Hairstyling and Aesthetics

Properties of the Hair and Scalp

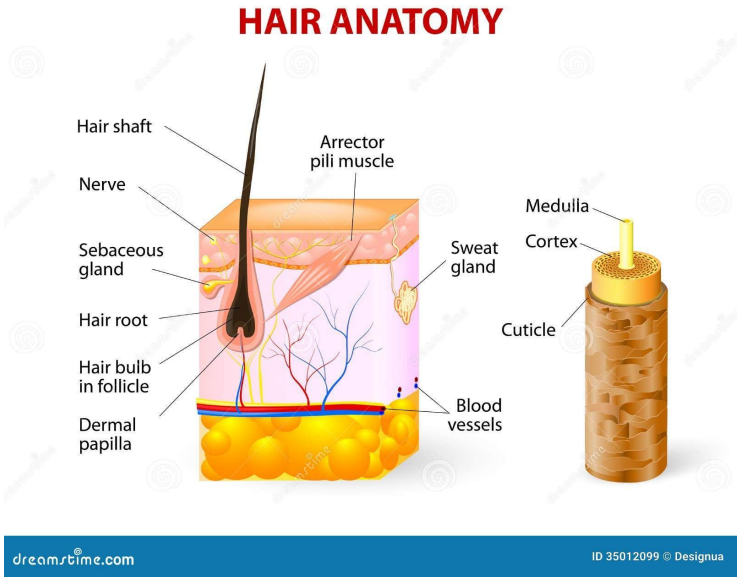
Hair Fun Facts!

- The Epidermis is the first layer of the skin
- The hair follicle houses the hair
- Sebaceous glands secrete sebum - this keeps hair and skin healthy and from being dry
- The arrector pili muscle - when activated gives you goosebumps! Yep it is a muscle! Hair is made of Keratin the same as fingernails and skin! But it is also the same a animal hooves, claws and feathers!
- Hair is the second fastest growing organ next to bone marrow in the human body.
- We lose an average of 50-100 hairs a day! Yep down the drain or in your brush!

Always remember

We colour hair and dye clothes, we tweeze eyebrows and pluck chickens and we cut hair and trim bushes.

Hair Structure



Hair is made up of three layers

1. Medulla (Inner layer)
2. Cortex (middle layer)
3. Cuticle (outermost layer)

The **hair bulb** is a thick club like structure that fits over the **dermal papilla**. It is hairs lifeline as this is how it gets fed!

Where do you have hair?

What 2 places on your body do you not have hair?

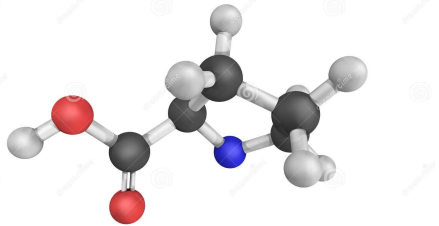
Amino Acid - WHAT...

Hair is 90% protein so what does that mean?

Protein is a long chain of amino acids which then turn into elements.

Living cells move to the hair follicle, which feeds the hair, the cells mature in a process called keratinization. As they move up the follicle they fill with a fibrous protein called keratin. Once they emerge the scalp they no longer have a nucleus and are no longer living.

Why is this important?



Elements of Hair

These elements are: (whew no wonder hair stinks when it is burned)

Carbon - 51%

Oxygen - 21%

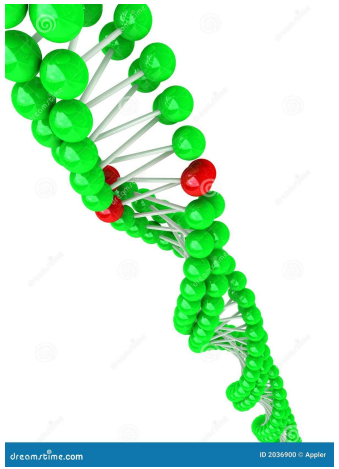
Nitrogen - 17%

Hydrogen - 6%

Sulfur - 5%

Understanding Hair Structure

These proteins that are made up of long chains of amino acids and are joined end to end like pop beads. The pop beads are joined by a peptide bond also known as an end bond. This is now called a polypeptide chain. They intertwine in a spiral shape called a helix. Then all these polypeptide chains are linked like rungs of a ladder across from each other by side bonds. Confusing right?



