com/xL73K>) that shows alcohol consumption can reduce the antioxidants in your skin and cause you to be more susceptible to sun burns. Interestingly, it took 8 minutes for the reduction in antioxidants to occur and the decrease lasted 70 minutes.

The effects were reduced when people drank the alcohol with orange juice. Presumably, scientists wanted to see how things were affected with the addition of a food that was rich in antioxidants. This indicates that if you are going to drink alcohol in the sun, be sure to have drinks that contain antioxidant rich juices. Of course, the study was done using 6 volunteers, so we wouldn't put too much faith in the conclusions. More work needs to be done.

This does suggest a new product idea for the "beauty within" trend. Could an alcohol manufacturer team up with a cosmetic company to produce skin safe cocktail mixers that people drink during outdoor festivities? Skin Safe Beer anyone?

How is sunblock different from sunscreen?

Misty asks...Do zinc oxide and titanium dioxide in products give sun protection the same way?

Yes, Misty, zinc oxide and titanium dioxide have the same mode of action: They are both minerals and they both physically scatter the rays of the sun to prevent sunburn.

How is sunblock different from sunscreen?

These minerals are generally referred to as sunblocks, which describes the mode of action of blocking the sun's rays. Compare that with the alternatives, which are typically referred to as "chemical sunscreens." (Note: To be accurate, ALL these ingredients are chemicals. And sun "block" versus sun "screen" is not strictly a technical term either. But this is how the market has historically referred to these ingredients, so we'll follow that convention for now.)

Sunscreens work by absorbing UV rays and changing them into a different wavelength of light that is not harmful to skin. Because sunscreens are chemically reactive, they can cause skin irritation, especially at higher concentrations. This is why you see so many concerns raised about chemical sunscreens and photosensitivity. Oxybenzone, octyl salicylate, and octyl methoxycinnamate are examples of UV absorbers.

Pro and con

If both types of ingredients provide the same benefit, yet chemical sunscreens have potential irritation concerns, why doesn't everyone just use mineral sunblock? Until fairly recently, the reason was that sunblocks were not very aesthetically pleasing to use. Because of their large particle size, these ingredients always left a white film on the skin. (Think of the noses of the life guards at your local pool.) In the last several years, mineral sunblocks with smaller particle sizes have been developed to reduce this whitening effect. However, concerns have also been raised that micronized titanium oxide can penetrate the skin and cause other health issues.

The bottom line

Sunblocks and sunscreens work differently to accomplish the same goal. Even though the products we have right now are not perfect, they're better than risking skin cancer by wearing nothing.

Rhamnose: Anti-aging miracle or marketing ploy?

Erica asks...Vichy has created a much publicized rhamnose based anti aging line, called Liftactiv. They claim rhamnose is a very important patented discovery and that it stimulates the papillary dermis, causing it to produce new skin cells, collagen, etc. Is it true or is it the usual marketing ruse?

Vichy, for those who may not be familiar with the brand, is the self-proclaimed "number 1 skincare brand in European pharmacies." Vichy is also owned by L'Oreal, so they have access to deep pockets for R&D spending.

Liftactiv day cream

According to Vichy's website, there are 13 Liftactiv products, 3 of which contain 5% Rhamnose. (see below for the day cream ingredients)

So what's the big deal about this product? Aside from the standard "reduces the appearance of wrinkles" claims, here's what Vichy says about Liftactiv:

"Our breakthrough formula features Rhamnose, a naturally derived plant sugar extracted in its purest form. Rhamnose in a 5% concentration has been clinically proven to improve skin rejuvenation at the source, improving collagen production, elastin production and cellular turnover."

These are pretty bold claims to make and would require significant research. Is there anything to back this up?

What does Rhamnose do?

According to a study from PubMed (<http://thebeautybrains.com/rE9Ut>), in vitro lab tests on cell cultures (i.e., testing done in a "glass dish"), show that cell cultures treated with rhamnose and other similar compounds produced fewer aging byproducts (known as Advanced Glycation Endproducts or AGE). These results suggest that rhamnose could be an effective anti-aging agent. Of course, laboratory testing alone does not demonstrate that the benefit will be seen when used on real people, but surprisingly (at least to us), there is an in vivo study that backs up the laboratory testing.

