BEHIND

THE SCIENCE

Our ‘Behind the Science” Masterclass is going to teach you everything that you need to know about the composition of ingredients used for the use of Brow Lamination and Lifting and how they work in unison with the anatomical structure of the hair.

WHAT IS BROW LAMINATION AND LASH LIFTING?

Brow lamination and Lash Lifting are cosmetic treatments that are designed to give the appearance of fuller, reshaped brows and lifted and fuller lashes. It is a form of hair perming, therefore it is crucial that the best and correct products are to the highest and safest standards. The results can last up to 6-8 weeks.

HAIR

ANATOMY

With regards to eyebrows specifically, the hair is grouped into 2 categories;

Terminal and Vellus.

Terminal: Terminal hair is the hair found on a person's head, underarms, and pubic region. It is also normally visible on the arms, legs, and occasionally the backs or stomachs in people with lots of body hair. Terminal types of hair are what the average person thinks of when thinking of hair. All terminal hair is connected to oil-secreting sebaceous glands on the skin.

Vellus: Vellus hair is what most people think of as peach fuzz. This type of hair is normally very fine and short, usually not more than a few millimetres in length. In addition to being fine, vellus hair is also not very easy to see because it is typically very light blond or translucent in colour. This hair generally covers all surfaces of the body but may be more noticeable on the upper lip or on the back of the neck, but is also often found within the eyebrows. It is usually easier to see this type of hair on women and young children because they tend to have less body hair than adult men.

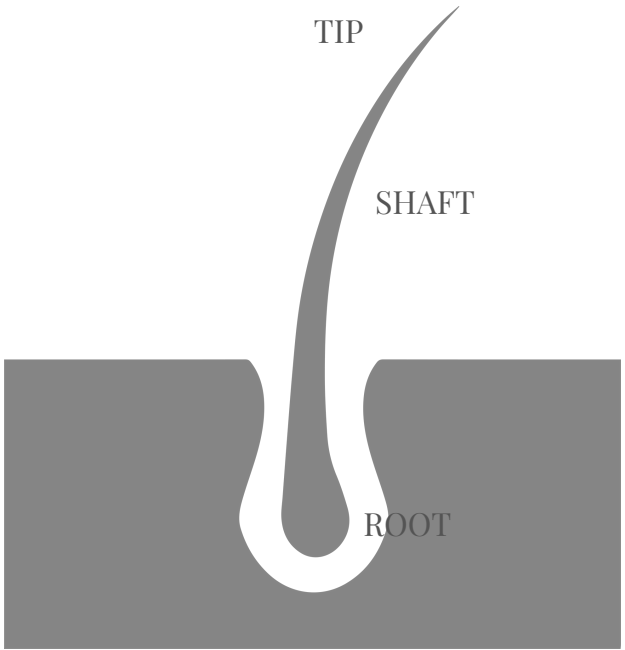
HAIR STRUCTURE

The structure of the hair is made up of three regions: the tip, the shaft and the root. Many people mistake the root for the follicle, but the follicle lies deeper within the tissue beneath the root of the hair.

The **TIP** of the hair is very delicate and small in diameter. It does not house a cuticle layer and is therefore more vulnerable as the cortex is so accessible and will process products very quickly.

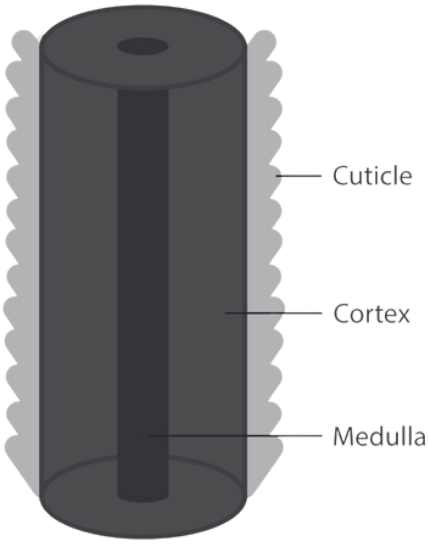
The **SHAFT** is the main body of the hair and increases in diameter size and becomes thicker as the cuticle layers increase.

The **ROOT** of the hair lies within the skin tissue and is surrounded by the dermal papilla structure (blood flow carrying oxygen and nutrients) in order to grow and reproduce.



HAIR LAYERS

Having discussed the regions, we now move on to the layers of the hair: The cuticle, cortex and the medulla.