Hair Bonds

Bonds are important to hairdressers, there are three! First we have weak physical hydrogen bond, these bonds are broken by heat and water. We use these in styling hair. There are lots of these bonds.

Secondly we have another weak physical bond called a salt bond. This is broken by changes in pH. We will come to pH later in more depth but alkaline or acidic solutions can break these bonds. Again pretty abundant in the hair.

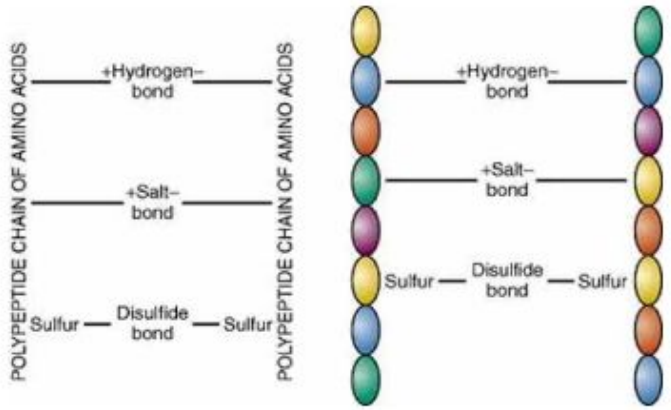
Lastly we have a disulfide bond. It is a strong chemical bond that is broken by chemicals such as a perm solution. There are less disulfide bonds in your hair but they are stronger so still make up ⅓ of the strength of your hair.

Challenge……

Start here:

Let's make a helix to represent the bonds

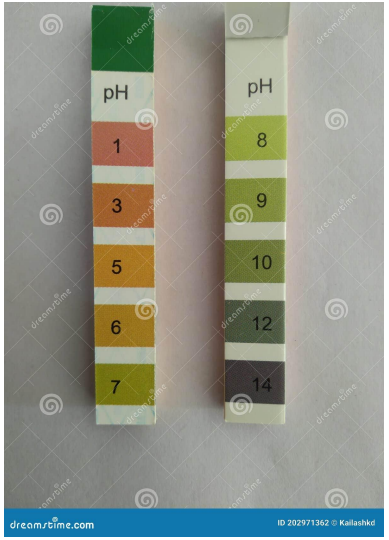
a. Hydrogen bond
b. Salt bond
c. Disulfide bond



What materials can you use to create these bonds. Remember the strength of each. Here are some suggestions - tooth picks, play dough, tape, hot glue, beads, dowels, paper.

pH - Potential Hydrogen

pH is important to hairdressers because of salt bonds and solutions too high in alkaline or too low in acidic can damage the hair.



Challenge

Using pH or litmus strips test different products in the classroom. Make a chart for acid and alkaline.

Where is the product on the scale?
Why is this important to know?
What now make perfect sense to you after you have done your testing?

pH - Potential Hydrogen

An ion is an atom or molecule that carries an electric charge. A positive charge is a cation, and an anion is a negative charge. A pH measures the ions. Fun fact only products that contain water can have a pH

Pure water has a neutral pH (it contains the same number of anions and cations). Blood is slightly alkaline with a 7.35 or 7.45 pH measurement.

Hair and skin are around 4.5 to 5.5 on the pH scale.

What other products would you like to test?

What other questions do you have now?

The pH Scale

How do projects change when you mix them?
Why does this happen?

Challenge
Using the same chart mix products together. Colour with peroxide of different strengths, shampoo and water, shampoo cocktail, add water to a mixed colour.

So if something is to acidic and you add alkaline does it make it safe to use?
What happened to the different layers of the hair?

Remember hair is 4.5-5.5 on the pH scale. The least amount of damage happen when products are as close to 4.5-5.5 as possible.

Hair Pigment

Where does colour come from? Whether it is in your hair or in your skin….Melanin

Melanin are tiny grains of pigment in the cortex of the hair and gives it it's natural colour.

