TRICHOLOGY: the scientific study of hair, its diseases, and care

Properties of the hair and scalp

- **hair shaft**
- **hair root**

HAIR SHAFT

- **Cuticle**: alkaline solutions soften and swell the hair, raising the cuticle and allowing the solution to penetrate into the cortex.
- **Cortex**: made up of millions of polypeptide chains. All chemical actions take place in the cortex.
- **Medulla** may or may not be presented.

CHEMICAL COMPOSITION OF HAIR

- **Keratinization process**
- **91% Protein**
  - Long chains of amino acids
- **COHNS Elements**
  - Carbon—51%
  - Oxygen—21%
  - Nitrogen—17%
  - Hydrogen—6%
  - Sulfur—5%

Side Bonds (cross bonds) of CORTEX

- Hydrogen bonds broken by heat or water – physical change
- Salt bonds broken by changes in pH – pH change
- Disulfide bonds broken by chemical – chemical change

Hydroxide relaxer → lanthionization process → lanthionine bonds

- **Cysteine**
  - Amino acid
  - Peptide (or end) bonds join amino acids together, forming long chains called polypeptide chains.
  - Polypeptide chains are long, coiled, complex proteins made up of many different amino acids linked together like beads.

Peptide bonds should not be broken; this could cause the polypeptide chains to come apart and dramatically weaken the hair, causing breakage.
**pH Balance**
- The pH balance of human skin and hair is between 4.5 and 5.5

**Hair color**
- **Hair Pigment**
  - Melanin granules are scattered between the cortex cells like chips in a chocolate chip cookie
- **Natural hair color**
  - Two types of melanin in the cortex
    - Eumelanin is melanin that gives black and brown color
    - Pheomelanin is melanin that is found in red hair, most brunettes contain this pigment.
  - Contributing pigment is the pigment in natural hair color. The foundation of haircoloring is based on modifying this pigment with haircolor to create new pigment.

**Wave Pattern and Tendencies**
- **Straight hair**: round cross session
- **Wavy hair**: oval cross session
- **Extremely curly hair**: flattened cross session

**Types of Hair**
- Vellus or lanugo
- Terminal hair

**Growth Cycles of Hair**
- **Anagen** – growth phase: ¼ to ½ inch per month. About 90% of scalp hair is growing in the anagen phase at any one time
- **Catagen** – transition phase 1-2 weeks: Follicle canal shrinks, detaches from the papilla. Lower part of follicle is destroyed
- **Telogen** – resting phase: the final phase lasts for approximately 3 to 6 months. About 10% of scalp hair is this phase at any one time

**HAIR LOSS - alopecia**
- Androgenic (androgenetic) alopecia caused by hormones and genetic predisposition a pattern of receding hairline and hair thinning on the crown
  - Alopecia areata: autoimmune disorder, white blood cells stop the hair growth. alopecia totalis: no hair
  - Postpartum alopecia: temporary hair loss at conclusion of pregnancy
- **Hair Loss Treatments**
  - Minoxidil®—topical medication applied to scalp
  - Finasteride®—oral prescription for men only

**DISORDERS OF THE HAIR**
- **Canities: albinos**
  - Congenital canities: with birth
  - Acquired canities: with age, genetics or illness
- **Ringed Hair**
  - Alternate bands of gray and dark hair
- **Hypertrichosis**
  - Also known as hirsuties, means superfluous hair
- **Fragilitas Crinium**
  - Brittle hair that causes splitting
TRICHOPTILOSIS
- Split hair ends
- Treatment—oil to lubricate and soften ends, or cutting the hair

TRICHORRHEXIS NODOSA
- Knotted hair, dry, brittle
- Nodular swellings along hair shaft
- Hair easily broken, creating a brush-like spreading of fibers along the hair shaft
- Treatment—softening the hair with conditioners

MONILETHRIX
- Beaded hair
- Treatment—scalp and hair treatments

VEGETABLE PARASITIC INFECTIONS
- Tinea capitis—ringworm of the scalp
  - Characterized by red papules or spots at the opening of the hair follicles
  - Causes the hair to break
  - Tinea favosa
dry, sulfur-yellow, cuplike crusts

DISORDERS OF THE SCALP
- Dandruff—Pityriasis
  - Pityriasis capitis simplex
  - Pityriasis steatoides

DISORDERS OF THE SCALP
- Animal parasitic infections
  - Scabies; caused by the itch mite
  - Pediculosis capitis (head lice)
- Staphylococci infections
  - Furuncle or boil
  - Carbuncle

SCALP ANALYSIS
- oily, dry, combination
- disorders
- diseases

HAIR ANALYSIS
- Texture: diameter of hair strand
- Porosity: ability to absorb moisture
- Elasticity: ability to stretch
- Growth pattern: whorl, stream, cowlick
- Density: number of individual hair strand on 1 square in
  - Average (2,200 hairs per square in)
  - Blonde (140,000)
  - Brown (110,000)
  - Black (108,000)
  - Red (80,000)

SUMMARY
- Trichology is the science that deals with the hair, its diseases, and care.
- The more you understand how salon services affect different hair types, the better you will be able to achieve consistent results on your client.
- Recognizing scalp and hair disorders will help you direct your client appropriately.