

**ADVANCED TRICHOLOGY  
COURSE I**

**WORLD TRICHOLOGY SOCIETY**



# **ADVANCED TRICHOLOGY COURSE PART II**



# DISCLAIMER



- Most Trichologists are not physicians and so do not “diagnose” hair or scalp conditions.
- Certified Trichologists should be trained to “recognize” certain conditions and **work with physicians** for the betterment of the patient/client.
- This Advanced Trichology Course is designed to help the Certified Trichologist achieve this goal and is NOT intended to encourage him/her to make medical diagnoses or provide medical treatments for his/her patients/clients. **THE COURSE IS DESIGNED TO HELP THE TRICHOLOGIST LOOK AT THE BLOOD TEST RESULTS TRICHOLOGICALLY, TO HELP GUIDE HIS/HER TREATMENT PROTOCOL.**
- **ANY MEDICAL DIAGNOSIS OR MEDICAL TREATMENT MUST BE HANDLED BY THE PATIENT/CLIENT’S PHYSICIAN.**
- **FOR MORE INFORMATION ON EACH TOPIC IN THIS COURSE, PLEASE DO YOUR OWN ADDITIONAL RESEARCH AND READING.**
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# ADVANCED TRICHOLOGY COURSE SYLLABUS

## PARTS I & II: BLOOD (LABORATORY) TESTS FOR THE TRICHOLOGIST

- WHY A TRICHOLOGIST RECOMMENDS THESE TESTS
- WHAT BLOOD TESTS ARE IMPORTANT & WHAT THE RESULTS MEAN
- WHAT TREATMENTS ARE AVAILABLE FOR THE TRICHOLOGIST
- CONTACTING A PHYSICIAN (EXAMPLE LETTER)
- EXAMPLE BLOOD TEST SHEET

## PARTS III & IV: EXAMINATION, RECOGNITION AND TREATMENT OF TRICHOLOGICAL HAIR LOSS CONDITIONS

- REVIEW OF HAIR LOSS PATTERNS AND HAIR & SKIN SCALES
- DISCUSSION OF TRICHOLOGICAL CASES AND CASE HISTORIES (REFERENCING BLOOD TEST RESULTS)
- MULTIMODAL TREATMENTS
- MORE DIFFICULT HAIR LOSS ASSESSMENTS THAT CONSIDER OTHER HEALTH ISSUES  
IMPORTANT FOR THE TRICHOLOGIST

# PARTS I & II: BLOOD TESTS FOR THE TRICHOLOGIST

## LEARNING OBJECTIVES

- TO LEARN WHICH ARE THE MOST COMMON BLOOD TESTS IMPORTANT FOR THE TRICHOLOGIST
  - TO LEARN WHAT THE BLOOD TEST RESULTS MEAN
- TO LEARN WHAT TREATMENTS ARE AVAILABLE FOR THE TRICHOLOGIST
  - TO LEARN HOW TO CONTACT A PHYSICIAN

# VITAMIN B12

## SUMMARY

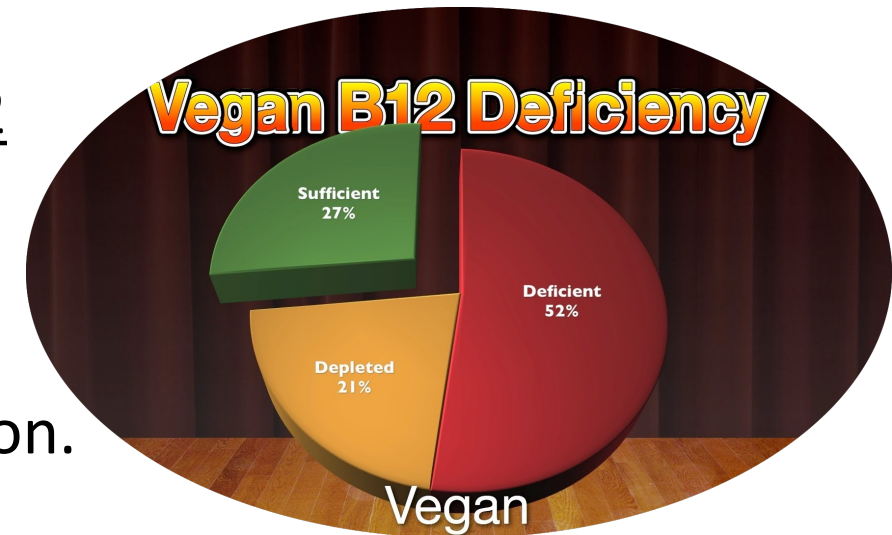
- Vitamin B12 is a \_\_\_\_\_ vitamin.
- B12 exists in four forms (known as \_\_\_\_\_) which contain the mineral cobalt, and so these are collectively called “cobalamins”.
- Methylcobalamin is an active form of B12 important in human metabolism.
- B12 aids in \_\_\_\_\_ production (oxygen carrying part of blood).
- Low levels of vitamin B12 may lead to anemia, lethargy, numbness, impaired cognition.
- \_\_\_\_\_ and Vitamin B12 often ‘work’ closely together.
- Vitamin B12 sources: red meat, poultry, seafood, eggs, milk, milk products, cereals (fortified).



