

## INDIANA TTAPS PART 4

**BIOCHEMICAL STRATEGY AND METHODOLOGY TO RESOLVE CHRONIC NEURO-MUSCULAR-SKELETAL DIAGNOSES, AS IT AFFECTS THE SUBLUXATION COMPLEX**

**COURSE SUBJECT:** PATIENT TREATMENT UTILIZING TAYLORIZED NUTRITIONAL BALANCING, BIOCHEMICAL INDIVIDUALITY, HERBS, SUPPLEMENTS AND ENZYMES

**COURSE DESCRIPTION:** **16 HOURS**, INCLUDES:

**4 INDIANA REQUIRED HOURS OF PUBLIC HEALTH/RISK MANAGEMENT [SECOND DAY]**

**METHOD OF INSTRUCTION:** VERBAL, HANDOUTS, QUESTIONING/CRITIQUING

PROGRAM SPONSOR:

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Four Seminars:

1. Reflexes [minimal scar tissue causing nervous system abnormalities]
2. Scar Tissue and Rehabilitation [denser scar tissue causing nervous system abnormalities]
3. Adjustments, Manipulation and Mobilization Techniques for scar tissue in and around joints
4. Body Chemistry Correction Methods for non-neurological causes

DETAILED HOUR-BY-HOUR SYLLABUS:

**DETAILED HOUR-BY-HOUR SYLLABUS:** (TEXAS ADMINISTRATIVE CODE, RULE 75.7(b)(2))

**4 Hours INDIANA REQUIRED PUBLIC HEALTH/RISK MANAGEMENT [DAY 2]**

**MAIN COURSE OF INSTRUCTION [12 HOURS]:**

Main curriculum references:

<b>Human Biochemistry, 9<sup>th</sup> ed, Orten and Neuhaus, Mosby, 1975</b>
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Pages noted are beginning of section referenced from this, or a specific page within the text

<b>Textbook of Medical Physiology, 5<sup>th</sup> ed, Guyton, 1976</b>
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Pages from this is referenced, for example, as G-p. 1

**1<sup>st</sup> hour:**

REMEMBER THIS PRIMARILY ABOUT VITAMIN, MINERAL, HERB AND ENZYME THERAPY:

### 1/3-1/3-1/3 RULE

FOR PRE-EXISTING SYMPTOMS AFTER ANY GIVEN SUPPLEMENT IS ADMINISTERED:

- 1/3 IMPROVE from a low range into an adequate range
- 1/3 UNALTERED within a low or adequate range
- 1/3 WORSEN from an adequate into an excess range: the **REVERSE EFFECT**

PRIMARY CONSIDERATIONS FOR A GIVEN PATIENT WHO HAS A SUFFICIENT NUTRIENT INTAKE:

- IS THIS A “**CERTAIN SUSCEPTIBLE PERSON**”: [AGE], **GENOTYPE** OR **INDUCED WEAKNESSES**?
- WITH REGARD TO **CERTAIN NUTRIENTS**: WHAT MAY BE INTERFERING WITH PROPER **ABSORPTION OR METABOLISM** IN THIS INDIVIDUAL?
- WITH REGARD TO **NORMAL CHEMICAL DEGRADATION**, SECRETION AND EXCRETION: WHAT MAY BE INTERFERING WITH PROPER METABOLISM IN THIS INDIVIDUAL?

### DEFICIENCIES

- PRIMARY OBJECTIVE SHOULD BE TO SURMIZE CAUSE(S),
- SECONDARY, CORRECT WITH DIETARY, POISON AVERSION OR OTHER MEASURES,
- TERTIARY, SUPPLEMENT TO OPTIMIZE WITH AS LITTLE INTERVENTION AS POSSIBLE

CAUSES:

- LACK OF INGESTION
- LACK OF ABSORPTION
- EXCESS OR DEFICIENT EXCRETION OR SECRETION
- INHALATION OR INGESTION OF POISONS
- PRODUCTION OF INTRINSIC POISONS by failure to breakdown and excrete or secrete metabolic intermediates
- EXCESS INGESTION OF CHELATORS WITH FOODS OR MINERALS
- EXCESS INGESTION OF BIO-UNAVAILABLE VS. BIOAVAILABLE SUBSTANCES
- CREATING AN IMBALANCE WITH INGESTION OF MINERALS OR VITAMINS
- INFECTION OR DISEASE
- SURGERY

### ENZYMES

These are the chemical basis for life. They enable chemical reactions to occur in a fraction of a second at body temperatures and pressures that would normally take hours, days months or years at high temperatures and pressures. We couldn't live in these bodies without them.

Enzymes require a certain pH range to be activated and are regulated by hormones and feedback systems.

Enzymes are proteins with cofactors such as minerals and vitamins.

### FEEDBACK SYSTEMS

The body works on a **NEGATIVE FEEDBACK SYSTEM** such that when something becomes overabundant, production of a precursor is lessened or halted.

A **POSITIVE FEEDBACK SYSTEM** is like **CANCER**: when something is produced, then MORE is produced without inhibitory systems interfering and stopping it

### Inorganic Factors, p. 529

Inorganic compounds are needed to provide a suitable medium for protoplasmic activity. The irritability of muscle and nerve cells, the permeability of cell membranes and the normal functioning of all cells depend on a proper balance of the diverse ions, particularly  $H^+$ ,  $Na^+$ ,  $K^+$ ,  $Cu^{++}$ ,  $Mg^{++}$ ,  $OH^-$ ,  $HCO_3^-$ ,  $Cl^-$ ,  $HPO_4^-$  and  $SO_4^{=}$ .

They play a primary role in osmotic phenomena, having much to do with the flow of tissue fluids, absorption and secretion.

Several salts are of utmost importance in acid-base equilibria.

Tissues, especially bones and teeth, have a high mineral content for hardness and rigidity.

Some minerals become parts of specialized physiologic compounds, such as hemoglobin's iron and thyroxine's iodine.

Other ions are essential to a number of enzyme systems, such as manganese, magnesium and potassium.

About 13 trace elements [p. 544] are essential.

### ANTIOXIDANTS

PROTON or ELECTRON DONORS

### DISTILLED WATER

LOADED WITH HYDRONIUM [ $H_3O$ ]

IS THE CHEAPEST ANTIOXIDANT MONEY CAN BUY

### THE VITAMINS

AVITAMINOSIS, p. 553-7, 623-3

This may occur:

**Primary** or direct, attributable to a deficient intake, found from a dietary history.

**Secondary**, a "conditioned deficiency" from other factors such as:

GI disorders

Poor teeth

Anorexia

Allergies

Malabsorption

Increased excretion  
Imbalance

If prolonged, can lead to:

Gradual decrease in tissue levels found in **blood, urine or tissue analysis**  
Biochemical lesion found in reduced enzyme levels, altered metabolites, etc.  
Anatomic lesion found in clinical evaluation  
Cellular pathology and diseases **observed in clinical symptoms**

## FAT SOLUBLE VITAMINS

→Depend on bile for optimal absorption←

### Vit. A, p. 557-70

A1, or Retinol, and A2, or 3-dehydroretinol, **have about the same physiologic activity**, qualitatively, but A1 promotes the growth of rats much more actively

Retinol can be manufactured from carotenes, **except in diabetes**.  $\beta$ -Carotene is the most effective provitamin yielding 2 molecules, the others form only one molecule of vitamin A. The conversion occurs primarily in the **intestinal wall** and to some extent in the **liver**. Carotene is not absorbed as easily as retinol and a considerable amount is lost in the feces. **Bile salts** and **fat** are required **in the intestine** for **carotene** absorption.

When the liver oil is ingested, the retinol esters are hydrolyzed by **pancreatic esterases** and the vitamin rapidly absorbed into the intestinal mucosa. The esters cannot be absorbed unhydrolyzed, such as in diarrhea. Bile is not necessary for the absorption of vitamin A, although **it is helpful**.