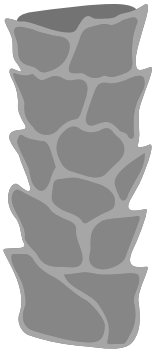


THE CUTICLE

The cuticle is the hair's outer, protective layer and is composed of overlapping cells similar to fish scales, but facing downwards. A healthy cuticle is smooth and flat. This gives the hair its shine and protects the inner layers from damage. It also minimises the movement of moisture in and out of the underlying cortex, thus maintaining the hair's hydration balance and flexibility. However, chemical processes and weathering can lift the cuticle and disrupt this balance, causing the hair to become dry and brittle and less able to protect the inner layers. When the scales are flat and the cuticle is therefore smooth and sealed, the hair will retain good hydration and moisturising properties cannot leak through the scales. When the scales are raised and not flat, the hair will not retain good hydration as moisturising properties will leak and escape. We can flatten raised scales to smooth the cuticle by maintaining the correct Ph Level. The cuticle itself is made up of 4-12 layers. The more layers present, the wider the diameter of the hair will be and therefore will be defined as a coarse hair type. The more layers present, the longer it will take for any product to penetrate through and reach the cortex, which is where we want to reach as an eyebrow maintenance artist. A healthy cuticle is crucial in order to maintain the overall good health of the hair.

FLAT SCALES -
CUTICLE CLOSED

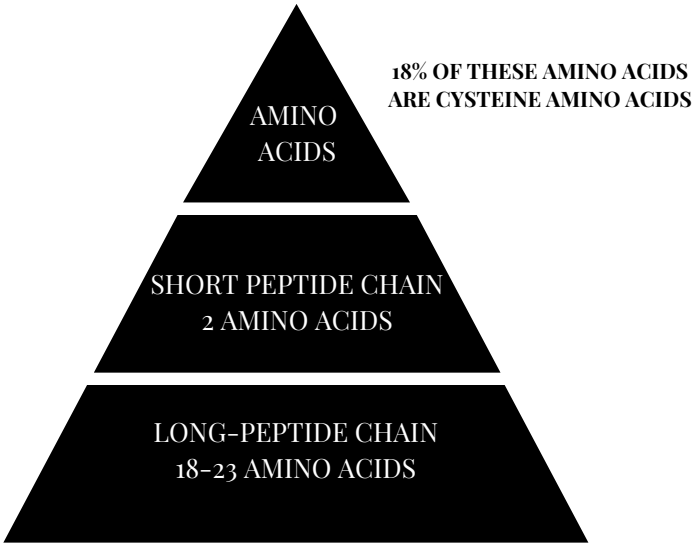
RAISED SCALES -
CUTICLE OPEN



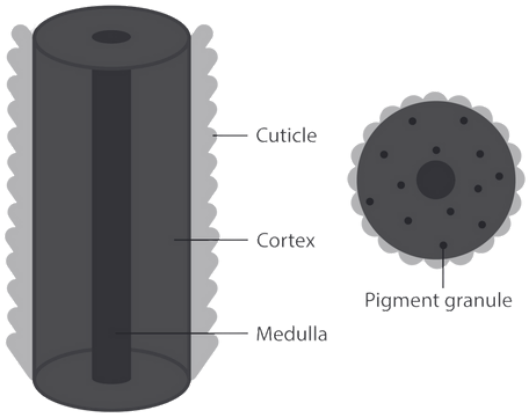
THE CORTEX

The cortex forms the bulk of the hair. It consists of long keratin filaments, which are held together by disulphide and hydrogen bonds. The health of your cortex depends largely on the integrity of the cuticle protecting it. The cortex is made up of 78-94% protein (keratin), 10-15% water, 3-6% amino acids and 1-3% melanin. Eyebrow hairs and eyelashes are mostly made up of tough, fibrous protein (keratin). As well as aiding strength, it is also responsible for giving the hair its structure i.e. whether it is curly or straight. Keratin is particularly rich in cysteine (a type of sulphurate amino acid) which forms disulphide bonds between molecules adding resistance and a rigid state. The amount of disulphide bonds will determine how curly or straight the hair is.

Keratin is made up of long-chain peptides (18-23 different amino acids) and smaller peptide chains (approx 2 amino acids). Peptide chains are made up of amino acids. 18% of all amino acids in keratin are cysteine amino acids. Therefore, in order for a successful keratin structure to form, amino acids are key.