# VITAMIN B12

## ACTION OF VITAMIN B12

- Vitamin B12 is a \_\_\_\_\_ which means it is important for certain enzyme reactions.
- Vitamin B12 is important in the extraction of ATP (energy) from proteins and fat during digestion.
- The methyl groups ( $-CH_3$ ) in Vitamin B12 help in protein synthesis.
- Vitamin B12 has a vital role in \_\_\_\_\_ through many reactions and processes that occur in the body.
- Red blood cell formation, central nervous system, DNA synthesis all need vitamin B12.
- **Diabetics** can be deficient as drugs such as Metformin may reduce their levels.
- Strict vegetarians can only get B12 from fortified cereals or \_\_\_\_\_.



# VITAMIN B12 BLOOD TEST RESULTS

- Normal range:  
250-1,100 ng/L
- Vitamin B12 deficiency:  
less than 250 ng/L
- Vitamin B12 HAIR SUFFICIENCY:  
\_\_\_\_\_ ng/L

- ng = nanograms (one billionth of a gram) per L = liter

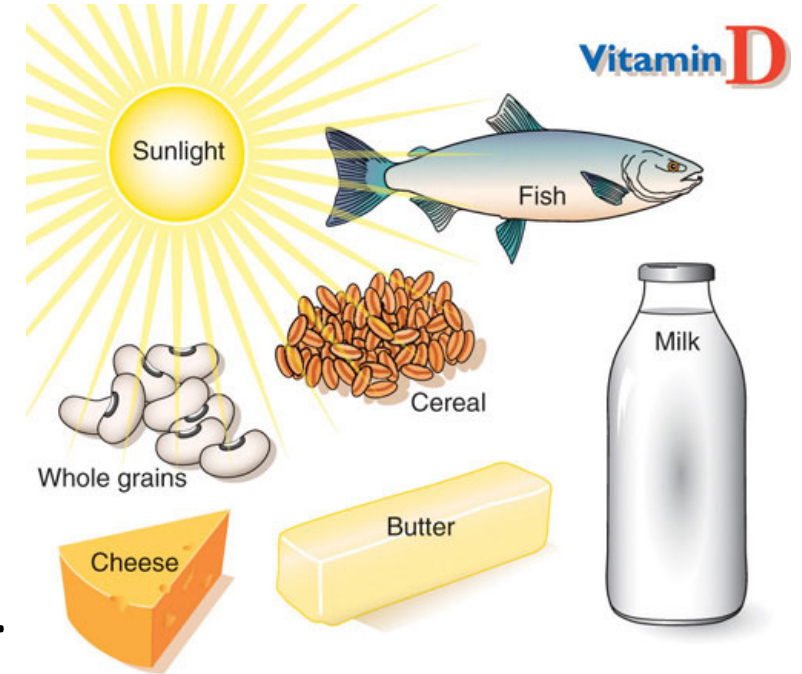




# VITAMIN D

## VITAMIN D SUMMARY

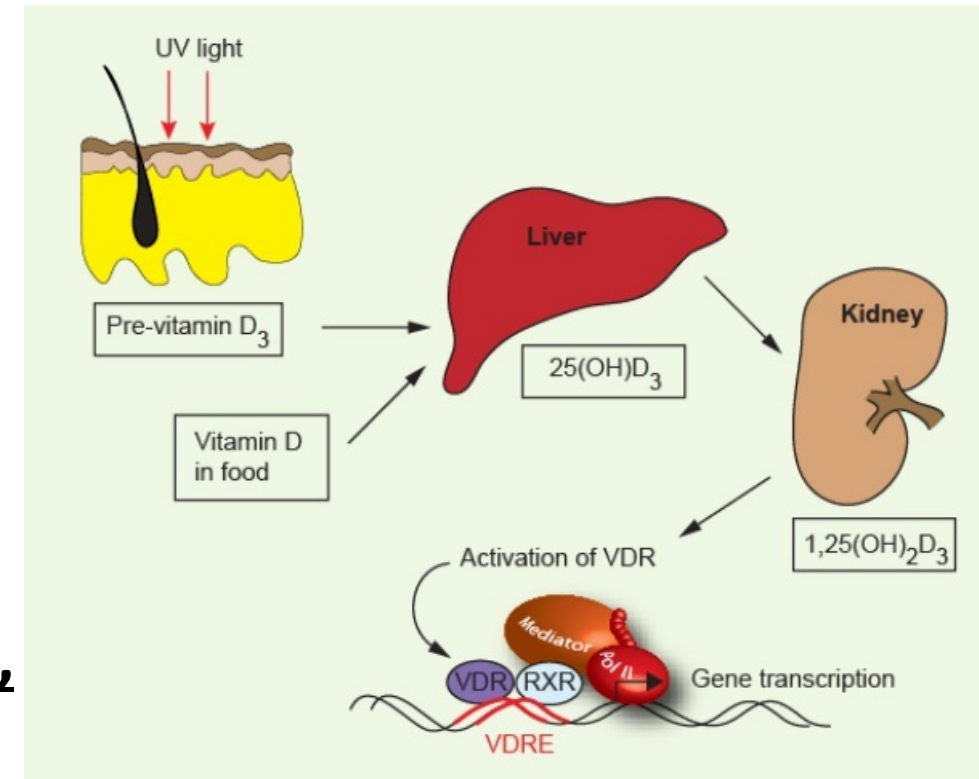
- Vitamin D in its active form is a hormone, not a vitamin.
- Vitamin D is available in 2 distinct forms, ergocalciferol ( \_\_\_\_\_ ) and cholecalciferol ( \_\_\_\_\_ ).
- There are only 3 known sources of vitamin D; sunlight, diet, and vitamin D \_\_\_\_\_.
- Only about \_\_\_\_\_ of vitamin D comes from our food.
- Diet sources of vitamin D: cod liver oil, cheese, egg yolks, mackerel, salmon, tuna fish, and beef liver (natural); orange juice, milk, yogurt, and cereal (fortified).
- **25-Hydroxy vitamin D test** [also known as the **25(OH)D test**] is best to see if there is a vitamin D deficiency.