There are tyo types of melanin:

Eumelanin provides dark brown to black colour to hair.

Pheomelanin which provides nature colour rangin from red, ginger, yellow to blonde tones.

All natural hair colour have both eumelanin and pheomelanin except for albinos.

Wave Patterns

Wave patterns are a result of genetics!

How does curly hair happen. Well it starts with your parents or grandparents. It's all in the genes!!!

The cross section of the hair determines your curl pattern. It is true that cross sections of straight hair tend to be round and curly hair tends to be more oval BUT modern microscopes have shown that crtoss sections of hair can be almost any shape.

When you straighten curly hair the shape changes, This will last longer depending on what bonds you are breaking down.

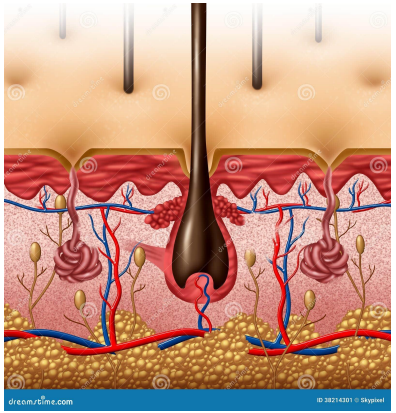
Curly hair straightening with a hair straighten will break down sal bonds and last the least among of time.
Curly hair blown dry straight breaks down the hydrogen bonds and lasts longer (or until it is wet again)
Curly hair straightened with a chemical will last the logest as you are breaking down the disulfide bond.

Types of Hair - Hair Growth

Vellus hair also known lanugo hair is short, fine, non pigmented and downy hair that appears on the body. Women have 55% more vellus hair than men and it helps to absorb perspiration

Terminal hair is long, coarse, pigmented hair found commonly on your head, arms, and legs.

All hair follicles are capable of growing both vellus terminal hair depending on hormones, genetics, and age.



Layers of the Hair

The Cuticle

The cuticle is the outermost layer of the hair. It consists of a single overlapping layer of transparent scalike, like cells that look like shingles on a roof or the skin of a fish.

The cuticle protects your hair and can give it the appearance of shiny and smooth hair when the cuticle is closed. It will feel soft and smooth.

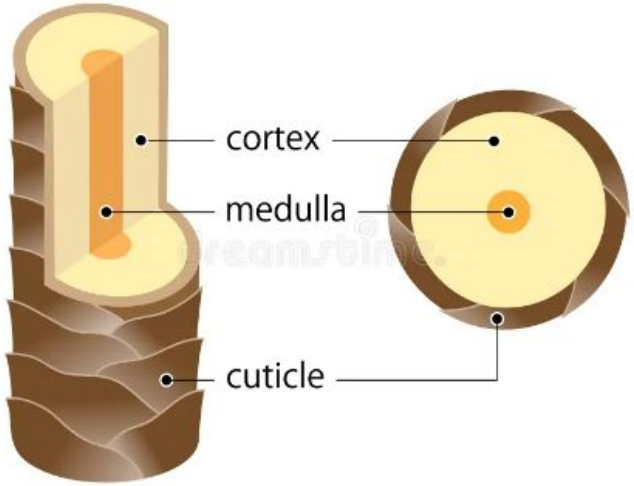
To make changes in the cortex (the inner position of the hair, a stylist must use an alkaline product to swell the cuticle and allow it to open and expose the inner layer - the cortex.

Layers of the Hair - The Cortex

The Cortex

This is main part of the hair. Most everything happens in the cortex.

It makes up 90% of the weight of the hair. It houses all your polypeptide chains, bonds and melanin. The is where serious change happens in the hair.



Layers of the Hair - The Medulla

The Medulla

A bit of a mystery is the medulla…

There is no known function and it does not come into play for salon services but fun facts about the medulla are:

Blondes and people with fine hair commonly don't have a medulla

Male beards have a medulla

Animals have a medulla and its ratio is larger than found on human hair.

Challenge: What is the difference between fur on animals and hair on humans? What is similar?