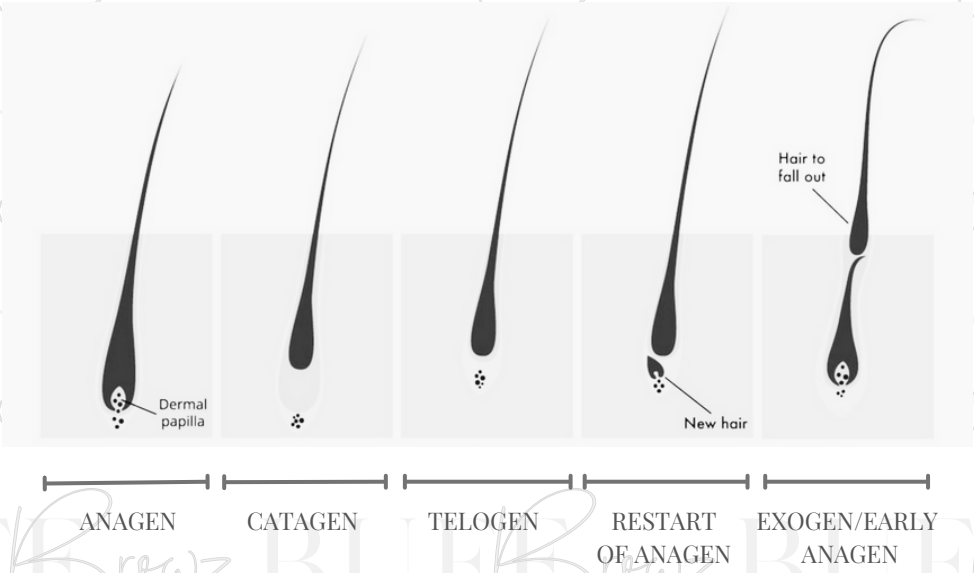
The cortex also houses melanocytes (melanin) which determine the colour of the hair. The colour depends on the amount, type and distribution of melanin within the cortex. You may see the hair becoming lighter in shade when performing brow lamination or lash lifting during Step 1 as this step is alkaline based, and melanin is very sensitive to an alkaline environment and can break down. However, this is not an indication to remove the product.



THE MEDULLA

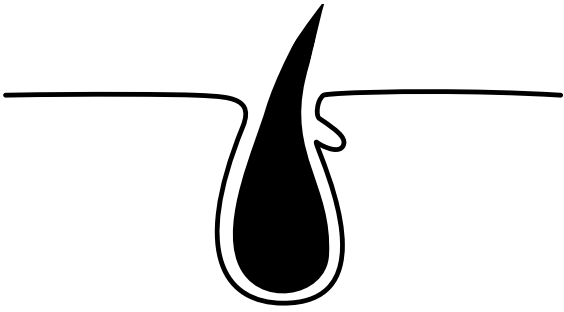
The medulla is only present in coarser hair types and is the innermost layer of your hair. It consists of a soft, thin core of transparent cells and air spaces. We do not need to access the medulla.

THE HAIR CYCLE



ANAGEN

Also known as the 'Growth Phase' or 'Active Phase', the Anagen Phase is when the cells in the root of the hair are most rapidly dividing so more new hair is formed, creating a hair strand. Eyebrow hairs and eyelashes don't grow as long as the hair on the head as their Anagen phase is much shorter at around 30 days, in comparison to approximately seven years for hairs on the scalp. We would never apply product to eyelashes in their Anagen phase as mainly the tip of the hair is present, and of course, does not house a cuticle. Therefore, we would cause mass damage. Not only this, to only form a lift of the tip of the lash would cause the lash to grow out with a kink at the very tip. Hairs that are in the Anagen phase within an eyebrow tend to stick outwards in comparison to other hairs as they are too short to lie flat post-lamination. Again we do not go out of our way to treat these hairs as it would cause too much damage and would inevitably mean over-processing surrounding hairs which again, could cause significant damage. Every hair within the eyebrow is at a different stage of growth. Therefore, you may find that your client has several hairs at the Anagen stage for example and will therefore not lie flat among the other hairs.



CATAGEN

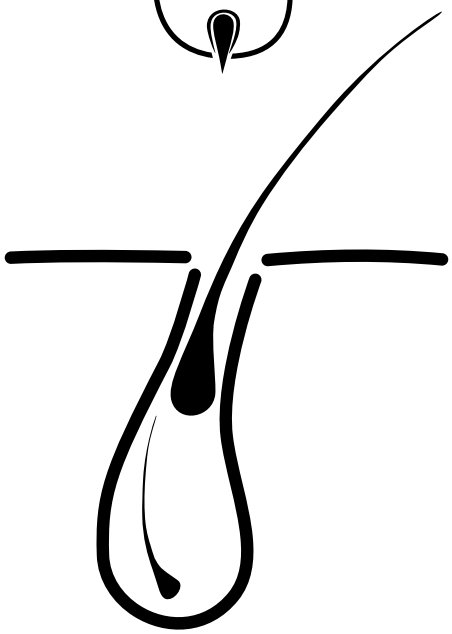
Following the Anagen Phase, the hair cycle enters a short transitional phase known as the Catagen Phase, which signals the end of active hair growth and cuts individual hairs off from the blood supply and from the cells that produce new hair. Approximately 3% of all hairs are in this stage at any time. During this phase, the hair follicle shrinks, detaches from the blood supply (the dermal papilla), and the eyelash/eyebrow hair stops growing. Lashes and eyebrow hairs maintain the length gained from the Anagen phase while waiting for the next phase. The Catagen phase lasts for 2 – 3 weeks. During this phase, the hair follicle becomes dormant but doesn't necessarily start shedding the hair itself immediately because the Catagen phase occurs so close to Anagen phase.