# VITAMIN D

## ACTION OF VITAMIN D IN TISSUE

- Vitamin D binds to specific vitamin D receptors (VDRs) found in the:
  - outer root sheath (ORS) of the hair bulb, and
  - sebaceous gland in the hair follicles.
- VDRs regulate epidermal cell production and cell differentiation.
- Studies have demonstrated that VDRs are important for hair growth, especially anagen initiation.
- Vitamin D also helps build skin barrier and bone strength.





# VITAMIN D

## 25-hydroxy vitamin D test [25(OH)D]

### Treatment Options

- Normal Daily Dosage:  
400-800 IU (daily)

• Trichological Supplementation:  
\_\_\_\_\_ IU (daily)  
(reduce to \_\_\_\_\_ IU daily after 3 months or during summer)

- Medical Prescription:  
50,000 IU once-a-week (6-12 weeks)

- Annual or bi-annual blood testing recommended

# FOLATE/FOLIC ACID

## SUMMARY

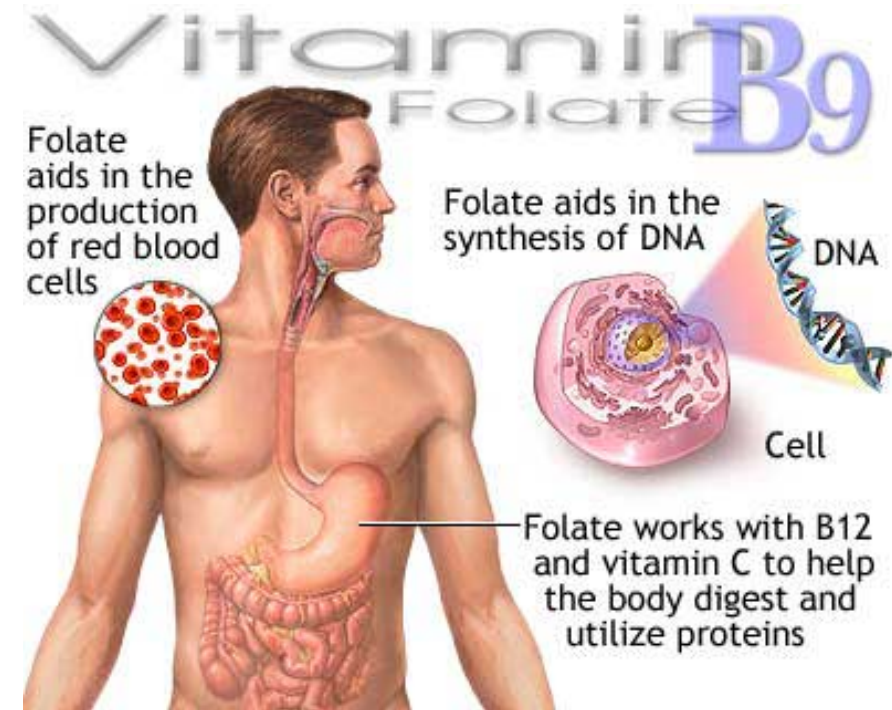
- Folate and folic acid are forms of a water-soluble B vitamin. Folate (also known as \_\_\_\_\_) occurs naturally in food, and folic acid is the synthetic form of this vitamin. Folic acid is found in fortified foods and \_\_\_\_\_.
- Folic acid helps in the production of new cells and plays a key role in brain functioning.
- Folic acid prevents birth defects particularly of the brain and spine during pregnancy.
- Folic acid works closely with \_\_\_\_\_ in **making red blood cells** and **helps iron function** properly in the body.
- Some specialists perform the blood test “RBC Folate” instead of “Serum Folate” as they feel it may be more accurate in assessing folate deficiency.
- Sources include cereals, baked goods, leafy vegetables (spinach, broccoli, lettuce), okra, asparagus, fruits (bananas, melons, lemons), legumes, yeast, mushrooms, organ meat (beef liver, kidney), orange juice, and tomato juice.