Clinical testing

According to a paper presented by L'Oreal (<http://thebeautybrains.com/LReej>), the effectiveness of Rhamnose has been confirmed by in vivo testing. A rhamnose containing lotion and a placebo lotion were applied twice a day for 8 weeks to the internal side of forearms of female volunteers between the ages of 50 and 70. Clinical and histological measurements were taken before and after treatment, and the results showed "a significant increase of pro-collagen I expression at papillary dermis level and considerable epidermis thickening..." This looks to be a properly designed test, but since we were unable to review the entire study protocol, we're concerned that measured effects may be statistically "significant", but may not be large enough to be observable to the user. We're still skeptical, but it's refreshing to have at least some basis for believing this technology works.

The bottom line

We're quick to call bullsh*t if there's no evidence of a product providing a differentiated benefit. However, in the case of Vichy's Liftactiv, based on the limited information we've been able to find, it appears that rhamnose MAY provide a measureable anti-aging benefit that other products don't. Whether or not you want to gamble \$50 to find out if you can tell a difference on your skin is up to you. (You may also want to keep an eye on other, less expensive, L'Oreal brands in case they decide to leverage this technology beyond Vichy.)

Will water cure my dry, flaky scalp?

Marta muses...I have a dry scalp. My hair had a lot of dry flakes from leave in conditioner applied every day for 2 weeks. I sprayed my hair with a spray bottle of water and my dry scalp was gone. Also I sprayed my hair with water and it was so soft because of build up of leave in conditioner... After I wash my hair is it possible for me use just water to get my scalp clean and my hands to remove flakes? Also, can I just leave conditioner in my hair and react it with water? It makes so much sense, because most products contain water, and just spraying water to the product reactivates it, so I can skip applying and save product and money.

It sounds like you may be barking up the wrong tree, dry scalp-wise.

Causes of dry scalp

Spraying your hair and scalp with water certainly won't get rid of dandruff flakes. Depending on what kind of leave in conditioner you're using, though, the water could be rehydrating the dried residue from the product. As a short-term solution, this is fine, since the additional water will distribute the conditioner through your hair and temporarily refresh your style. However, it's not advisable to leave product residue on your scalp for long periods of time. This could even be contributing to scalp itching, which might make your dandruff worse.

The bottom line

If dry scalp/dandruff really is the cause of the flaking, try one of the over-the-counter drug dandruff shampoos that contain an active ingredient like salicylic acid, zinc pyrithione, coal tar, or selenium sulfide. To save money, buy the cheapest dandruff shampoo you can find, as long as it contains one of these approved drug ingredients.

Is salicylic acid really not effective against acne?

Sally says...Today I saw my dermatologist. When I told him that for the past 10 years I have been using salicylic acid to avoid pimples, he told me that it is now known that salicylic acid does absolutely nothing to help acne. I haven't heard this before, and honestly, it seems that I get a few pimples whenever I skip a few days of using a Paula's Choice salicylic acid product. (Is it placebo effect?) Has anyone else heard about this?

This would be a shocking development, since salicylic acid has been an approved anti-acne drug for years!

What does the recent research reveal?

We did a search of PubMed literature for recent (2010-2012) peer reviewed scientific journal articles on the subject of acne and salicylic acid. Any new discoveries about this trusted ingredient no longer working would certainly be reported here. Here's what we found:

One article (entitled Management strategies for acne vulgaris <http://thebeautybrains.com/8jlqA>) said "Mild acne responds favorably to topical treatments such as benzoyl peroxide, salicylic acid, and a low-dose retinoid."

Another, (Salicylic Acid Peels Versus Jessner's Solution for Acne Vulgaris: A Comparative Study <http://thebeautybrains.com/s1PJj>) said "In terms of noninflammatory acne lesion counts, sites treated with salicylic acid showed significant improvement."

And a third (Topical antimicrobial treatment of acne vulgaris: an evidence-based review <http://thebeautybrains.com/5PCQJ>) looked all the way back to 2004 and reported..."Although they have not been extensively studied, alternative agents including dapson, salicylic acid, azelaic acid, and zinc are safe and efficacious when combined with traditional therapies."