TELOGEN

The third stage of the hair growth cycle is the Telogen Phase which is a resting period where strands remain in their follicles but are not actively growing as they are no longer attached to the dermal papilla which provides the blood supply. An estimated 10-15% of hairs are in the Telogen Phase at any given moment. This phase is the longest phase and lasts for 3-4 months within eyebrows and lashes.

EXOGEN

This is the final stage of hair growth and is where the hair stand fully falls out and a new follicle is formed, which goes on to form root, and the growth cycle is repeated.



BROW LAMINATION

WHAT IS BROW LAMINATION

Brow lamination is a top trend at the moment. Everyone LOVES it, but what does it do?

Brow lamination is a cosmetic treatment that is designed to give the appearance of fuller brows. It relaxes and manipulates the brow hairs into the desired position to create a fluffier appearance. It is a form of hair perming, therefore it is crucial that the best and correct products are used to the highest and safest standards. The results can last up to 8 weeks. An artist can create a fluffier or a more defined finish.

Brow Lamination can be done solo or paired with tinting or a hybrid stain, depending on the finish desired.

When performing eyebrow lamination and lash lifting, we want to target just the hair shaft as much as possible.

We are looking to target the cortex in order to restructure disulphide bonds in order the change the shape of an eyebrow and lift the eyelashes.

We need to maintain good health of the cuticle.

Now let's dive in deeper!

Eyebrow Lamination is where the structure of the hair changes. But how does this actually happen? What causes this change to occur? Disulphide Bonds!! In hair, keratin molecules are arranged in straight bundles. These bundles are held together by disulphide bonds (-S-S-), which give strength to the hair. Disulphide bonds are made by the amino acid called cysteine. The cysteine of one keratin molecule forms a disulphide bond with the cysteine of the neighbouring keratin molecule; disulphide bonds are held together by chemical bonds, and can only be broken through a chemical reaction.

A chemical reaction involves using a specific chemical that will break the disulphide bonds. The traditional chemical for such a process is Ammonium Thioglycolate (TGA). By adjusting the TGA levels, the process will be shorter or quicker. The legal limit for TGA in the UK is 11%, but the level could vary within this limit. Ammonium Thioglycolate contains a thiol group (-SH); the thiol group replaces one of the sulphur atoms in the disulphide bond. When the disulphide bond is broken, the keratin bundles come apart, and hair is weakened allowing us to change the structure and shape of the hair. In recent years, many manufacturers have started to use a different agent to cause the same chemical reaction called Cysteamine Hydrochloride. Both chemicals achieve the same result but require different processing times as one is stronger than the other... stay tuned to find out more!

HYDROGEN

BONDS

Although not as relevant to the procedures in hand, we will briefly cover Hydrogen Bonds. These bonds are known as 'side bonds', and are very weak in comparison to Disulphide Bonds. Hydrogen Bonds can be easily and temporarily broken in the presence of water, heat and styling products. However, once these elements are removed, the Hydrogen Bonds can reform and maintain their natural structure.

How are Hydrogen Bonds relevant?

All three steps used for lamination and lash lifting contain high levels of aqua (water) and other ingredients of a fluid consistency to aid moisture. These elements will also affect the Hydrogen Bonds as well as the Disulphide Bonds. Therefore, we see the result of both bonds having been broken. However, we really only want to be able to see the result of the Disulphide Bonds having been broken, not the Hydrogen Bonds. Seeing the results of the Hydrogen Bonds having also been broken misconstrues your ability to see the true success of your actions. In order to be able to see just the results of the Disulphide Bonds having been broken, any products that break Hydrogen Bonds have the be removed i.e. any aqua/other fluids need to be thoroughly removed and for the hair allowed to dry out so that it is not being weighed down and all Hydrogen Bonds have reformed.