# FOLATE/FOLIC ACID

## ACTION OF FOLIC ACID

- As folic acid is biochemically \_\_\_\_\_, it is converted to active forms, (tetra-hydrofolic acid and methyl-tetrahydrofolate).
- These folic acid chemicals are transported across cells where they are needed to maintain normal \_\_\_\_\_ production and nucleic acids (important for DNA production).
- Using vitamin B12 as a cofactor, folic acid can normalize high homocysteine levels which has been thought to cause \_\_\_\_\_.





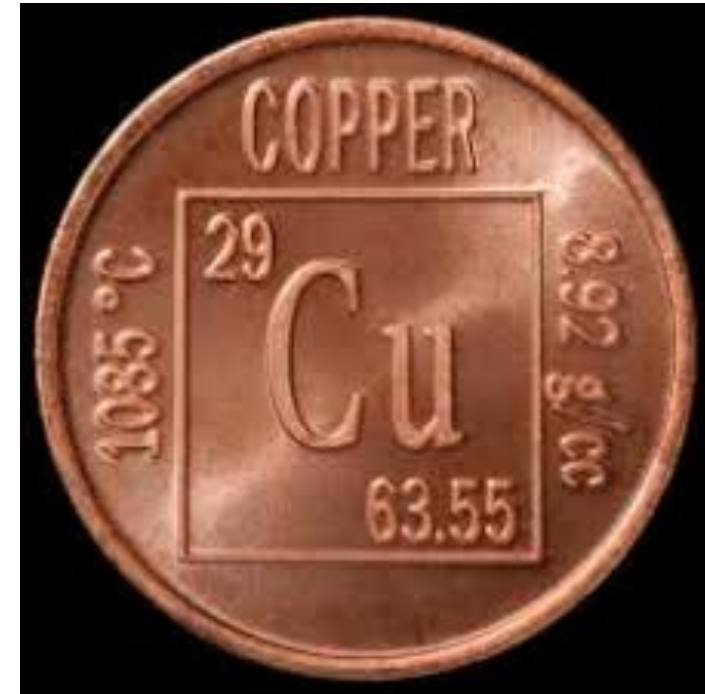




# COPPER

## SUMMARY

- Involved in the formation of \_\_\_\_\_, the synthesis of \_\_\_\_\_, and the formation of bone.
- Additional functions of copper are energy production, wound healing, taste sensation, skin and hair \_\_\_\_\_.
- Copper is also involved in the proper processing of collagen and elastin (**connective tissue**).
- Sources include: shellfish, beans, nuts, meat, and leafy greens.



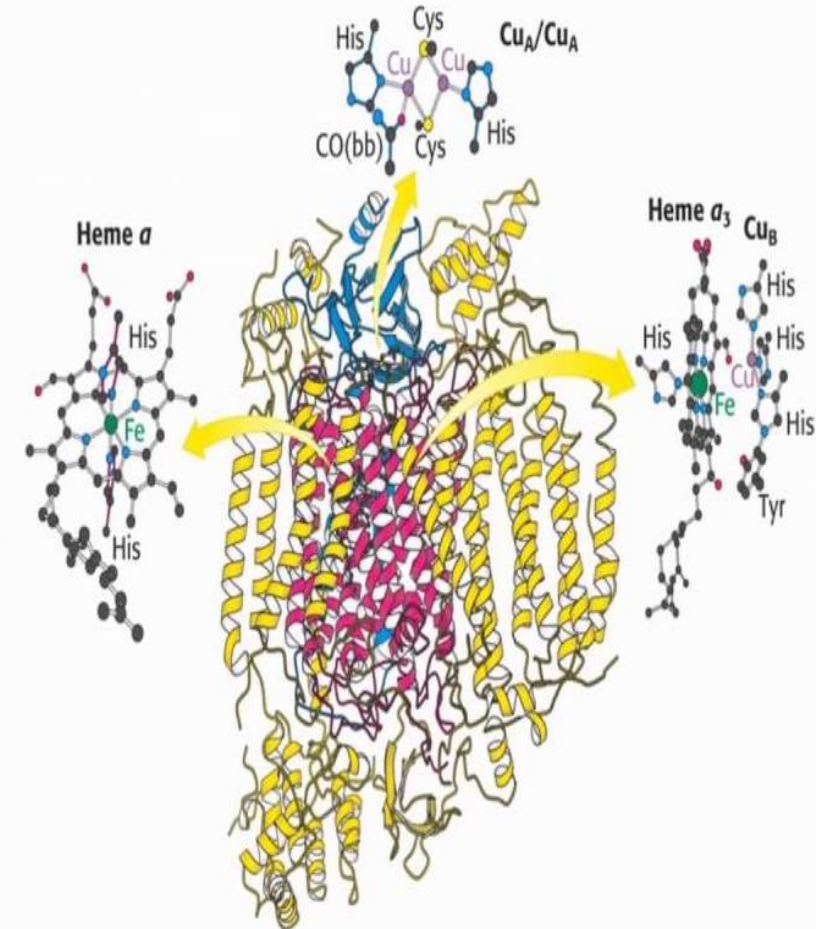
# COPPER

## ACTION OF COPPER

- Copper enzymes are important for many processes:
  - help iron bind to \_\_\_\_\_,
  - help in iron \_\_\_\_\_ through intestine
  - are important in \_\_\_\_\_ production (in the electron transport chain—cytochrome),
  - influence collagen and elastin production in the skin,
  - amino acid/protein synthesis.