In cases where there is a stoppage of bile, **bile salts** or **dessicated bile** should be administered to be sure the **provitamin** is taken up.

The vitamin is recombined with **fatty acids** immediately after passage through the gut wall, then the vitamin esters are conveyed by the portal vein to the **liver**, where they are stored in ester form. Vitamin A is then redistributed to the various organs via the bloodstream in the form of a **protein complex**.

**Toxicity, especially in children:** loss of appetite, weight loss, irritability, fissuring at the corners of the mouth, cracking and bleeding of the lips, loss of hair, liver enlargement, bone and joint pains.

Deficiency **adversely affects growth** of young, as do lack of other vitamins or other essential nutritive factors.

**Night blindness** is the best known deficiency symptom.

This is termed the **“Antibiotic/Anti-infective” vitamin**, although it doesn't do it directly

The specific influence this vitamin has is on **Epithelial structures**.

Photophobia is avoidance of light.

**Xerophthalmia is keratinization** of cells of lacrimal glands which then **stop secreting tears**, the external surfaces become dry: **Dry Eyes**. The external surfaces become dry and have a dull appearance, ulcers form, **bacteria aren't washed away**, the eyelids swell and become sticky and scaly. Frequently there are bloody exudates and severe eye infections. If not treated in time, blindness results, but in most instances death occurs because of **respiratory infections** before this occurs because of keratinizing epithelium for the normal epithelium in various parts of the respiratory tract, alimentary tract, eyes and paraocular glands and the **genitourinary tract**. One of the results of this keratinization is the loss of cilia in the respiratory epithelium. These ordinarily tend to sweep upward bacteria-laden foreign particles and thus combat infection.

Vit. A is necessary for **reproduction** and **lactation**, just as essential as vit. E, as is **normal taste acuity**. Both the intensity and the quality of taste are affected because of distinct histologic changes in the taste buds and surrounding tissue.

**Skin conditions** frequently result from a deficiency, such as **dryness and scaliness of the skin** in early stages.

Sometimes small pustules [follicular **hyperkeratosis**] appear around hair follicles or extensor surfaces of the upper and lower extremities on the shoulders, neck, back, lower abdomen and buttocks. They are hard and pigmented and surrounded by a zone of pigmentation. Sometimes the pimples resemble acne except that there is seldom any pus. Another finding is **urinary calculi**.

It's necessary in **tooth formation** because the enamel layer is an epidermal structure.

Paralysis and nerve degeneration because deficiency may retard **bone growth**, particularly endochondral bone while the CNS and other soft tissues continue to grow at a nearly normal rate, which can have an effect on the nervous system, even crowding the brain, entirely mechanical in origin.

**Atrophy of the testes** may occur.

A general function is **maintenance of epithelial tissues** in a normal condition, by perhaps playing a role in the **differentiation of epithelial cells into specialized cells and tissues**. For this reason recent work suggests that retinol may in some way exert potential protection from carcinogens/mutagenic agents particularly in the early **preneoplastic stage**. Since tumorigenesis generally involves a loss of differentiation, such a possibility appears plausible. There is evidence that a number of carcinogens are much more potent in animals that have had a long-term deficiency of vit. A.

Vision:

Light-sensitive rods and cones require vit. A for their formation and proper functioning. Their outer segments are surrounded by pigment epithelium cells that store vit. A. The pigment contained in the outer segments of the rods [visual purple/rhodopsin] is a conjugated protein consisting of a protein [opsin] linked to a prosthetic group, the red-colored aldehyde called neo-b retinene/11-cis-retinal.

Rhodopsin is extractable from the rods by **mild detergents** [**bile salts** or digitonin] with which it forms a soluble complex.

**Bone density:**

A large study concluded that a high intake of vit. A was associated with loss of bone density, but only with a low intake of vit. D. Another showed that overtaking or undertaking vit. A resulted in loss of bone density.

**Joint surfaces:**

Because vit. A is necessary in the maintenance of epithelial tissues, joint surfaces need it to be formed and maintained.

**Joint lubrication:**

Because vit. A maintains epithelial tissues, those that **exude joint lubrication** need it.

**Mucopolysaccharides:**

Retinol appears to be involved with mucopolysaccharide **biosynthesis at an enzymatic level** by increasing the incorporation of <sup>35</sup>S and <sup>14</sup>C-glucose into chondroitin sulfate. The effect may involve sulfate formation or activation, which explains the damage to mucus-secreting epithelial tissues manifested as xerophthalmia, and dryness and keratinization of the skin and epithelium of the gastrointestinal and genitourinary systems in vit. A deficiency.

**Nucleic Acids:**

Retinol may have some relation to **nucleic acid metabolism**, since there is a decrease in the DNA content of several organs during vit. A deficiency, remedied by administration of it.

**Electron Transport:**

Retinol may also be involved in **electron transport systems**.

**Milk:**

Both carotene and vit. A are secreted by the mammary gland, and **Human Colostrum** has 2-3 times more than does human milk, with human milk having 5-10 times the vit. A activity of cow's mil.

**Vit. E has a sparing action on vit. A**, i.e. vit. A and carotene are more effective in curing their deficiency symptoms if vit. E is **administered at the same time**. Ingestion of **α-tocopherol increases the storage** of vit. A in the liver and **prevents the oxidation of vit. A**.

The antioxidant properties **of E are enhanced by**, for example **Phenols** and **Ascorbic Acid/vit. C**.

**Good sources:** A1 predominates in Cod liver oil and other saltwater fish; A2 in those of freshwater fish; fish roe, flesh of oily fish, livers of other animals, butter, eggs and cheese.

The Provitamin/carotenes occur most abundantly in carrots and other yellow vegetables, e.g., squash, sweet potatoes and many green vegetables, particularly broccoli, spinach and beet greens.

**2<sup>nd</sup> hour:**

<b>Vit. D, p. 20, 432-3, 570-80</b>
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Meets **the definition of a "Hormone"**.

Absorption from the intestinal tract **requires the presence of bile salts**. After absorption cholecalciferol is transported in the plasma **tightly bound to an  $\alpha_2$ -globulin**.

There are at least 10 compounds known to have antirachitic properties, designated D<sub>1</sub>, D<sub>2</sub>, etc. 5 are well-defined as chemical compounds, but only two are of great importance:

D<sub>3</sub> is animal-derived, cholecalciferol, of fish liver oils, in milk and eggs and produced on irradiation of the skin and when 7-dehydrocholesterol is irradiated [this can be produced, for example, by irradiating milk]

D<sub>2</sub> is plant-derived, ergocalciferol.

Pathological calcification occurs with overload of D<sub>2</sub>

1,25-dihydroxycholecalciferol [active form of D<sub>3</sub>] has 2 primary effects:

Acts on the intestinal mucosal cells to increase the absorption of calcium and phosphorus by inducing the biosynthesis of a calcium-binding protein essential to the active transport of calcium and phosphate through the intestinal mucosa, increasing the plasma level of calcium and phosphate and increasing their availability for deposition in the bones.

It must be **modified first by the Liver, then by the Kidney to become the active form after ingestion**, requiring **NADPH** and **molecular oxygen**.

Biosynthesis in the kidney is stimulated by the parathyroid hormone in response to a decrease in the plasma level of calcium and phosphate, then it acts together with the **parathyroid hormone** to mobilize calcium from bone, thus, must be regarded as a **calcium-mobilizing hormone**.

Excess:

Nausea, anorexia, weakness, headache, digestive disturbances and polyuria, kidney damage and **calcification of other soft tissues**.

**Excretion** is gradual through the bile, taking several months.

Deficiency:

Tetany, manifested by muscle twitching.