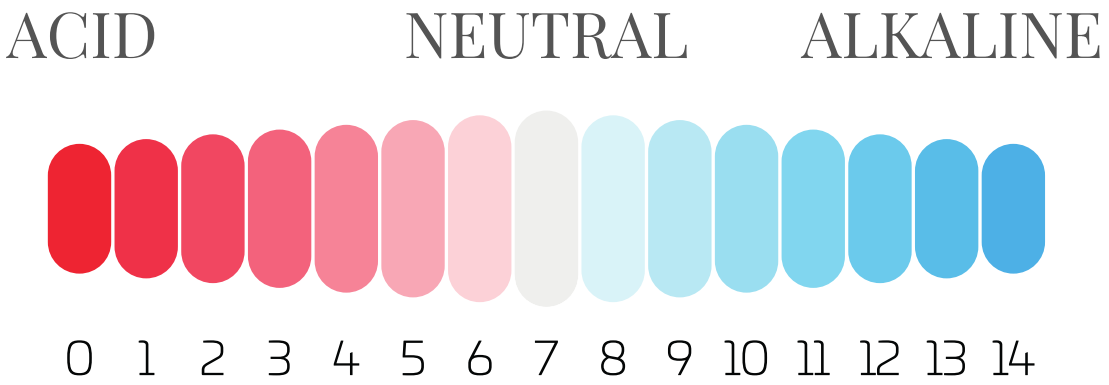
Only then will see the true results of the Disulphide Bond restructure. It may be that you need to reapply further product as it turns out that you are not satisfied with the results. But you will not know until you can see only the true chemical change in the Disulphide Bonds.

It is good practice to remove excess product in between steps in order to assess your results clearly, but also to remove any product that could cause a barrier for the next product.

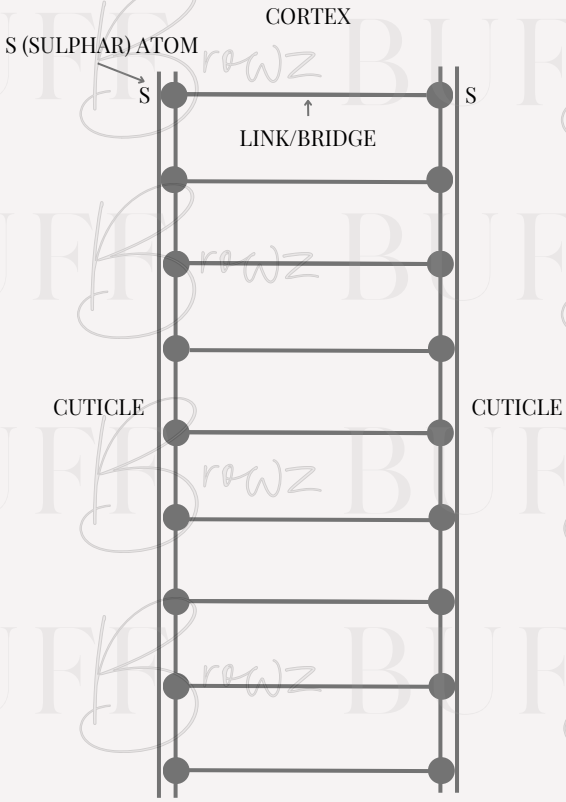
FACT - Disulphide Bonds can only be broken and restructured through a chemical change; these bonds are not affected by water. Therefore, we are busting the myth that clients need to keep their eyebrows or lashes free from water for a certain amount of time as the water is not going to affect the new structure. However, steam and heat can affect the results whilst the hair is particularly vulnerable (within the first 48 hours). Heat and steam can cause the cuticle to open, which will cause the cortex to be more susceptible to a pH change. Although the disulphide bond structure will not change, the pH change could cause the hairs to slightly change shape.

DISULPHIDE BONDS & THE PH SCALE

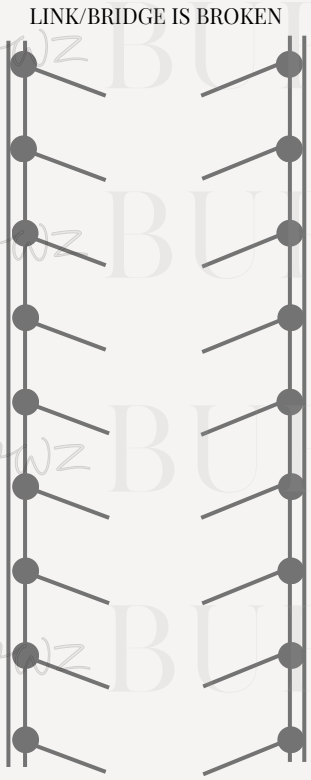
Disulphide Bonds can be known as Disulphide Bridges or S-S Bonds. They are covalent links between the Sulphur atoms of two cysteine amino acids and their formation stabilises the higher-order structure of proteins (keratin). How are Disulphide Bonds broken? We disturb the pH level of the hair. What is the pH Scale? The pH Scale stands for 'Potential of Hydrogen' and specifies the acidity or the alkalinity of a substance. Hair lives in the acidic region of the pH Scale at approximately 4.5-5.5. The pH of the hair can be disturbed by general weathering, minor chemical distribution and major chemical reactions i.e. Brow Lamination and Lash Lifting. When the pH is disrupted, the cuticle becomes lifted which allows the product to be able to access the cortex.