### *Cytochrome c oxidase*

consists of **13 subunits** and contains **two hemes (two iron atom)** and **three copper ions**, arranged as two copper centers.





# COPPER

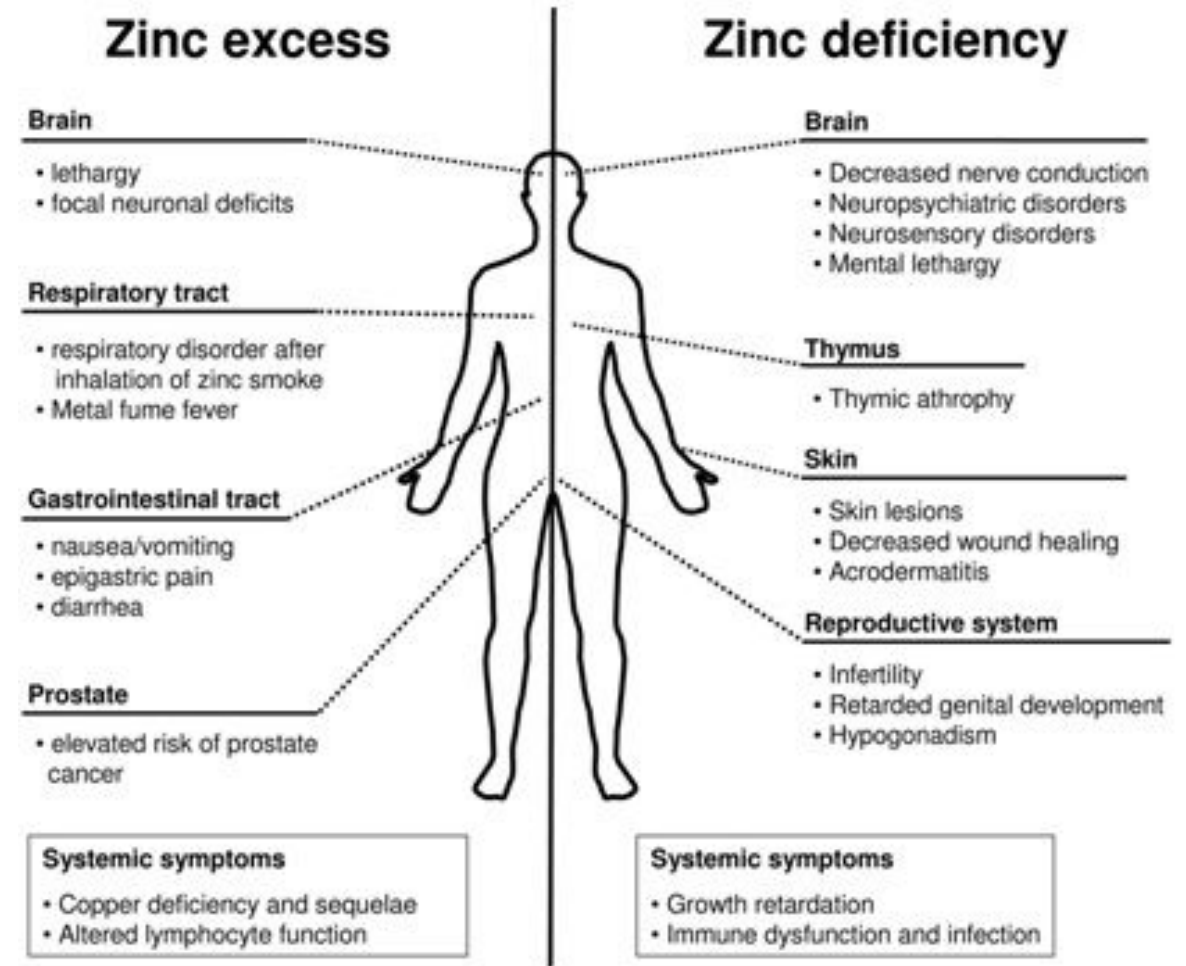
## Treatment Options

- Normal Daily Dosage:  
0.9 mg (daily)
- Trichological Supplementation:  
1.0 – 2.0 mg (daily)
- Medical Prescription:  
up to 10.0 mg (daily)
- Annual or bi-annual blood testing recommended