**Rickets** in children [rachitic rosary in ribs]

**Osteomalacia** [adult rickets] in adults

Ratio of calcium to phosphorus is constant in the bones.

Blood serum can show normal calcium, but decreased phosphorus.

Serum calcium and phosphorus equaling or exceeding 40 mg/100ml, rickets does not develop, whereas below 30 always leads to rickets.

There is also a noticeable increase in serum alkaline phosphatase, corrected with vit. D.

**Antibiotics** prevents both the rise in serum calcium and increased transport of calcium normally induced by vit. D.

**Good sources:** Sunlight [Ultraviolet] irradiation of foods containing precursors of the vitamin [cholesterol], cod liver oil and other fish-liver oils and the best natural sources. The edible portions of oily fish [sardines, salmon, herring] are also excellent sources.

**Vit. E, p. 580-2**

**Tocotrienols** help vitamin E to work.

Vitamin E prevents oils from oxidation rancidity.

When **vitamin E is in capsules with added oils, it is used up and less potent.**

**When vitamin E is frozen, it becomes inactivated, when it is thawed, it cannot be reactivated.**

Vitamins A, C and E must be taken in a balance.

When one is taken without the others the other 2 are depleted.

When 2 are taken without the other, the third is depleted.

α-Tocopherol is the most potent of the tocopherols

Is an alcohol

**If it ends in anything but ol, it's synthetic**

If it has a word behind it, it's synthetic

**Destroyed by freezing and excessive PolyUnsaturated Fatty Acids [PUFAs]**

**Maintains cell wall Membrane permeability**

**Cell wall permeability** allows nutrients and water into cell and waste out of cell

Prevents Scar Tissue formation by **keeping cell walls pliable**

Prevents 60% of second heart attacks

Spared by Vit. C

**Needs Selenium**

**Good sources:** Found in all oils [cottonseed, corn, peanut and wheat germ are particularly good. Green lettuce leaves and orange peels also have a high content and nearly all green-leaved plants have some. It is also found in meat, butter, milk, eggs and fish-liver oils], except Olive oil.

Bile salts and the presence of fats are believed to be useful or even essential for absorption.

**Vit. K/Phylloquinone, 582-6**

Coagulations vitamin

Requires bile to be absorbed (small intestine)

**Obstruction of the bile ducts (jaundice ensues) causes clotting to be delayed**

When given orally, bile or bile salts have to be present.

Deficiency is slowing of the rate of blood clotting, increased prothrombin time (p. 822)

Sensitive to light

Activity is abolished by irradiation, alkalies, strong acids and oxidizing agents

K<sub>1</sub> is obtained from the **alfalfa leaf, cabbage, cauliflower, kale, spinach and other green vegetables.**

Good sources are **tomatoes, cheese, egg yolk and liver.**

K<sub>2</sub> is **produced by bacterial synthesis**, is synthesized by microorganisms in the **intestinal tract.**

Both have the same general activity, but K<sub>2</sub> needs more from diet

The vitamin **isn't part of the prothrombin molecule** but has some influence on the production of prothrombin by the liver

Its administration is ineffective if the liver is so badly damaged that it cannot produce prothrombin or if the intestine is incapable of absorbing the orally administered vitamin.

Menadione is more potent than K<sub>1</sub>, is soluble in oil, sparingly soluble in water and stable to air when protected from light. Its diphosphate ester is water soluble and is widely used clinically.

Deficiency: remarkable tendency to bleed profusely from minor wounds, and slight bruises result in extensive subcutaneous hemorrhages.

Vit K in the form of Coenzyme Q (2,3,-dimethoxy-5-methylbenzoquinone) is a component of the electron-transfer system and in oxidative phosphorylation (p. 210) as an electron acceptor.

It has a genetic action in inducing RNA formation for the synthesis of blood-clotting proteins.

It appears to be needed for the carboxylation of the γ-carbon atom of glutamic acid residues in prothrombin to form calcium-binding sites.

**Salicylates** are antagonistic to vit. K

Coenzyme Q Group, p. 587

**Has the ability to cure or protect against vit. E deficiency**

Are active in electron transport or oxidative phosphorylation or both (p. 207)

<b>Antistiffness factor/ Stigmasterol</b>
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A plant sterol with a formula similar to ergosterol.

Its absence is alleged to cause stiffness of the wrists and elbows of guinea pigs. The muscles atrophy and become streaked with bundles of fine white lines of calcium deposits. Calcium phosphate is found under the skin, in the joints and elsewhere. **Cod-liver oil accelerates and intensifies the onset**

In its crystalline form its administration in doses of 0.01 μg per day for 5 days is claimed to cure the above conditions.

Found in: fresh kale or alfalfa and fresh cream.

## WATER-SOLUBLE VITAMINS

The individual water-soluble vitamins bear no closer resemblance to each other chemically than do the fat-soluble vitamins. They are conveniently grouped together merely because of their solubility in water, the first basis for their classification, which is also of some importance from the nutritional and clinical aspects, i.e., vitamin deficiencies are likely to be multiple in nature and often may be mixed fat-soluble or mixed water-soluble vitamin deficiencies.

Water-soluble vitamins include ascorbic acid, thiamin, niacin, riboflavin, pyridoxine, pantothenic acid, biotin, folic acid, and cobalamin. P-aminobenzoic acid, inositol,  $\alpha$ -lipoic acid and choline are frequently included in this list, but many nutritionists believe these aren't true vitamins. None but possibly  $\alpha$ -lipoic acid appears to be a coenzyme or a part of one.

### Ascorbic Acid/vit. C, p.588

Scurvy was probably the first disease to be definitely associated with a food deficiency and was common in Europe, occurring frequently among sailors (scurvy dogs).

It is very sensitive to oxidation, particularly in the presence of copper, but not of aluminum, therefore, **foods prepared in copper vessels lose ascorbic acid quickly.**

This factor is rapidly destroyed by alkalis, but fairly stable in weakly acid solutions, consequently baking soda has a harmful effect, but cooking in steam has little destructive action on the ascorbic acid of foods if they are neutral or slightly acid. Drying/dessication vegetables usually results in a loss of ascorbic acid.

Sources: citrus fruits and tomatoes are the best sources. Other sources are better, but are little-consumed or inedible. Green peppers and parsley are richer than oranges. Spinach and other greens are good sources of it, but lose their vit. C content progressively on storage at room temperature. Citrus fruit juices and tomato juice may be canned with slight loss, but should not be permitted to be in contact with air for a long period of time because of loss by oxidation.

Raw cantaloupes strawberries, cabbage and turnips are all about equivalent of tomatoes, but cabbage and turnips lose some in cooking. Potatoes, fresh peas, asparagus and lettuce are good sources.

Plant polyphenols play an important part as antioxidants in protecting ascorbic acid from oxidative destruction: rutin, quercetin and related flavonols. The effect is believed to be indirect because of the chelation of heavy metal ions ( $\text{Cu}^{++}$ , etc.) that catalyze the oxidative degradation of ascorbic acid. The vit. C-like action of the so-called bioflavonoids is attributed to this protective action, thus decreasing oxidative losses of ascorbic acid from foods, etc. during storage or in the intestinal tract, especially in individuals in achlorhydria or hypochlorhydria.

In 1928, Szent-Györgyi found a "hexuronic acid" **with high reducing power in the adrenal cortex** and later showed that it had antiscorbutic properties.