Based on this quick review, there seems to be nothing that contradicts the conventional knowledge that salicylic acid is an effective anti-acne agent.

The bottom line

We're not sure where your dermatologist is getting his or her information, but until we see evidence to the contrary, we say that salicylic acid is still effective against acne.

How can I tell which wrinkle creams really work?

Angie asks...What is your go-to anti-aging/wrinkle product? I've been trying the new StriVectin-SD for about 5 weeks now and my face feels softer and looks healthier. They say it takes about 8 weeks to see full results, so I'll let you know how it goes!

To be honest, we haven't heard great things about StriVectin, but we are big fans of testing products for ourselves rather than just accepting the marketing hype.

How to test your own wrinkle cream

Case in point: Autumn Whitefield-Madrano (who runs a terrific blog called "The Beheld" (<http://www.the-beheld.com>) has done a "split-face" experiment using Neutrogena Rapid Wrinkle Repair. While this kind of study doesn't take the place of a controlled clinical study, it does demonstrate the kind of critical thinking that the Beauty Brains champion. So, Autumn has graciously agreed to share her experimental results with our readers. Enjoy! (You can view Autumn's pictures on the Beauty Brains blog. <http://thebeautybrains.com/KaaBS>.)

Wrinkle Cream Assessment (by Autumn Whitefield-Madrano)

At age 34, I'm only just now tiptoeing into the world of anti-aging creams. My inborn skepticism has always led me to believe that most creams are snake oil—but when I started seeing fine lines creep up on my face, even snake oil viscerally seemed like it just might be worth a shot. The best way to test its efficacy—not in some company's lab, but on me? Applying anti-aging cream to half my face for a month.

The results

Well, the cream (Neutrogena Rapid Wrinkle Repair, for the curious) lived up to its eponymous claim: It did rapidly "repair" my wrinkles, to a degree. I could tell a difference in the length and depth of the fine lines that crinkle up beneath my eyes when I smile, and so could 59% of people who examined close-up photos of my face. (Only 15% of people guessed flat-out wrong; the rest couldn't tell a difference.)

Visualizing with Visia

I went in for a Visia skin analysis, which confirmed what I'd detected: There were fewer wrinkles on the treated side of my face. But when the spa director at Sensitive Touch in New York looked more carefully at the other results of my Visia scan, she advised me to stop using the cream altogether. Visia showed that I had more spots and irritation on the treated side of my face. The difference between the halves of my face wasn't dramatic—about as dramatic as the "wrinkle repair"—but it begged the question: At what point is the tradeoff of mild skin damage for mild wrinkle improvement no longer worth it?

The cream's packaging clearly instructs users to discontinue use if signs of irritation or rash appear. But as anyone who's used even a mild retinol knows, skin irritation isn't some kooky, infrequent side effect, like, say, the weird dreams that accompany anti-smoking drug Chantix. We expect that irritation—when half my face started seriously flaking a week into the experiment, I took it as par for the course. But that was just the visible side effect: Had I not had a high-tech skin analysis done, I might not have realized that my skin was continually being irritated, even after it had adjusted as seen by the naked eye. (I'll admit that the peculiarities of my experiment prevent me from

getting too up in arms about it: A half-face of flaky, peeling skin is even weirder-looking than a full face of the same.) Plus, the cornucopia of sunscreen agents in this particular ensures better broad-spectrum protection...but one of those agents, homosalate, is known for drying and tightening the skin.

Pros and cons

The series of tradeoffs—broad spectrum protection for heightened chance of irritation; mild retinol benefits for mild retinol damage—might be worth it for some. Frankly, I'm not sure it's worth it for me—but I'm not sure it's not worth it, either. I think my reluctance indicates that scientific proof of a treatment's efficacy isn't really what I'm after when I spend that meditative moment applying cream every night. I'm more after the idea that I'm doing something brief but concrete to help myself age gracefully. The cream I used has a nice feel (love that dimethicone!), making me feel like every night I was indulging myself (well, half of myself) in a feminine ritual. I know that sunscreen, yoga, and getting my five-a-day are the true routes to aging gracefully—but despite its underwhelming visible effects, I just may keep this cream as a companion along the way.