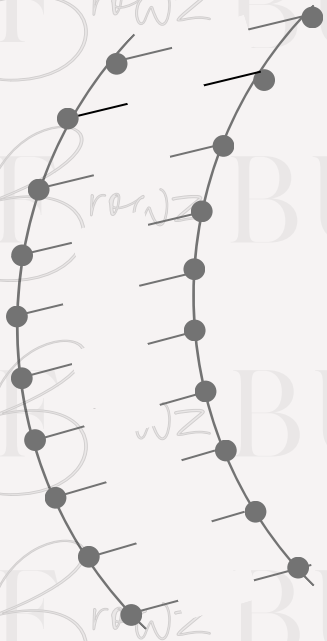
Step 1 LIFT is an alkaline substance and has a higher PH value than 7 (7 is a neutral pH) at around 8.5-11. Increasing the pH value opens the outer layer of the hair shaft (the cuticle) and breaks the disulphide bonds within the cortex in order to modify the structure of the hair. More technically, the Ammonium Thioglycolate (TGA) OR Cysteamine Hydrochloride which is found within Step 1 releases Ammonia OR Ethanolamine (an ammonia derivative), which lifts and opens the cuticle and allows the Thioglycolate OR the Cysteamine Hydrochloride to seep through and break the Disulphide Bonds. Prolonged use of the step would break the bonds and the internal structure of the hair shaft entirely and will cause hair breakage as it completely loses its elasticity and strength.



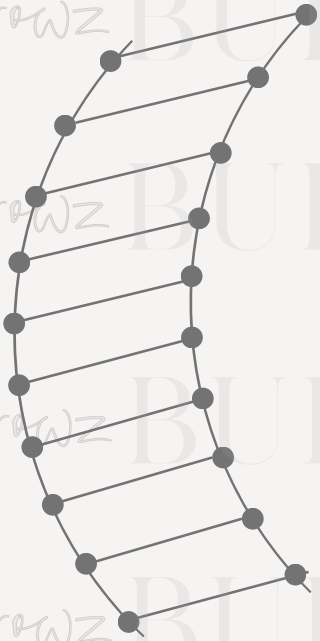
This diagram shows how the atoms are linked which create cysteine bridges which form bonds which we refer to as disulphide bonds.



This diagram shows how the bridges/links are broken post Step 1 application.

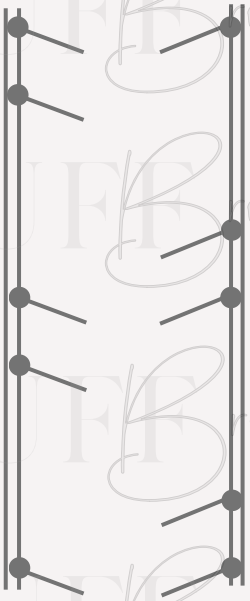


This diagram represents how the shape of the hair has been changed from its natural structure and shape whilst the bridges/links are still broken.

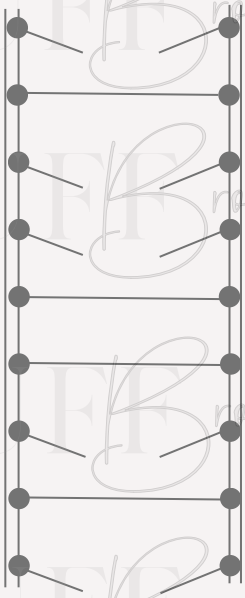


This diagram represents how the bridges/links have been reformed and connected post Step 2 application and how they now form a new shape and structure which is how they will permanently stay.

This diagram represents how all of the links and atoms have been destroyed by Step 1 therefore there are no links/bridges present to reconnect together and the hair will ultimately die and fall out.



This diagram represents how a handful of the links have been completely destroyed and therefore the existing links that are closest to each other will reconnect which will end up curling and kinking the hair and ultimately deforming its structure entirely.