Best sources: corpus luteum, liver, fish roe and milt, citrus, tomatoes,

**Vitamin C as ascorbic acid is normally in a balance with dehydroascorbic acid.**

**Elevated dehydroascorbic acid mimics vitamin C deficiency.**

**An acidic diet, such as from a lot of wheat or animal protein, causes ingested ascorbic acid to be converted into dehydroascorbic acid.**

**Therefore eating an acidic diet causes a relative vitamin C deficiency.**

**Bioflavonoids help vitamin C to work**

Deficiency symptoms: Joints become swollen and tender, perhaps enlargements of the junctions of the ribs with cartilage and other bone lesions, hemorrhage of gums and loosening or breaking of the teeth, anemia, pains in the joints and hemorrhages from the mucous membranes of the mouth and gastrointestinal tract skin, muscles and subperiosteal tissues. Gums show swelling, tenderness, gingivitis, redness, ulceration and even gangrene. Weakness and emaciation ensue. **A white line is seen on the outside of the bony shaft**, not seen in normal bone. The pathological change is a weakening in the endothelial wall of the capillaries **because of a reduction in the amount of intercellular substance**.

Ascorbic acid is essential for the production of intercellular material (p. 656) **and it is necessary for the healing of wounds and fractures of bones.**

Low values have been found in infectious disorders, congestive heart failure, kidney and liver diseases, gastrointestinal disturbances, purpura, endocrine cases and malignancies. In none of these is it a primary causative factor, but the reduction may be significant as a result of an increased requirement or a lowered threshold for its excretion. Burns, fractures or extensive surgery also show a pronounced diminution.

Small amounts of orange juice change the picture even at a late stage and animals may be brought back to an almost normal condition quite rapidly.

A major function of ascorbic acid is formation of tissue collagen *intercellular cement substance*. It is also essential to the activity of the enzymes proline hydroxylase and lysyl oxidase which catalyze the conversion of proline to hydroxyproline and lysine to hydroxylysine, which are vital in maintaining the tertiary structure for collagen (p. 657). Higher concentrations of the enzyme and vitamin (p. 656) are found in injured tissues in which wound healing and scar tissue or callus formation occur.

Its link to the **mitochondrial electron-transport chain** (p. 207) is at the stage of cytochrome c, so the oxidation of a metabolite through 1 mole of ascorbic acid yields 1 mole of ATP by oxidative phosphorylation (p. 210).

Involvement of ascorbic acid in biologic oxidations is predictable because of the readily reversible conversion of ascorbic to dehydroascorbic acid.

Ascorbic acid is required in the metabolism of tyrosine (p. 327) and normally protects the enzyme that oxidizes *p*-hydroxyphenylpyruvic acid, a metabolic product of tyrosine.

Other functions of ascorbic acid are its role in the **conversion of folic acid to a physiologically active form** of tetrahydrofolic acid (p. 609) and a need for it in the **hydroxylation of cholesterol to cholic acid** (p. 287).

It's also acts as a regulator of cholesterol metabolism, accelerating the rate of conversion of acetate to cholesterol in the **adrenal glands**.

Deficiency causes anemia because it aids in the absorption and possibly utilization of iron.

**3<sup>rd</sup> hour:**

## **B Vitamins**

**Except for Thiamin** (p. 594), members of the vitamin B complex are reasonably heat-stable.

A given B deficiency is almost always accompanied by deficits of other vitamins. This is true of all vitamin B complex-deficiency conditions in man, and perhaps of other vitamin deficiencies as well.

<b>B<sub>1</sub>/Thiamin, p. 594</b>
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The **Antineuritic** or antiberiberi factor [Aneurin]

Severe deficiency causes:

Arrested growth in young animals

**Polyneuritis** in animals causing inability to fly, **walk or even stand, bradycardia**, malfunction of the **blood-brain barrier** permitting pyruvic acid to enter the brain directly. **Altered metabolic pathways in the brain** must occur which may be responsible for the polyneuritis that develops. Beriberi in man, characterized by polyneuritis with **muscular atrophy, cardiovascular changes and pitting edema**. At first weakness and fatigue followed by **headache, insomnia, dizziness, loss of appetite and other GI symptoms, constipation, diminished flow of urine, whining, rapid irregular pulse and tachycardia, rigidity, enlarged heart, cyanosis**. Later symptoms: nervous symptoms, **edema and serous effusions, cardiac involvement**.

Almost always accompanied by deficits of other vitamins, which is true of all vit. B complex deficiency and perhaps other vitamin deficiencies as well.

Stable up to 100°, which alkali hastens.

**Causes inhibitory influence on appetite, is necessary component of Alcohol Dehydrogenase**

Found in: whole grains, legumes, beef, pork, liver, heart, kidney, fish roe. nuts and yeast, less so in eggs, milk, fish and many vegetables and fruits.

Milling take 80% out of grain, so it is enriched back in, and lost if water in which foods are cooked is discarded, so use it in soups, gravies and sauces. Polished rice is also deficient

It's involved in the intermediate metabolism of carbohydrates in all body cells. Several oxidative phenomena are dependent on it, which rate is increased with it, such as breaking down lactate and pyruvate.

Linked to 2 molecules of phosphoric acid becomes Thiamin pyrophosphate (TPP) or diphosphothiamin (DPT), which is a coenzyme, cocarboxylase, each requiring a protein apoenzyme and takes part in decarboxylation of of  $\alpha$ -ketoacids, esp pyruvic and  $\alpha$ -ketoglutaric (chap. 8).

It's involved in transketolation (p. 236)

Usually the level of cocarboxylase parallels the level of thiamin in blood, but in diabetes mellitus there is a high thiamin content with a low cocarboxylase.

As the pyrophosphate it functions primarily as a coenzyme in the decarboxylation of  $\alpha$ -keto acids including pyruvic and  $\alpha$ -ketoglutaric and is a component of the multienzyme complex pyruvic dehydrogenase.

Various factors that influence the requirement may be related to the amount of carbohydrate metabolized.-high carbohydrate decrease it, whereas protein has no specific effect, but in view of its limited distribution in foods it's almost the only vitamin that be lacking even in a fairly good diet.

With symptoms of cardiovascular disturbance, Weiss showed that B<sub>1</sub> usually ameliorates them though the patient is suffering from a lack of several vitamins, and GI disorders have been ascribed to the deficiency as well as lack of appetite and loss of muscular tone.

A certain group of symptoms are frequently caused by lack of thiamin, including loss of appetite, **low gastric hydrochloric acid**, atony of the stomach and intestines, constipation and a strong tendency toward the development of intestinal inflammatory processes. It may require parenteral administration for this reason.

#### B<sub>2</sub>/Riboflavin, p. 598

Pellagra is caused primarily by a deficiency of niacin, but also exhibits a lack of riboflavin.

Deficiency can cause cessation of growth, **vascularization of the cornea**, loss of hair and scaliness of the skin, and later, **cataracts** may develop.

**Cheilosis**, inflammation of the lips, fissures at the corners of the mouth, scaliness, **greasiness** and fissures in the folds of the ears and nose; and initial trauma or infection followed by a skin lesion; ocular disturbances like **inflammation of the cornea, bloodshot eyes, photophobia, dimness of vision** and **itching, burning and dryness of the eyes** with redness of the conjunctivas may occur.

Occurance: milk [lactoflavin], meats [esp. liver and kidney], fish and eggs, **leafy vegetables**. Fruits, root vegetables and whole grains AREN'T good sources.

Flavoproteins [combinations of riboflavin with protein] are enzymes that function in tissue respiration as components of the electron-transport system and in several enzymes including L- and D-amino oxidases, xanthine oxidase, cytochrome-c reductase, and certain dehydrogenases.

The prosthetic group is usually FAD [flavin adenine dinucleotide, p. 206] and FMN [flavin mononucleotide].

The flavoproteins are important intracellular enzymes involved in oxidation-reduction reactions.