# ZINC

## SUMMARY

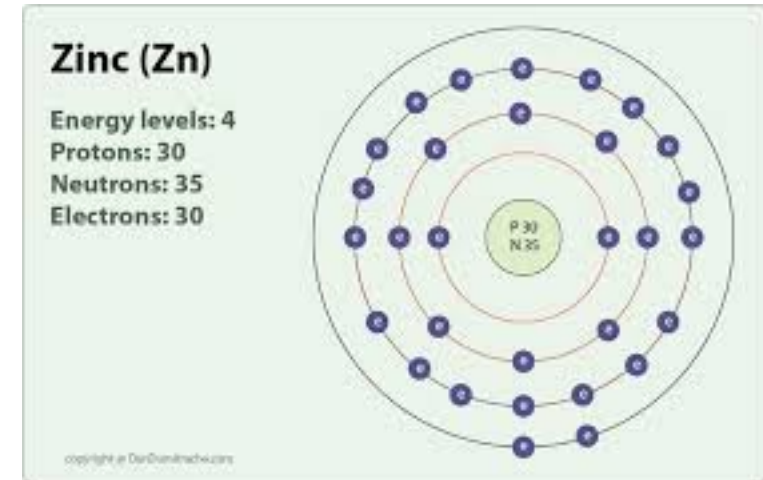
- The \_\_\_\_\_ most abundant trace metal in the human body.
- Helps with our sense of smell and improved \_\_\_\_\_.
- Sources include: seafood, meat, poultry, eggs, beans, nuts, soy products.



# ZINC

## Action of Zinc

- Important in over \_\_\_\_\_ different enzymes and thus is involved in a wide variety of biochemical processes.
- Interacts with the hormone insulin to ensure proper function and so participates in the regulation of \_\_\_\_\_.
- Necessary for \_\_\_\_\_ regulation.
- Promotes wound healing,
- Necessary for \_\_\_\_\_ and the processing of collagen.









# RELATIONSHIP BETWEEN ZINC vs COPPER vs IRON

- Iron supplements may \_\_\_\_\_ intestinal zinc and copper absorption and vice-versa, because these three elements compete for binding to the same \_\_\_\_\_ molecule located in the small intestine.
- Copper-dependent enzymes are needed to transport \_\_\_\_\_ in the body, and a lack of copper can cause iron deficiency.
- Zinc supplementation can cause an \_\_\_\_\_ of serum copper binders that \_\_\_\_\_ copper availability.
- Zinc and copper compete against one another in order to properly regulate the physiological pathways in the body. The proper \_\_\_\_\_ between the two is critical to maintaining health.
- Unlike zinc, copper can readily \_\_\_\_\_ in the body into toxic concentrations. In order to maintain adequate zinc levels, a higher dose of zinc compared to copper is required daily.

# VITAMIN/MINERAL SUMMARY

- Certain vitamins and minerals are needed for energy production (ATP) and/or for \_\_\_\_\_.
- Some of the important vitamins/minerals for these processes are:

## **IRON/FERRITIN:**

Protein Synthesis  
Tissue Oxygen Supply  
ATP Production (Stages 2 & 3)  
Co-enzyme

## **CBC:**

Hemoglobin  
Tissue Oxygen Supply

## **VITAMIN B12:**

Protein Synthesis  
Tissue Oxygen Supply  
ATP Production (Stage 3)  
Co-enzyme

## **VITAMIN D:**

Protein Synthesis  
Hair Cell Differentiation  
& Cycling  
Co-enzyme

## **FOLIC ACID:**

Protein Synthesis  
Co-enzyme

## **COPPER:**

Protein Synthesis  
ATP Production (Stage 3)

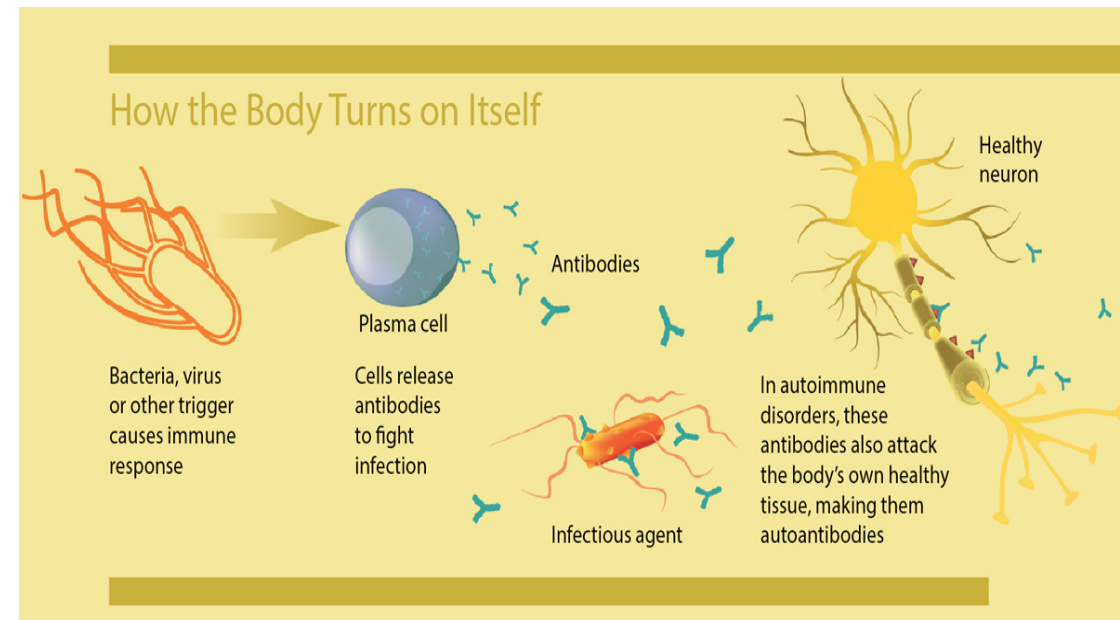
## **ZINC:**

Protein Synthesis  
Thyroid Maintenance  
ATP Production (Stage 1)