This diagram represents how only a handful of the links have been destroyed and therefore not enough bridges have been broken and the hair would be under processed as a result.

STEP ONE

AMMONIUM THIOGLYCOLATE VS CYSTEAMINE HYDROCHLORIDE

Step 1 is an alkaline substance and has a higher PH value than the hair's natural PH value. Increasing the PH value opens the outer layer of the hair shaft (the cuticle) and breaks the disulphide bonds within the middle layer (the cortex) in order to modify its structure.

It is really important that you understand the ingredients that you are working with so that you can accurately assess what products to use on which hair type and how long to apply them for. There are two main ingredients that you really need to focus on: Ammonium Thioglycolate vs Cysteamine Hydrochloride.

The two ingredients serve the same purpose, but have completely different structures and affect the anatomy of the hair contrarily. They both increase the pH of the hair to an alkaline region, open the cuticle and break the disulphide bonds.

Ammonium Thioglycolate is the traditional ingredient used for the use of eyebrow lamination and lash lifting. The Ammonium opens the hair cuticle and the Thioglycolate breaks the disulphide bonds. The legal limit is 11% of this specific ingredient. It is an extremely powerful and invasive ingredient and has to be used with utmost caution as it works very quickly and allows for little control. It is good for coarse hair types and if used correctly and with profound knowledge, will not cause any malfunctions to the hair anatomy.

Ammonium Thioglycolate is very dehydrating and correct aftercare is absolutely crucial.

Cysteamine Hydrochloride is a much less invasive ingredient. It is a decarboxylated derivative of cysteine, which is the amino acid that makes up 18% of the keratin protein structure. Therefore it has a strong ability to increase the strength of the hair structure whilst in use. It is generally a slower processing ingredient, however, there is no limit to how much of it can be used within the composition of the product due to its gentle characteristics; the more that is present, the quicker the processing time. Genuine Cysteamine-based solutions are often labelled as "organic" or "plant-based" systems. It should be paired with an Ethanolamine derivative as opposed to Ammonium. Ideally, a derivative is used as they are weaker and less invasive. The derivative would open the cuticle, allowing for the Cysteamine Hydrochloride to act. Cysteamine Hydrochloride is often marketed as a “damage-free” ingredient. The truth is that both TGA and Cysteamine Hydrochloride can cause damage, but the risk is much lower with Cysteamine Hydrochloride.

STEP 2

Sodium Bromate vs Hydrogen Peroxide

These ingredients reform and connect the links to create new bonds. An acidic base will also be present to bring the hair back down to an acidic region (below pH 7) to close the cuticle and neutralise Step 1.

Sodium Bromate has been used in the past but has been found to be incredibly dehydrating. Hydrogen Peroxide is a much better quality ingredient to use to avoid harm to the hair.

Step 2 should always be the same brand as Step 1 and mirror the timings used during Step 1.

Step 2 should also contain ingredients that aid hydration and protection.

STEP 3

Step 3 is crucial to optimise the health of the hair; it provides nourishment and strength and regenerates the hair.

Step 2 will flatten and seal the cuticle, but Step 3 can help to maintain the closure of the cuticle to lock in moisture and hydration in order to prevent future damage.

Step 3 needs to include the following ingredients:

A regenerative ingredient to rebuild the keratin structure: Hydrolyzed Keratin such as Panthenol/Vitamin B5, Aloe Vera and/or Lecithin

Amino Acids to rebuild the full chain of the keratin structure: Serine, Threonine, Glycine, Glutamic Acid, Alanine, Lysine, Arginine or Proline

A hydrating and moisturising ingredient: Glycerin or Collagen or both, Hydrolysed Wheat or Soy Protein, Malya, Urtica Dioica Extract, Hydrolysed Silk, Caprylyl Glycol, Sodium Gluconate, Propylene Glycol, Butylene Glycol

An Antioxidant to aid protection: Vitamin E or Alpha Tocopherol

Growth factors: Hydrogenated Castor Oil, Lecithin, Urtica Dioica Extract, Aloe Vera extract or Peptide Biothenoyl Tripeptide-1

HAIR TYPES

AND TIMINGS

When it comes to lamination, understanding your client's hair type is crucial. It takes experience to successfully assess the different hair types and therefore what timings to use. There are 3 different types: Fine, Coarse and Normal. PLEASE NOTE that these are my personal advised timings and are a guideline, but they may need to be amended from time to time as every client is different.

FINE

If you feel/brush through your client's brows, and they are easy to move and very light, soft and slim in nature, your client has a 'fine' type of brow hair. Therefore, when you carry out lamination, the product won't long to achieve the desired results and the product will easily and quickly be able to access the cortex in order to modify the hair's structure.