Hair Growth

There are 3 phases of hair growth:

1. Anagen
2. Catagen
3. Telogen

Anagen is the growth phases. Your hair is in the phase for 90% of its life remember you hair falls out. This phase can last up to 10 years but on average it lasts between 3-5 years. Hair grows approximately 1.25 cm a month.

Do the math

How long will hair grow if it had a 3 year life space? A six year life span? A ten year life spans?

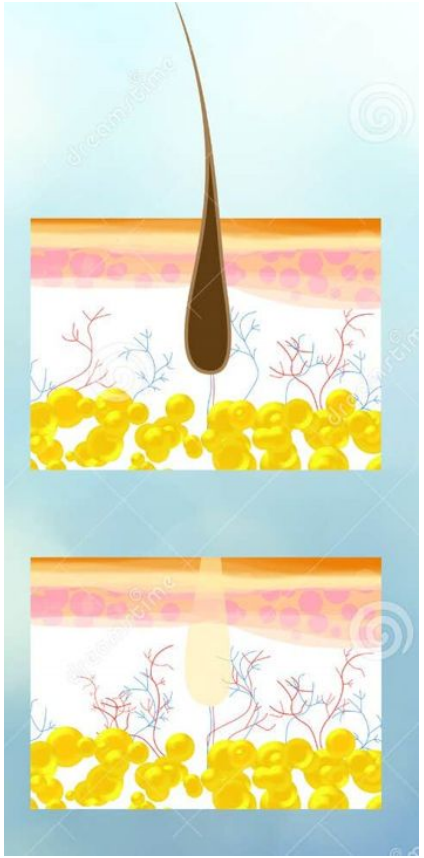
Hair Growth

Catagen

Catagen is a brief stage also a time of change. The follicle canal shrinks and detaches from the dermal papilla. This phase last 1-2 weeks.

Telogen

The telogen phase also known as the resting phase. It is the final stage of growth. The last 3 -6 months of the hair. As this phase ends the anagen phase begins again.



Growth Patterns

Different heads of hair have different growth patterns. These are especially important when preforming services like cutting, straightening, perming and even styling hair.

- Cowlicks - Hair growing up away from the scalp in the opposite direction of other hair
- Stream - Hair growing down (this is what you want)
- Whorls - Hair growing in a circular direction

Challenge - What growth pattern do you have?
Where else on your body do you see growth patterns?
Why is this so important to know when performing services?

Disorders of the Hair

Alopecia

Androgenic Alopecia

Terminal hair turns into vellus hair. This is a result of genetics, age and hormonal changes. This happens more to men but can happen to women.

Alopecia Areata

Hair loss from an autoimmune disorder. White blood cells stop hair growth during the anagen phase. This can happen in small patches or all over your whole body. (Alopecia totalis)

Postpartum Alopecia

Temporary hair loss experienced after having a baby

Alopecia

Challenge

With today's technology there are lots of ways that you can treat each of the 3 types of alopecia.

Do some research on 1 of the 3 types of alopecia. What are the treatments? What are some side effects? What could be challenges to having the treatment?

Androgenic Alopecia Alopecia Areata Postpartum Alopecia

Pityriasis

The biggest scalp disorders is a result of a fungus called malassezia…called Pityriasis which is dandruff.

Dandruff is caused by this fungus (malassezia) but also by the shedding of dead skin cells.

Stress, hormones, age, and poor hygiene can affect this condition

Research the definitions of both types of dandruff and how you can treat both types