#### B<sub>3</sub>/Niacin. P. 599

Pellagra [black tongue, soreness and inflammation of the tongue and mouth, alimentary disorders such as **achlorhydria** and **diarrhea, pigmentation and thickening of the skin** which may persist for years after the dermatitis has healed, nervous disorders and **mental disturbances**, black flaky skin dermatitis] cure

not only required niacin, but good quality protein foods as well supplying tryptophan [lacking in corn, present in casein] that stimulates nicotinamide. Riboflavin and thiamin are usually deficient as well.

**Tryptophan** can be **transformed into nicotinamide** by the body tissues: tryptophan is converted to kynurenine [p. 333], which is converted in the liver and kidney to hydroxyanthranilic acid in the presence of pyridoxine, which substitutes in animals for nicotinic acid.

Apathy and lesions in the mouth such as the inner surfaces of the lips and cheeks becoming covered with pustules and the mucous lining coming away in shreds, intense salivation and bloody diarrhea, pustules on the thorax and upper abdomen, tender bleeding gums may lead to ulceration and necrosis of the gums may occur.

Occurrence: Meats, especially liver, fish and eggs, whole wheat and rice, vegetables and peanuts.

**Biounavailable:** a number of vegetable articles of diet contain sparing niacin firmly bound to a protein.

Nicotinamide is a part of two important coenzymes, NAD<sup>+</sup> and NADP<sup>+</sup>, nucleotides that are members of enzyme systems involved in cellular respiration as components of the electron-transport system.

Nicotinamide and riboflavin are intimately associated in these reactions.

#### **Nicotinamide aggravates depressive disorders**

This occurs when NAD grabs 2 hydrogens from a reduced substrate by a dehydrogenase and leaves an oxidized substrate. FAD then grabs the 2 hydrogens becoming FADH<sub>2</sub>.

NAD is important in a microsomal system for biologic oxidations [p. 198] and NADPH(H<sup>+</sup>) in biosynthetic reactions such as biosynthesis of fatty acids (p. 265) and various steroids (p. 282).

### **B<sub>5</sub>/Pantothenic Acid, p. 605**

Dermatitis, **gray hair**, inflammation of nasal mucosa, spectacled eye [more characteristic of Biotin], atrophy of the adrenal cortex from stress, **corneal changes of vascularization**, thickening and **opacity**, interference with **sexual function and reproduction** and neurologic lesions, easily fatigued, cardiovascular disturbances and GI symptoms, **numbness and tingling of the extremities**, mental depression and **upper respiratory infections**.

Occurrence: just about in everything. Deficiency has to be artificially induced.

Forms a part of **coenzyme A, the only function of this vitamin**.

### **B<sub>6</sub>/Pyridoxine, p. 602**

Deficiency causes swelling of the ears and wrists and dermatitis of the hands and feet and nasal region followed by incrustation.

A major function is as a coenzyme for the **transaminases** (p. 206).

The change from pyridoxal to pyridoxamine and vice versa is required in transamination reactions (p. 296-transamination involves all amino acids, excepting lysine and threonine).

3 different  $\alpha$ -keto acids participate in transamination: pyruvate,  $\alpha$ -ketoglutarate, and oxalaoacetate.

Transamination reactions are catalyzed by specific enzymes called “aminotransferases/transaminases”.

All the aminotransferases are pyridoxal phosphate dependent, forming pyridoxamine phosphate upon accepting an amino group.

Transaminases are present in heart and liver tissues in relatively high concentrations, and damage to these organs leads to transaminase leakage into the blood serum, showing cardiac and hepatic damage.

Is necessary for **conversion of Tryptophan to Nicotinamide**.

In its aldehyde form, pyridoxan, it increases the rate of transport of amino acids and of potassium into cells against a gradient.

**With Magnesium is necessary for the prevention of excessive oxalate formation.**

Is involved in the **metabolism of unsaturated fatty acids**.

Occurrence: **egg yolk**, meat, fish and mild, whole grains, cabbage and legumes.

Symptoms: carpal tunnel syndrome, PMS, fall in hemoglobin, alteration of **leukocyte** relationships, depression and mental confusion, skin lesions, peripheral neuritis, general irritability, abdominal distention, vomiting and diarrhea and convulsions.

Tryptophan metabolism is **altered** during and shortly after **pregnancy**, so B<sub>6</sub> should be elevated at these times, as it should be with **high milk consumption** and **estrogen** administration.

Homocysteine accumulation causes atherosclerosis.

#### CARPAL AND ULNAR TUNNEL

B<sub>6</sub>-decreases swelling around the nerves

AVOID MILK PRODUCTS [DEPLETES B<sub>6</sub>]

NO ANIMAL PROTEIN FOR 3 WEEKS, THEN NO MORE THAN 1 PER 5 MEALS [DEPLETES B<sub>6</sub> AS TRANSAMINASE]

#### TRANSAMINASES

B<sub>6</sub> IS A TRANSAMINASE: **HEAVILY COOKED ANIMAL PROTEIN** UNDERGOES DEAMINATION [DENATURING], THUS NEEDS MORE B<sub>6</sub> TO TRANSAMINATE REMAINING AMINO ACIDS TO MAKE COMPLETE PROTEINS

#### B<sub>7</sub>/Biotin, p. 608

Deficiency produced by eating large quantities of **raw egg white** [avidin combines with and forms a complex that can't be absorbed-denatured by heating the egg white, which denatures the avidin]: extensive dermatitis, **spectacled eye**, **hair loss** [denuded areas], swelling, redness of the lips, brown scaliness of the skin with extensive **dermatitis**, **eyes become gummed shut**, **edema of hands and feet**, progressive **spasticity**, **anemia**, anorexia, nausea, lassitude and muscle pains.

Ordinarily **intestinal bacteria synthesize sufficient biotin** for the body needs

Occurrence: widely distributed.

Functions in **carbon dioxide fixation** or carboxylation, such as in conversion of pyruvic to oxaloacetic acid.

It also functions in the conversion of acetyl CoA to malonyl CoA in the **biosynthesis of fatty acids**.

Biotin is a component of the enzyme carbamyl phosphate synthetase which reacts with bicarbonate, glutamine and ATP to form carbamyl phosphate, glutamate and ADP.

It acts in the biosynthesis of arginine and pyrimidines [nucleic acids].

#### CARBON DIOXIDE, p. 306

Is converted by **biotin** to carboxybiotin.

#### B<sub>9</sub>/Folic Acid/Folacin, p. 609

**Necessary for growth.**

**Chemotherapy inhibits.**

Composed of: pteridine, p-aminobenzoic acid [**PABA**] and glutamic acid

**B<sub>12</sub> and ascorbic acid** is involved in the conversion to folinic acid, the citrovorum factor [CF], which is **perhaps a thousand times more active biologically**. These are concerned in the production of an agent that stimulates the formation of normal red blood cells.

Folic acid is first converted to **tetrahydrofolic acid [THFA]** in the presence of **NADPH** and **ascorbic acid**. This is **the active form of Folic Acid**.

THFA is involved in the transfer of the methyl group [p. 305] and in the utilization of single carbons [formate] in the synthesis of serine, thymine, purines, methionine, choline and nucleotides such as inosinic acid. Folic acid also plays a role in tyrosine metabolism [p. 327] and erythrocyte formation [p. 767]

#### TETRAHYDROFOLIC ACID

Folic Acid Needs B<sub>12</sub> (p.306) or vit. C (p. 611) for conversion to this active form, which is needed for metabolism of **Homocysteine** to Methionine.

Methionine is converted to S-adenosyl methionine [**"SAM"**], which is converted to: **choline**, creatine, carnitine, **epinephrine**, etc.

Excess of **Homocysteine elevates cholesterol**.

Biounavailable: Most of the folic acid in foods is present as a polyglutamate, which **are poorly absorbed**, but the **mucosal cells of the duodenum and jejunum** contain a deconjugating enzyme that splits off the glutamate residues, then the monoglutamate is readily absorbed from the normal intestine.