TIMINGS 3-4 minutes

PLEASE NOTE

To make it very clear, Step 2 ALWAYS mirrors the exact timings of Step 1.

NORMAL

If you brush through your client's brows and they feel fairly strong and slightly rigid with their movement, and they are slightly thicker in texture, you are working with a normal hair type. These clients are the perfect candidates for lamination.

TIMINGS 5-6 minutes

COARSE

If you brush through your client's brows and they feel very stubborn to move and don't move freely, and look and feel very thick in texture, your client has coarse hair. It will be harder and will take longer for the product to be able to access and penetrate the cortex in order to be able to modify the structure of the hair.

TIMINGS 6-8 minutes

IMPORTANT

It is crucial to regularly assess your client's hair's movement during Step 1. If you are coming to the end of your prescribed timings, and there are several hairs that are not relaxed and flat to the skin, they need a longer processing time. If there are a small handful of hairs that lift back off of the skin after the removal of Step 1, they need a 'spot lami'. If this is the case, we would advise applying a small amount of product solely to the stubborn hairs and allow an additional minute of processing time. Assess the results every minute and remove the product once those hairs have relaxed. Gone are the days where we leave our client to process, Regular assessment is key. It may even be that you check the hair and they are ready prior to the end of the decided processing time and that it is time to remove the product before they become damaged.

PLEASE NOTE that thicker/coarser hair types absorb more product more quickly than finer hair types. During your check-ups, you might find that you need to apply more product to the hair.

THE BUFF BROWZ

CYSTEAMINE SYSTEM

LIFT

The Buff Browz LIFT solution is Cysteamine-based, not TGA-based. Cysteamine Hydrochloride is a much less invasive ingredient. It is a decarboxylated derivative of cysteine, which is the amino acid that makes up 18% of the keratin protein structure. Therefore, it has a strong ability to increase the strength of the hair structure whilst in use. The Buff Browz LIFT is also a nutrient powerhouse and is composed of essential ingredients for optimum hair health. Ultimately, LIFT will not only restructure the shape and direction of the hair, but it will also help to nourish and improve the strength and condition of the hair. This acts almost as a treatment, but also almost obliterates the risk of over-processing the hair. The solution is completely fragrance-free and allows for a slightly longer processing time in comparison to TGA brands which allows for better control.

The additional nutrients included in LIFT are as follows:

- **Aloe Barbadensis**
- **Hydrolyzed Collagen**
- **Hydrolyzed Wheat Protein**
- **Glycerin**
- **Panthenol**
- **PLUS the famous Procapil (Biotynoil Tripeptide-1) for ultimate strength**

THE BUFF BROWZ

CYSTEAMINE SYSTEM

SET

The Buff Browz SET solution is Hydrogen Peroxide based and is also a nutrient powerhouse which ensures that the hair remains as healthy and as nourished as possible, whilst also neutralising LIFT.

The additional nutrients included in SET are as follows:

Aloe Barbadensis
Hydrolyzed Collagen
Hydrolyzed Wheat Protein
Panthenol
PLUS the famous Procapil (Biotynoil Tripeptide-1) for ultimate strength

SET also contains Citric Acid which is perfect for ensuring that the hair stays within the acidic region for optimum health whilst also keeping the cuticle sealed.

THE BUFF BROWZ

CYSTEAMINE SYSTEM

NOURISH

The Buff Browz NOURISH solution has been methodically designed and composed by our director who insisted on having key ingredients within the composition to optimise results for both the artist and the client:

- **Hydrolyzed Wheat Protein: A key ingredient to aid regeneration and rebuild the keratin structure.**
- **Cetrimonium Chloride: Aids moisture and keeps the cuticles sealed and flat.**
- **Vitamin E: A top-rated antioxidant to aid protection.**
- **Argon Oil: Aids moisture and Hydration and also contains Vitamin E which is a great antioxidant.**
- **Panthenol/Vitamin B5: A great amino acid which aids hair regeneration and hydration.**
- **Glycerine: Aids moisture and hydration and flattens and seals the hair cuticles.**
- **Sodium Hyaluronate: Promotes growth and aids moisture as it is a derivative of Hyaluronic Acid.**
- **Jojoba Oil: A brilliant antioxidant to aid protection.**
- **Hydrogenated Castor Oil: Encourages growth.**
- **Algae Extract: A protein powerhouse that encourages growth.**
- **Glutamic Acid: An amino acid which has a cashmere effect on the hair and maintains good hair structure.**
- **Citric Acid: Has an acidic pH balance which keeps the hair within the acidic region and keeps the cuticles sealed and flat to lock in moisture and hydration.**