Hair care questions

Does silicone really nourish hair?

Joan asks...Could you please help with these two products (Phillip Kingsley's Elasticizer and Phytodefrisant)...are they nourishing or just bunch of silicones?

First, let's be clear about what "nourish" means in the context of hair care.

Is there a difference between "nourish" and "condition"?

You can nourish garden plants by adding water and fertilizer to the soil they grow from. But hair that has already grown out from your scalp can't be nourished like that, because it's dead. All you can really do is condition it. The definition of conditioning, according to "Conditioning Agents for Hair and Skin," is as follows:

"A product can be said to have conditioning properties if it improves the quality of the surface to which it is applied, particularly if this improvement involves correction or prevention of some aspect of surface damage."

This point is often lost because the cosmetic industry uses so many synonyms for "condition." But when it comes to hair, condition, nourish, moisturize, revitalize, replenish, restore, and vitalize all basically mean the same thing.

Which ingredients provide the best conditioning?

While it's true that some conditioning agents (like coconut oil) do have the ability to penetrate hair and help strengthen from within, the vast majority of ingredients work by coating the hair. If left on the hair, almost any kind of oil will provide some degree of conditioning, but these can also leave hair feeling greasy and weighed down. Other ingredients, like cationic conditioners and silicones, are designed to remain on the hair after rinsing, and they provide superior lubricity and shine.

Elasticizer versus Phytodefrisant

The Phillip Kingsley product is a relatively standard rinse out conditioning treatment, which is based on silicones and cationic polymers. The Phtyo product, on the other hand, doesn't contain any traditional conditioning agents. It's all plant extracts and is designed to give your hair texture during heat styling. Since it's not rinsed out, the starchy plant materials are left in the hair, where they will provide texture. There's no scientific data, however, to back up their claim that the "straightening effect is cumulative with continued use." So, if you want the most "nourishment" for your hair, Elasticizer will give you the most benefit. If you want an "all natural" styling product, then try the Phytodefrisant Botanical Hair Relaxing Balm.

The bottom line

In reality, silicones are just as "nourishing" as any other ingredient that you can put on your hair.

Does Joan Rivers Great Hair Day really work?

NC asks...I have a guilty pleasure - I watch the bitchy fashion show with Joan Rivers. I heard she has some kind of miracle hair product that restores hair. More beauty BS, I assume? Come on, Brains, what's the scoop?

The product in question is "Great Hair Day" by Joan Rivers. It's essentially a colored powder that "fills in" the areas where your hair is thinner. This product is a pressed powder packaged in a compact.

Does Great Hair Day really work?

We haven't tested this specific product, but we do know that the general approach of using powder to conceal thinning hair can work with the right formula. For example, we tested Toppik Hair Building fibers and found that it works surprisingly well because it contains tiny keratin fibers that sort of "flock together" with your hair fibers. The result of this fiber building action is that Toppik actually improves the appearance of hair volume.

Compare that with the Joan Rivers' formula, which is basically talc and some polymers. It's more like a foundation than a fiber-building formula. It appears to be designed to just cover up the light covered, shiny scalp that peeks through as your hair starts to thin.

Joan Rivers Great Hair Day Ingredients

Talc, microcrystalline cellulose, kaolin, mica, polymathy methacrylate, boron nitride, vp/hexadecene copolymer, fragrance, isododecane, dehydracetic acid, salicylic acid, benzoic acid, phenoxyethanol, propylene carbonate, benzyl alcohol, disteardimonium rectorate, biotin oily tripeptide-1, oleanolic acid, apigenin, peg-40 hydrogentated castor oil, ppc-26 buteth-26, water, butylene glycol, benzethonium chloride, polyquaternium-7, polyquaternium-39, methicone, May contain iron oxides, titanium dioxide, chromium oxide

Toppik Hair Building Fibers Ingredients

Keratin, Ammonium Chloride, Silica, DMDM Hydantoin, May Contain: FD&C yellow 5, D&C red 22, D&C red 33, FD&C blue 1, D&C green 5, D&C orange 4.

The bottom line

If you're trying to stop your scalp from showing through thin hair, then Great Hair Day may be fine for you. If you're trying to actually make it look like you have more hair, we'd recommend Toppik. Both products have to be applied daily (assuming you wash your hair) and are about equally expensive (they'll cost around \$25).