Deficiency: **decreased resistance to malarial infection** and **impairment of the response to estrogens**, **absence of normal pigmentation of the hair**, **leucopenia**, diarrhea, edema, lesions of the mouth, megaloblastic anemia, glossitis and GI tract disturbances. It **relieves SPRUE/Celiac Disease by improving the blood picture and relieving the GI symptoms, maintaining GI absorption.**

Because it masks B<sub>12</sub> deficiency, the FDA restricts its use in “one-a-day” type vitamin preparations.

<b>B<sub>12</sub>/Cobalamin Group, p. 612</b>
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Prevents pernicious anemia.

A unique feature of the B<sub>12</sub> compounds is the presence of the cobalt atom in the trivalent state.

Cyanide is present in B<sub>12a</sub> is cyanocobalamin, which is a minor component of the total cobalamins, and may be an artifact produced by decomposition of the major component, now shown to be coenzymes B<sub>12</sub>.

They are highly active as growth factors. The active forms of the cobalamin vitamin group appear to be the adenine containing coenzymes B<sub>12</sub>. **Sodium Bicarbonate/baking soda destroys B12.**

The single **cobalt** atom is in the center of the **porphyrin**, like iron in heme and **magnesium** in **chlorophyll**.

“**Intrinsic Factor**” is a glycoprotein and may serve as a carrier in increasing intestinal transport, or it may “protect” the vitamin from, or render it unavailable to, intestinal bacteria and is necessary for the absorption of B<sub>12</sub>. Present in **normal gastric juice** [low pH due to **Normal HCl levels**].

Maximal absorption of it in man occurs in the lower ileum.

It has an influence in various phases of metabolism such in the synthesis of nucleic acids and the metabolic pathways of glycine, serine, methionine and choline, more probably as a transmethyating agent, and as a coenzyme in the biosynthesis of thymine, methionine and possibly choline in this way, probably at least 7 or eight different enzyme reactions.

**4<sup>th</sup> hour:**

<b>Choline, p. 618</b>
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Is not a true vitamin.

Is a constituent of the **Lecithins** [p.910], an essential component of cell membranes and lipoproteins

Deficiency occurs in diabetics and fatty liver

Feeding **raw pancreas cures fatty liver**, and the effective agent, or one of the effective agents, was found to be the choline part of **lecithin** present in the pancreatic tissue, the **lipotropic action of choline**.

Low choline can produce **anorexia** and a **failure to grow**.

Together with manganese and folic, choline prevents perosis [**slipped tendon disease**] and prevents cirrhosis of the liver.

Methionine and choline with betaine contain **methyl groups**.

Low choline produces **hemorrhages of the kidneys and eyes** and if the diet is low in methionine as well the **hemorrhagic condition appears in other organs also**. An anemia and hypoproteinemia also develops.

If methionine is added to a low-choline diet, it **decreases liver fat**, probably because it offers a **methyl group** to offer the system, and a shift of the methyl groups is required in fat metabolism, transmethylation [p.305].

A choline deficient diet develops **high blood pressure**, perhaps resulting from renal damage, **causing extensive fibrosis of the renal capsule**.

A significantly **decreased resistance to infection** and **decrease in immunoglobulin formation** [p. 753] can occur.

Occurrence: meats, **egg yolk**, bread, cereals and various other vegetables, especially beans and peanuts.

#### Inositol, p. 620

Occurrence: a muscle extractive [p. 679], brain, erythrocytes and tissues of the eye, widely in plants in fruits, vegetables, whole grains and nuts, and also in milk and yeast contain considerable amounts.

Found in nature in at least 4 forms: free inositol, phytin, phosphatinositol, and a water-soluble, nondialysable complex.

Phytin is the mixed calcium and magnesium salt of inositol **hexaphosphate** [**phytic acid**].

It **enhances the release of oxygen** of **oxyhemoglobin** [p. 798].

#### p-amino-benzoic acid, p. 620

Deficiency causes **failure to lactate**, **graying of hair** and lack of growth.

Greeley, the arctic explorer, **became gray** after a 9-month period of undernutrition. After he had eaten a normal diet for a while, his hair darkened perceptibly.

Has a bacteriostatic effect.

Blocks the bacteriostatic effect of sulfanilamide in high levels.

Interestingly, the bacteriostatic potency of each sulfa drug is directly proportional to the drug's ability to counteract the bacteriostatic action of PABA.

**PABA forms part of the folic acid molecule.**

#### Bioflavonoids/vitamin P [for permeability], p. 621

Citrin in lemon peel consists of a mixture of flavonoids having physiologic activity associated with the maintenance of normal **capillary permeability and fragility**. The active factor is hesperidin, shown to have similar physiologic activity exerted.

Hesperidin, its aglycone hesperitin, rutin and its aglycone, quercetin all have comparable actions.

Compounds of this type have been found capable of interacting with various metabolites and enzyme systems that can affect the vascular system.

They have been utilized clinically, with good results, in the treatment of diseases in which vascular abnormality is a factor.

The principal action [p. 588] of the bioflavonoids is as an antioxidant [**chelating of heavy metal oxidative ions?**], thus protecting **ascorbic acid** from oxidative destruction. Thus, their effect is indirect on the maintenance of normal capillary permeability, via ascorbic acid.

Occurrence: in the **juice, peel or pulp of citrus fruits**, in tobacco leaves, in buckwheat, and currants and many other fruits and vegetables.

#### Biosynthesis of vitamins, p. 623

**Bacteria produce** large amounts of vitamin K and biotin and an instance of metabolic synthesis is seen in the tryptophan-niacin transformation [p. 333].

The continued use of antibiotics orally results in vitamin deficiency signs in many cases, caused by the destruction of vitamin-elaborating organisms in the gastrointestinal tract.

#### CONDITIONED VITAMIN DEFICIENCIES, p. 624

A large number of intestinal bacteria can decompose ascorbic acid. Decomposition is rapid and complete, but is inhibited by the presence of any sugar that can be fermented by the organisms. Niacin and possibly thiamin and folacin are also susceptible to destruction by intestinal flora.

IMBALANCES, p. 624

For instance, **vit. E has a sparing action on vit. A** and instances of interdependence of the members of the B complex have also been observed.

#### ACID AND BASE-FORMING PROPERTIES OF FOODS

When a food is incinerated, the ash remaining has an acid, alkaline or neutral reaction, depending on the proportion and type of anions and cations present.

When the same food is consumed by a person, its final products **sometimes** have the same reaction as the ash, but other factors can modify the ash left by metabolic processes.

Proteins, phospholipids and nucleoproteins yield sulfuric, phosphoric, and uric acids. These acids are neutralized by basic elements before excretion and thus tend to diminish the alkaline factors of blood and urine. Fruits and vegetables usually have enough positive ions such as calcium, magnesium, sodium and potassium to balance the acid produced from proteins.

**Organic acids**, citric, malic, tartaric and lactic present in fruits and vegetables are **oxidized to carbon dioxide, lost by way of the lungs**.

Potassium salts of the above acids, also occurring in fruits are oxidized, yielding potassium bicarbonate, which, if present in excess, is excreted in the urine.

Thus, vegetables, even acid fruits, have an alkaline effect.

There are some exceptions: benzoic acid, present in **cranberries, plums and prunes** is not oxidized by the body and is **excreted as hippuric acid** [after combining with glycine] and thus has an acidic effect on the urine; oxalic acid, found in rhubarb, beet leaves, cocoa, and tea is oxidized poorly and is neutralized and **excreted as oxalate**.

**5<sup>th</sup> hour:**

### **HORMONES, p. 379**

Communication is a most important problem in a multicellular organism and it is essential that various tissues interrelate so that each can play its particular role in the function of the whole body.