# ANTINUCLEAR ANTIBODY (ANA) TEST

## SUMMARY

- The **antinuclear antibody** (ANA) test is used as a primary test to help evaluate a person for \_\_\_\_\_ disorders that affect many tissues and organs throughout the body and is most often used as one of the tests to help diagnose **systemic lupus erythematosus (SLE)**.
- ANA testing may also be useful in patients/clients with \_\_\_\_\_ and **cicatricial alopecia** or \_\_\_\_\_ problems (Hashimoto's thyroiditis).
- By itself, a \_\_\_\_\_ does not indicate the presence of an autoimmune disease or the need for therapy.
- A **positive ANA** blood test shows that the immune system is making an \_\_\_\_\_ (protein) and that autoantibodies are present.
- Some \_\_\_\_\_ can cause a positive ANA such as:  
-chemotherapy treatments, anti-inflammatory drugs, antifungal medications, immunosuppressive agents.



# ANTINUCLEAR ANTIBODY (ANA) TEST

## RESULTS

Depending on the laboratory used for the blood test, the ANA test can give two types of results: 1) **the titer**, and 2) **the pattern**.

1) A **titer** result with a range of \_\_\_\_\_ is negative.

If the result is greater than \_\_\_\_\_, then it may suggest a positive ANA test result.

2) **Pattern** results include:

**Negative, Homogenous, Speckled.** All results (except negative) may suggest a positive ANA test result.

## **NOTE:**

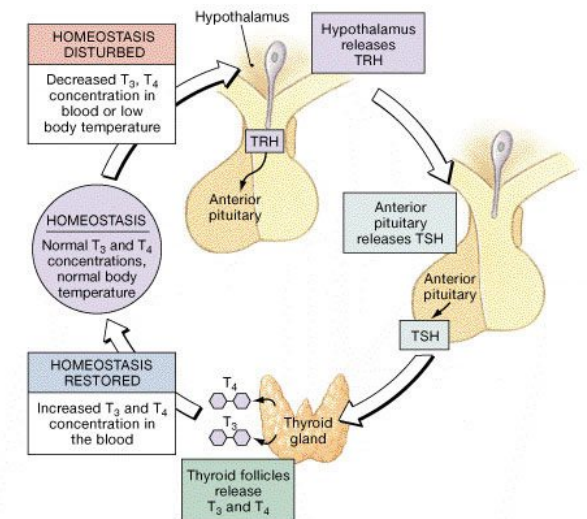
- Up to \_\_\_\_\_ of completely healthy people have a positive ANA test. This is called a “ \_\_\_\_\_ ” test result.
- Whatever the result, the client **must** check with his/her physician/rheumatologist.



# THYROID STIMULATING HORMONE (TSH)

## SUMMARY

- The thyroid gland influences the \_\_\_\_\_ of proteins, carbohydrates, lipids and minerals.
- Research studies have shown that hair follicles are directly affected by the \_\_\_\_\_ as thyroid hormones control many hair growth \_\_\_\_\_ such as hair cycle and hair pigmentation.
- Hair loss due to either **hypo-** (\_\_\_\_\_) or **hyper-** (\_\_\_\_\_) thyroidism can be assessed with the help of blood tests to identify any change in concentrations of **thyroid stimulating hormone (TSH)**.
- TSH is a hormone that controls thyroid gland activity. It's typically used as a marker of \_\_\_\_\_.
- Other thyroid tests may also be helpful in this assessment such as, triiodothyronine (\_\_\_\_\_) and thyroxine (\_\_\_\_\_).
- If the thyroid problem is rectified with \_\_\_\_\_, there can be an improvement in hair quality and hair regrowth.



# THYROID STIMULATING HORMONE (TSH)

## RESULTS

- Normal TSH levels for the average adult range from \_\_\_\_\_ mIU/L (milli-international units per liter).
- However, some specialists agree that a reading of \_\_\_\_\_ or less is truly ideal, with anything \_\_\_\_\_ mIU/L considered “at risk”.
- There has been an association shown between thyroid function and **ferritin** levels. It has been reported that the optimal ferritin level for thyroid function is between \_\_\_\_\_ ng/ml.
- Thyroid test results can be affected by certain \_\_\_\_\_, such as anti-inflammatory drugs, anti-anxiety medications, chemotherapy agents, anti-epileptic medications, and the oral contraceptive pill.