Is there such thing as a humidity resistant gel?

Monica asks... I live in MD, and even in the cold it be high humidity. My hair always get poofy in a day after I apply gel. I like my hair to be shiny, have nice defined curls, and not be crunchy. I'm African American, and if I don't use a styling gel my hair will look like a Michael Jackson bush lol. I did my own research and learned that its the PVP that draws moisture, even through I use serum with dimethicone. What ingredients are effective for holding my curls in high humidity? I read that polyquaternium -4 is supposed to be good in holding hair in humidity with little build up, soft feel , and good wet and dry combing. Also polyquaternium -11 is good, but more moisturizing, and PVP/PVA is good because of the mixture of both. I was thinking about using Aussie Instant Freezing Sculpting Gel because of the Polyquaternium 4. lol help... me....

We're always surprised to see products that still use PVP, since there are so many superior ingredients to choose from.

PVP = Polyvinylpyrrolidone

You're absolutely correct about PVP. It will give a crispy feel to your style, but it absorbs moisture like crazy, so it's not a good choice when used by itself. A PVP/VA mixture is better, but still not ideal. And the Polyquaterniums are good for soft feel and combing properties, but they don't provide a very strong hold.

So which ingredient is best for providing solid hold that's moisture resistant? The best we've ever seen is VP/Dimethylaminoethylmethacrylate Copolymer, aka Gaffix™ VC-713 (kinda just rolls off your tongue, doesn't it?) This polymer provides superior holding power even at low use levels and has outstanding high humidity resistance. Just be warned that it won't give you the same kind of crunchy feel as PVP. Here are a few products formulated with this Gaffix.

The bottom line

Some of the best high humidity hair gels include: Pantene Pro-V Curly Hair Style Curl Shaping Hair Gel, Extra Strong Hold TRESemme Tres Gel Extra Hold, and L'Oreal Studio Line Mega Gel, Max Hold (but it contains alcohol).

What are cationics and why are they stuck to my hair?

Gerry asks..I read that cationic surfactants stick very close to the hair because of their charge, so they can't be rinsed off with water. Which shampoo do I have to use to avoid a build up? Is a build up possible at all? Can I use soap for this, too?

“Cationic” is a chemist’s way of describing a surfactant that has a positive charge. Many, but not all, cationics have a chemical name that ends in an “-ium” (like Polyquaternium-7.) There are also anionic (negatively charged) and non-ionic (non-charged) surfactants.

How do cationics condition hair?

Damaged hair has a negative charge, and opposite charges attract, so cationics make good conditioners because they will stick to the damaged spots of hair. This charge interaction helps them deposit on hair during rinsing, but the attraction is not like glue, which would make them hard to remove. It’s more like the static electrical stickiness a balloon has after you rub it on a sweater. The attractive force is relatively easy to overcome, which means that washing with almost any regular shampoo will remove them. If you find that your regular shampoo feels like it’s leaving something behind, that’s because most shampoos these days have some conditioning agents built in. In that case, use a clarifying shampoo and you should be just fine.

By the way, as a rule of thumb you should avoid using soap on hair (especially if you have hard water), because the soap can react with the mineral ions to form a residue that leaves your hair feeling raspy and looking dull.

Does mira oil really grow hair?

FMC asks...Is mira hair oil really worth a try?

Before we answer your question, we have a question of our own: What the heck is mira oil??

What is mira oil?

It turns out that this oil has been used in India for centuries. Apparently, it's a blend of several natural plant oils. While we couldn't find an exact description of its composition, this site (<http://thebeautybrains.com/hj0wK>) says that mira oil contains a plant extract known as ecliptha alba. One of its purported abilities of mira oil is to help hair grow faster. But does it really do anything?

The magic of mira oil

Surprise! There MAY actually be something to this stuff. We found studies published on PubMed (<http://thebeautybrains.com/CjEwQ>) that indicate that ecliptha alba extract may stimulate hair growth. Of course, that doesn't mean that the mira oil that you buy on the internet works, because the active ingredient could be in a different form, or used at much lower concentrations, than in the published studies. For example, both studies evaluated an alcohol or ether soluble portion of the extract, not the oil soluble portion that you'd expect to find in mira oil. Still, it's an intriguing possibility.