**Two types of mechanisms are involved: neurologic, requiring the operation of the nervous system, the other is chemical and requires the production of regulatory substances called hormones. These two systems interrelate in a very carefully tuned system that regulates metabolism.**

Hormones are produced by special cells or glands such as the adrenals, intestinal mucosa, ovaries, pancreas, parathyroids, pituitary, testes and thyroid.

Only particular target or effector cells may respond to a hormone, and a given hormone may elicit different effects in different tissues.

Hormones are usually classified into three main groups:

1. Steroids [derived from cholesterol]
2. Derivatives of amino acids [aromatic amino acids such as phenylalanine, tyrosine and tryptophan serve as parent compounds for these]
3. Peptides and proteins

**Hormones do NOT initiate new reactions in cells, but serve to regulate critical or rate-limiting reactions in a metabolic pathway.**

The necessary equipment for a hormonal response is inherent to the target cell at the time of differentiation.

**None of the hormones is secreted at a uniform rate.**

Adrenal hormones are secreted in a diurnal rhythm.

Gonadotropins [gonad-stimulating pituitary hormones] are secreted in complex cycles, such as in females to coincide with such events as ovulation and menstruation or pregnancy and lactation.

Others respond to environmental factors such as:

- Insulin and glucagon responding to the glucose level in the blood
- Aldosterone responding to the Na<sup>+</sup> concentration
- Parathormone and calcitonin to the Ca<sup>++</sup> concentrations of the blood
- Thyroxine responding to environmental temperature
- Enterogastrone responding to the fat in the diet

Generally, there are two kinds of hormonal systems **acting to maintain the status quo**:

An adaptive system responding to outside environment

A homeostatic system responding to the internal environment

All hormones exert their effect in biocatalytic concentrations, such as glucagon inducing glycogenolysis in concentrations of only  $10^{-6}$  molar

AMPLIFICATION dictates that a single liver cell may respond to a single molecule of glucagon, yet it produces many molecules of glucose from glycogen. Thus, the impact of a single molecule can be amplified into an effect involving hundreds of thousands of glucose molecules.

TURNOVER of hormone molecules is extremely rapid, continually lost either by metabolism, conjugation or excretion, otherwise there would be an uncontrolled accumulation of hormone, which would be disastrous in response. Hormonal response **MUST** be transient and carefully controlled.

Hormones exert multiple actions, such as in a given cell, as that a hormone **may stimulate the biosynthesis of a given enzyme**, but require an **increased cellular permeability** that the necessary amino acids can enter the cytoplasm from the environment. Necessary RNAs must be produced and all these reactions will require a stimulation of ATP production, etc.

Hormones exhibit a high degree of cellular specificity so that only the target cell will respond to the hormone despite the hormone being found throughout the body. A receptor site recognizes the particular hormone.

Different tissues of an organism may respond differently to the same hormone, such as glucocorticoids signaling the breakdown of protein in muscle tissue but are anabolic in their effect on the liver.

Recognition requires a specific complexing of the hormone molecule to a receptor molecule [a sensor] to form a hormone-receptor complex **in or on the surface membrane** of the cell. Once the sensor has detected the hormone, the resultant H-R complex might lead to a secondary reaction that yields a "second messenger" being the **intracellular** communication system and be instrumental in triggering the metabolic responses.

Another possibility is for the hormone or the complex to **penetrate the cell membrane**, enter the cytoplasm and migrate to the nucleus where the hormone could exert its effect **at the genetic level**, a hormone-gene or nuclear-based action and one in which the hormone exerts its effects at the cytoplasmic level.

For example:

1. Estradiol stimulates RNA synthesis by enhancing RNA polymerase activity
2. Testosterone is converted to dihydrotestosterone, is bound to its specific binding protein, then acts at the chromosomal level to elicit a selective transcription of mRNA
3. Glucocorticoids stimulate the production, by induction of gluconeogenic enzymes

Genetic induction of protein syntheses stimulated by a process of hormonal derepression involves the transcription of all types of RNA, mRNA, tRNA, and rRNA which would increase the rate of translation at the genetic level, such as:

1. Insulin
2. Androgens
3. Erythropoietin
4. Corticosteroids
5. Estrogens

**Frequently, the action of a hormone is magnified by the addition of theophylline [including caffeine] to the system.**

Theophylline magnifies glucagon stimulating the uptake of amino acids by the liver.

**Hormones that influence the permeability of membranes by affecting transport mechanisms are:**

1. **Epinephrine**
2. **Parathormone**
3. **ACTH**
4. **Glucagon**
5. **Aldosterone**
6. **Thyroxine**
7. **Growth hormone**

ACTH stimulates:

1. Steroidogenesis in adrenal cortex cells [p. 395] but not in testicular tissue
2. Glycogenolysis in adrenal tissue but not in liver

Hormones that bind at receptor sites on the cell membrane:

1. Insulin
2. ACTH
3. Glucagon
4. Epinephrine

**The presence of an appropriate binding [glyco]protein on the cell membrane must be the determining factor. Thus the glycoprotein acts as the nervous system at the cell membrane level.**

Prostaglandins are derived from eicosatrienoic acid and arachidonic acid and:

1. Cause strong contractions of the uterus
2. Have a **vasodilatory** effect on adipose, adrenal and **uterine tissue**
3. Exert an inflammatory effect in wound healing
4. Exert a modulatory function in sympathetic innervated tissues
5. Are found in renal tissues, appearing to function in the stimulation of sodium transport

The pituitary/hypophysis is attached by a stalk to the hypothalamus, the hypothalamo-hypophysial system, representing an extension of the CNS terminating in a hormone-producing gland.

The two systems of communication in humans, the neural and hormonal, act in concert.

**Adrenal cortex, p. 396**

Exposure to stress, cold, trauma, etc. causes a fall in the **ascorbic acid** level in this gland.

The blood level of ACTH seems to influence the rate of secretion of ACTH probably by way of the **negative-feedback loop** exerted by the release of the adrenal steroids.

### Thyroxine, p. 401

Biosynthesis is dependent on presence of adequate **iodine**.

Absorbed **iodide** present in the circulating blood is trapped within the thyroid cells so 70-80% of body **iodine** is concentrated in this gland. Trapping of **iodide** requires active transport across the cell membrane. Release of TSH can stimulate the **iodide** pump, increasing the concentration gradient several hundred times.

Trapping **iodide** may be inhibited by certain agents such as thiocyanate and perchlorate, which compete with **iodide** for the transport mechanism. Once inside the cell, **iodide** is oxidized by an enzymatic process requiring thyroid peroxidase and **hydrogen peroxide**, iodinating tyrosine the precursor of thyroxine, yielding monoiodotyrosine/MIT, then diiodotyrosine/DIT.

Two DITs condense to become tetraiodothyronine/thyroxine/T<sub>4</sub> and alanine. Condensation of MIT to DIT forms triiodothyronine/T<sub>3</sub>.

TSH acts to:

1. Increase pinocytotic engulfment of colloid, leading to the proteolytic release of T<sub>3</sub> and T<sub>4</sub>
2. Increase the **iodide** trapping process
3. Increase the oxidation of **iodide** to **iodine**
4. Increase glucose metabolism by way of the pentose pathway

The iodinated tyronases have no thyroxine activity, but T<sub>3</sub> has 3-8 times that of thyroxine.

A conversion of T<sub>4</sub> to T<sub>3</sub> can also occur in the presence of **B<sub>6</sub>, Fe and Linoleic Acid**.