# BLOOD TESTS: CONTACTING A PHYSICIAN (EXAMPLE LETTER)

YOUR LETTER HEAD

DR'S NAME/ADDRESS

DATE

**Re: PATIENT/CLIENT'S NAME**

Dear Dr. ,

I would be very grateful if you could perform the following blood tests for the above client/patient, and either mail, email or fax the results to my office:

LIST OF TESTS

As a certified trichologist of the World Trichology Society, I know of the importance of testing thyroid function and the serum levels of ferritin, vitamin B12, vitamin D, and folic acid as possible causes of many hair loss conditions. This opinion is backed by previously published research in the Journal of Cosmetic Dermatology, British Journal of Dermatology, Dermatologic Clinics, Clinical Endocrinology, and the Journal of the American Academy of Dermatology, which have shown that low, or even low-normal, levels of some of these factors can have a detrimental effect on the efficacy of protein synthesis in the hair cell. This, in turn, can cause shortened anagen and lengthened telogen phases of the hair cycle.

Should you have any questions please do not hesitate to contact me.

Yours sincerely,



# EXAMPLE BLOOD TEST SHEET

- YOUR COMPANY DETAILS

PATIENT/CLIENT NAME: \_\_\_\_\_

## INSTRUCTIONS

- 1) **PLEASE TAKE THIS FORM TO YOUR PRIMARY CARE PHYSICIAN FOR A PRESCRIPTION.**
- 2) Stop all vitamins/supplements 48 hours before blood test (MUST continue with all medications unless told not to by your physician).
- 3) For menstruating women, do not take blood test during your menstruation as it may result in a false low in iron results.
- 4) Check with prescribing physician if 12 hour fast is needed.

## BLOOD TESTS FOR TRICHOLOGICAL EVALUATION

..... SERUM FERRITIN

..... PERCENT IRON SATURATION

..... TOTAL IRON BINDING CAPACITY

..... COMPLETE BLOOD COUNT (CBC)

..... VITAMIN B12

..... 25-HYDROXYVITAMIN D TEST

..... SERUM COPPER

..... SERUM ZINC

..... ANTINUCLEAR ANTIBODY (ANA)

..... THYROID STIMULATING HORMONE (TSH)

..... SERUM FOLATES

..... \_\_\_\_\_.

Research papers to help back up your blood test request (there are many, many more!)

- Journal of Cosmetic Dermatology
  - British Journal of Dermatology
    - Dermatologic Clinics
- Journal of the American Academy of Dermatology
  - Clinical Endocrinology

# Assessment of Vitamin D receptors in alopecia areata and androgenetic alopecia.

Journal of Cosmetic Dermatology

Authors: MMT Fawzi, et al.

- Conclusions:

1) Serum and tissue VDR (\_\_\_\_\_ ) levels were lower in AA (\_\_\_\_\_ ) as well as AGA (\_\_\_\_\_ ) patients when compared to controls.

2) This study suggests an important role for vitamin D receptors (VDR) in the \_\_\_\_\_ of Alopecia Areata (AA) and Androgenetic Alopecia (AGA) through documenting lower serum and tissue VDR levels in AA and AGA patients in comparison with controls.

# Biochemical and trichological characterization of diffuse alopecia in women

British Journal of Dermatology

Authors: DH Rushton, et al.

- Conclusion: This study suggests the following biochemical investigations could be undertaken as a basic screen for women with diffuse alopecia: \_\_\_\_\_.

# Vitamin D deficiency in Alopecia Areata

British Journal of Dermatology

Authors: AA Cerman, et al.

- Conclusions:

1) Deficient serum 25(OH)D levels are present in alopecia areata patients

\_\_\_\_\_.

2) The **lower** the vitamin D levels, the \_\_\_\_\_ the alopecia areata severity.

3) Screening alopecia areata patients for vitamin D deficiency seems to be of value for the possibility of \_\_\_\_\_.

# Management of hair loss in women

## Dermatologic Clinics

Author: DH Rushton

- Conclusion: An optimal hair growth potential is considered to exist when specific parameters for the following biochemical variables are operating:  
\_\_\_\_\_, and Hemoglobin.

# Evaluation and treatment of male and female pattern hair loss

Journal of the American Academy of Dermatology

Authors: EA Olson, et al.

- Recommendations for evaluation:
  - 1) Screening blood work is generally recommended in all women. Check \_\_\_\_\_ (thyroid stimulating hormone) and \_\_\_\_\_.

# Thyroid Hormones Directly Alter Human Hair Follicle Functions: Anagen Prolongation and Stimulation of Both Hair Matrix Keratinocyte Proliferation and Hair Pigmentation.

Journal of Clinical Endocrinology & Metabolism

Authors: van Beek N, et al.

- Conclusions:
- 1) Human hair follicles (HF) are \_\_\_\_\_ of thyroid hormones,
- 2) HF demonstrate that T3 and/or T4 regulate multiple hair biology parameters, ranging from HF \_\_\_\_\_ to \_\_\_\_\_.



The importance of adequate serum ferritin levels during  
[anti-androgen] treatment of women with  
androgen-dependent alopecia

## Clinical Endocrinology

Authors: DH Rushton, ID Ramsay.

- Conclusions:
  - 1) Some women with hair loss may require serum concentrations above \_\_\_\_\_ ng/ml.
  - 2) We would recommend monitoring vitamin B12 levels for women with hair loss, which should be maintained above \_\_\_\_\_ ng/L.

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# **ADVANCED TRICHOLOGY COURSE END OF PART II**