The bottom line

We wouldn't rush out and spend a lot of money on mira oil until we see further research, but at least there's a kernel of scientific fact behind this product's claims.

Does any hair repair technology actually work?

Michelle asks...Are there ANY hair products out there that can actually reconstruct/repair hair (as opposed to just protecting it from further damage)?

This is a great question, because one of our pet peeves is all the products that claim to repair hair but don't. When you actually look at the science behind those products, you find that they are almost always "regular" conditioners. That means they are very good at smoothing the cuticle and helping to prevent future damage, but they do nothing to truly repair hair.

Does any hair repair product really work?

There is hope, however, because of one new technology that works differently. This technology is based on a PolyElectrolyte Complex, or PEC for short. This PEC complex consists of a negatively charged ion (PVM/MA copolymer) and a positively charged ion (Polyquaternium-28.) This combination of positive and negative charges creates a single complex with the unique ability to stick to damaged hairs and to itself.

How does PEC technology repair hair?

What does all this mean? Well, instead of just coating the outside of hair like most conditioners do, the tiny PEC molecules are able to enter the split ends of hair. Because the complex can stick to the damaged hair, protein, and other complex molecules, it creates little bridges across the open ends of the splits. As your hair dries, the water evaporates from the complex, causing it to contract. The force of this contraction pulls the end of the split hairs back together again. Once the PECs are dry, they bind the split end shut.

The bottom line

If you want hair repair that lasts longer than one shampoo, look for brands that sell products containing PEC technology like Nexxus, Joico, and Treseemme

Heat Protection Products For Hair

Heat styling is the most popular way to straighten and shape your hair. Unfortunately, it can also be very bad for you. This article explains why high temperature styling is bad for hair and tells you which ingredients to look for to protect your hair from heat.

Why heat is bad for hair?

Heat exposure causes three types of hair damage: 1) decomposition of hair pigment (melanin) which cause changes in hair coloration; 2) damage to the fiber surface, which makes the hair feel rough and look dull, and 3) weakening of internal hair proteins, which can result in increased breakage. These effects are greatest when hair is exposed to temperatures above 130C. Blow dryers, curlers, and flat irons are all capable of inflicting significant heat damage.

How do heat protection products work?

No one knows for sure, but here are three possible theories to explain how heat protection products work:

Uniform heat distribution

Products that leave a “buffering” layer on hair can prevent direct contact between the heating appliance and the hair surface. This protective layer can help minimize local overheating effects.

Reduced heat conduction

Almost any product that makes the hair more slippery can claim heat protection, because if the flat iron or curling iron slides through the hair more quickly, there is less likelihood of damage. This effect can reduce heat conduction and therefore decrease damage.

Oxidation-prevention

At least one study, *J. Cosmet. Sci.*, 49, 245-256 (July/August 1998), suggests that the thermal decomposition of hair protein is caused by an oxidation reaction. Since oxidation and reduction are opposite chemical reactions, a reducing chemical like sodium bisulfite or ascorbic acid may stop the damaging reaction.

How is heat protection measured?

Heat protection can be measured using a variety of experimental techniques. Three common methods are: 1) Combing analysis to measure increases or decreases in hair surface roughness, 2) Fluorescence spectroscopy to analyze the breakdown of hair protein (usually tryptophan), and 3) Texture analysis to show changes in the mechanical properties of hair tresses.

Which ingredients really work?

There are dozens (hundreds? thousands?) of products that claim to protect hair from heat damage. Do they really work? The scientific literature shows only a few chemical compounds that have been studied and shown to provide a real, measurable benefit. For best results, look for leave-in treatment products that have these ingredients in listed toward the top of the ingredient list (in the first 5 ingredients or so):

- PVP/DMAPA acrylates copolymer
- Hydrolyzed wheat protein
- Quaternium 70

(This doesn't mean these are the ONLY ingredients in the universe that really work, but these are the only ones that have published data. Strong reducing ingredients that work by the oxidation-prevention mechanism described above are not recommended, because they may cause other types of hair damage.)