	Definition	Treatment
Pityriasis capitis		
pityriasis steatoides		

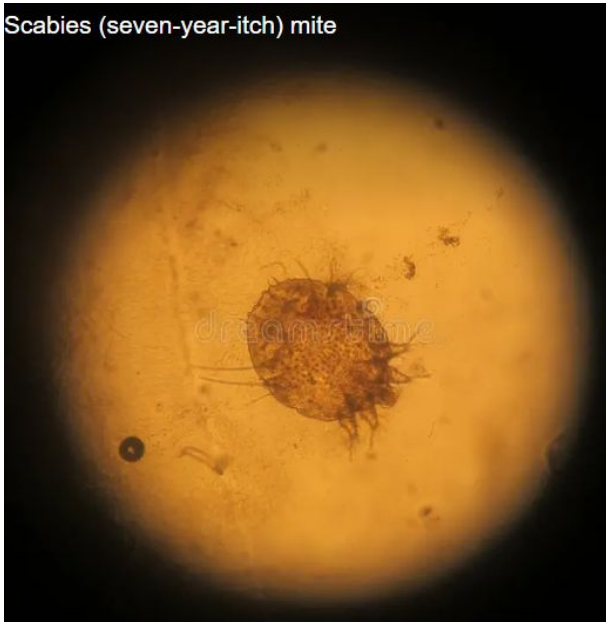
Fungal Infections

Tinea is the technical term for ringworm.
It is characterized by itching,
scales and sometimes painful circular lesions.

Pediculosis capitis is the technical term for head lice.

Parasitic Infections

Scabies is a highly contagious skin disease that is caused by a parasite called a mite. It burrows under the skin. Blisters and inflamed like pimples with pus form on the scalp. It is itchy!



Staphylococcus Infections

Lastly we have bacterial infections, there are two common staph infections they are a **furuncle (a boil)** and a **carbuncle** a larger boil.

We have to be very diligent to avoid the spread of fungal, bacterial and parasitic infections by taking the proper cleaning, sanitation and disinfecting measures in the salon/classroom. ***Do not treat anyone with these infections***!

Make the Match

Ringed Hair	A condition also known as hirsuties, growth of terminal hair where vellus hair is usually found
Excess hair	Technical term for brittle hair
Trichoptilosis	Technical term for dandruff
Pityriasis	A variety of canities, characterized by alternating bands of gray and pigmented hair
Fragilitas Crinium	Technical term for split ends

Analysis of the hair

- Texture
- Density
- Elasticity
- Porosity

It is important for a hairdresser to know how to analyze the hair for these properties, it can affect the success of our services.

Texture

Texture is determining the diameter of each individual hair shaft. To determine whether your client has fine, average or coarse hair, you take one individual hair at the crown (this is used as it usually represents the average hair on the head) and roll it between your fingers. It is hard with limited experience to know when you roll an individual hair whether you are feeling fine, average or coarse but usually fine hair you can not feel or barely feel but coarse hair is quite noticeable.

Is your hair fine, average or coarse?

Test a friends hair. What is the difference?

Density

Density is the amount of hairs per square centimetre on your head. Think of it as the population of your hair.
My hair is more like Hamilton or maybe Guelph but others with lots of hair are more like Toronto. Sometimes coarse hair tricks you into thinking that you have high density.

Fun Facts:
Blondes (140,000 per 2.5 cm squared) have the highest density
Red heads have the least (80,000 per 2.5 cm squared) You may think my friend is a redhead and she has super thick hair. She probably has coarse hair…
Do you have high, average or low density? Measure a 1cm x 1cm space on your head. Take a picture…can you count how many hairs you have. Now measure your head. What is the total? Compare this with your friends

Elasticity

This is the ability for your hair to stretch and then return to its original shape. As we lose our elasticity, hair will break. This is when your side bonds have become weaken or broken. Hair will stretch up to 50% more when wet then dry so if combing out your hair when it is wet is difficult you may have poor elasticity.

Does your hair have good elasticity called normal low elasticity where it breaks?

Porosity

Porosity is the ability for hair to absorb moisture and retain it. You can analyze whether your client has resistant hair

- Resistant hair - a tight cuticle
- Porous hair - a slightly raised cuticle
- Highly porous hair - looks like the cuticle is rough and fuzzy looking.

Another test you can do is to cut a piece of hair off your client or yourself and put it in some water. If it floats it has good porosity. If it sinks to the bottom it is highly porous.

Is your hair resistant, slightly porous, porous or overly porous? Remember porosity may be different on various parts of your head.

Hair Analysis

https://youtu.be/_J5XUZ9tAg4?si=3p9NahKqWFX2jXoa

Link the old document to the end of the deck

Original Document
https://legacy.octe.ca/download_file/5222/1444