The bottom line

Regardless of which heat protection ingredients you choose, be careful not to confuse "heat protection" with "heat activation." Activation simply means the product undergoes some kind of change when heat is applied. Typically this refers to setting agents (in technical jargon, thermoplastic resins), which melt at the temperature of blow dryers or irons, and therefore form tighter bonds with the hair.

Does purple shampoo for silver hair really reduce brassy tones?

Donna says...Ever since I've been dying my hair blonde, I've been told by many people to treat my hair with a "purple/silver" toning shampoo or conditioner every few days to help prevent my hair from getting a brassy tone to it. Supposedly, this works by 'color theory', in that the purple toner in the shampoo is able to cancel out the brassy yellow colors in the hair. An example of such a product is the AG Sterling Silver line, one that I've been using myself (although I'm still skeptical). My question is, do these types of products actually work to keep brassy colored hair at bay?

There is a good bit of science at work here, but don't get your hopes up too high. Here's why:

The cause of yellow hair

Back in the late '60s or early '70s, companies recognized the need for shampoos focused on the problems of people with gray or silver hair. Specifically, consumers complained about their silver hair developing a yellowish cast. The yellowing effect could come from protein degradation, lipid oxidation or perhaps even residue from other haircare products. And it makes sense that it would be apparent on silver hair; subtle shifts in color are more visible on such a light background (hair that doesn't have any dark pigment). Regardless of the cause, women (and men) wanted some way to stop their silver mane from looking like it had been peed upon. (We exaggerate for dramatic effect but you get the idea.)

Colors can cancel

Enter an enterprising chemist who remembered the basic physics of the color wheel. The color wheel shows that colors that are at opposite positions have wavelengths that will cancel each other out. So, if one wanted to cancel the color yellow, one would look across it on the color wheel and find violet. Then, pulling out their trusty cosmetic ingredient dictionary, this chemist would have likely found that a dye, External Violet 2, has two very important properties: first, it produces an intense violet color, and second, it can stain surfaces like hair and skin. Being water-soluble, Ext Violet 2 is easy to incorporate into shampoos at sufficiently high levels, where it can sustain hair. When done properly, this light violet stain is enough to counteract the yellow cast of hair, thereby returning hair to its true silver shade.

What about blond hair?

Unfortunately, the effect of violet dye shampoos on blonde hair will be very subtle, if there is any effect at all. Unlike silver hair, which has a slight yellow cast that really stands out from the background, blonde hair essentially consists of ALL yellow shades. Canceling out a little bit of yellow on a very yellow background will be a barely noticeable improvement.

AG Sterling Silver Shampoo Ingredients

Water/Aqua/Eau, Sodium Laureth Sulfate, Ammonium Laureth Sulfate, Cocamidopropyl Betaine, Cocamide Mea, Glycol Distearate, Laureth-10, Lauryl Pyrroudone, Hydroxypropyl Methylcellulose, Cinnamidopropyltrimonium Chloride, Dimethicone PEG-8 Meadowfomate, Helianthus Annuus (Sunflower)

Extract, Calendula Officinalis Flower Extract, Lavandula Angustifolia (Lavender) Extract, Trifolium Pratense (Clover) Extract, Pinus Palustris Leaf Extract, Dianthus Caryophyllus (Carnation) Flower Extract, Panthenol, Silk Amino Acids, Cocodimonium Hydroxypropyl Hydrolyzed Keratin, Hydrolyzed Wheat Protein, Hydrolyzed Wheat Starch, Sodium PCA, Tetrasodium Edta, Ethylhexyl Methoxycinnamate, Citric Acid, Parfum/Fragrance, Methylchloroisothiazolinone, Methylisothiazolinone, Ext. Violet 2 (CI 60730), Blue 1 (CI 42090), Red 33 (CI 17200).

The bottom line

All this doesn't mean you can't try it. If your hair has the right shade of yellow (brassiness), the violet may make a noticeable improvement. Just be careful, because depending on the hair, the violet over yellow could give the blonde hair a greenish cast. It's advisable to try the product on a part of the hair that's not too obvious until the right routine is identified. Also, these dyes will build up if used repeatedly, and depositing too much violet dye could leave your blonde locks looking like Purple Rain.