Thyroid affects growth and development and has a stimulating effect on total metabolism:

1. The cardiovascular system
2. The GI tract functions
3. Muscular activity
4. Increased synthesis of all forms of RNA: m, r and t
5. Increases oxygen consumption of tissues, related to glucose oxidation

Hyper: protrusion of eyeballs, dilated pupils, mental excitement and irritability

Hypo: skin becomes thick and puffy, swellings under the eyes caused by a deposition in the skin of additional protein, slower mentally and physically, low BMR, increased deposition of fat, high blood cholesterol

Goitrogenic foods are anti-thyroid: cabbages, turnips, soy, peanuts and mustard seeds, which causes elevated TSH [**negative feedback**]

**Physiologic/Clinical Hypothyroidism:** many symptoms of it, but all blood levels are within normal range  
→ hormone isn't working at the cell membrane or nucleus level because of halogen interference with iodine or iodide: perchlorates [in streams and rivers], chloride, fluoride, bromide [in bread conditioners, sodas]

### IODINE IS FOUND IN ALL CELLS AND ORGANS

IS NEEDED IN THYROID TO MAKE TRIIODOTHYRONINE, WHICH IS 5 TIMES AS POTENT AS T4 [THYROXINE]

LUGOL OF IODINE CONSISTS OF IODINE AND IODIDE

ORGAN USE OF IODINE:

**LUGOL OF IODINE** AND INTESTINAL CRITTERS: IT USED TO BE USED AS AN ANTIBIOTIC, PAINTED ON, AND CAN BE USED IN THE INTESTINES TO KILL PATHOLOGIC BACTERIA

**LUGOL OF IODINE** AND CANDIDA

IODINE ABSORPTION IS BLOCKED BY OTHER HALOGENS SUCH AS FLUORIDE, CHLORIDE, PERCHLORATES, ETC.

**6<sup>th</sup> hour:**

### Adrenocortical hormones, p. 406

All hormones produced by the adrenal cortex are **steroids** [p. 281], **derived from cholesterol**, occurring first in the **mitochondrial electron transport chain**, requiring **Niacin** [NAD], **Riboflavin** [FAD] and **Fe**.

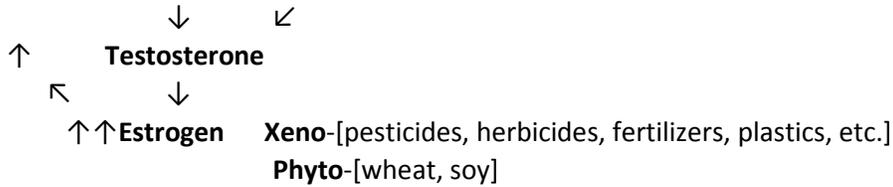
The adrenal cortex **hypertrophies during perimenopause**, then takes over making sex hormones during menopause, EXCEPT when it DOESN'T hypertrophy properly due to **high STRESS**.

### Sex hormones, p. 408

Cholesterol is converted to vitamin D by sunlight, then to Pregnenolone, Progesterone, then directly to Testosterone or via DHEA. Testosterone is converted to Estrogen.

Xenoestrogens, such as in pesticides, herbicides and plastics, BPA in receipts, phthalates in fragrances and Phytoestrogens, high in wheat and soy make your body think you're already too high in estrogen, so it slows the production of Pregnenolone/Progesterone [which is primarily concerned with keeping ligaments and tendons pliable, and density in bone], and Testosterone [which is primarily responsible for strength and endurance].





**Fatty tissue** produces estrogen and progesterone, especially postmenopausal in adrenocortical stress hypoplasia, thus contributing to non-responsive and inconsistent weight-loss obesity, basically your body needs the fat to produce hormones so it keeps the weight on, or re-instates it plus some after weight loss.

**Glucocorticoids are antagonistic to insulin** [can raise blood glucose in excess by providing a supply of carbohydrate, blood glucose and glycogen at the expense of endogenous protein, which is degraded to amino acids]

**Aldosterone** regulates electrolyte balance to produce Na<sup>+</sup> reabsorption/retention and K<sup>+</sup> excretion. Other target tissues are: **salivary glands, sweat glands** and **intestinal mucosa**.

**Elevated cortisone:** hypertension, headaches, skin eruptions, confused mental state, and diabetes.

**Adrenal Medulla, p. 396, 422**

Methyl donor is S-adenosyl methionine [**S.A.M.**]

**Epinephrine** increases cardiac output and raises blood pressure, increases pulse rate, causes vasodilation of skeletal and cardiac muscle by **vasoconstriction of skin** and splanchnic vessels and causes hyperglycemia when injected, relieving hypoglycemia caused by insulin.

**Norepinephrine** decreases pulse rate

The Cortex hypertrophies during menopause to take over the function of production of Sex Hormones.

Hysterectomy doesn't proper allow time for Cortex hypertrophy.

High Stress doesn't allow for proper hypertrophy.

High Stress causes excess secretion of Epinephrine in Fight or Flight.

Prolonged high stress causes excretion of Cortisol.

**ADIPOSE TISSUE, p. 253**

**Progesterone, Estrogen and Testosterone** are manufactured here and can take the place of producing these in Menopause. This tissue hypertrophies and multiplies in response to underproduction of Sex Hormones by Adrenal Cortex.

When Adrenal Cortex hypertrophies and produces adequate amounts of Sex Hormones with menopause [womenopause], this tissue is no longer needed abundantly for the function and is used as energy.

**CHOLESTEROL**

Is used to make a lot of hormones and vit. D

Is converted into bile salts by vit. C

Bile salts reduce surface tension, thus are detergents or **surfactants**, helping digestion and absorption

The bile salts, after helping to digest and absorb fats and cholesterol and other substances are absorbed into the blood stream

At the cellular level these surfactants reduce the surface tension of water, thus allowing chemical reactions to occur **at the cell membrane level**

Lack of surfactants cause “blue baby syndrome” because oxygen can’t be absorbed properly through the water tension in the lungs

#### **Insulin, p. 424**

Is rapidly metabolized or destroyed in the liver and other tissues by the enzyme insulinase.

Generally increases all protein synthesis and in the liver produces a positive nitrogen balance by increasing protein synthesis and decreasing protein catabolism.

In muscle acts at the translational level and on the proper functioning of ribosomes.

#### **Glucagon, p. 430**

Has an effect opposite to insulin, causing hyperglycemia.

#### **Gastrin, p. 434**

It stimulates hydrochloric acid production.

Things that stimulate its production: proteins or polypeptides, hydrochloric acid, mechanical stimulation caused by distention of the stomach.

**Histamine** also stimulates production of hydrochloric acid. **Gastrin may also stimulate histamine production.**

#### **Secretin, p. 435**

Is formed and liberated by duodenal mucosa by hydrochloric acid in the acid chime, carried by the blood stream to the pancreas whic it stimulates to produce a flow of pancreatic juice rich in bicarbonate, but low in enzymes. It also stimulates flow of intestinal juices and increases secretion of bile by the liver.

#### **Cholecystokinin-Pancreozymin, p. 435**

is produced by the mucosa of the upper small intestinal and stimulates the pancreas to produce a pancreatic juice rich in enzymes or their zymogens as well as bicarbonate, including trypsinogen, chymotrypsinogen, lipase, nucleases and procarboxypeptidase.

Also stimulates contraction of the gallbladder and dilates the sphincter of Oddi.

#### **Enterogastrone, p. 435**

Produced by duodenal mucosa, is associated with the presence of fat and other substances from food in the duodenum to inhibit gastric secretion and gastric motility, thus slowing gastric digestion, including hunger contractions. There is a diminution in the volume of juice secreted and a lower concentration of hydrochloric acid.

#### Renal, p. 436

**Renin-angiotensin system** plays an important role in control of  $\text{Na}^+$  reabsorption by the kidneys.

**Angiotensin II** acts to stimulate aldosterone secretion by enhancing the conversion of cholesterol to pregnenolone, increase heartbeat and is a vasoconstrictor, causing hypertensive activity.

Things that release rennin into the bloodstream: arterial pressure, decreased blood  $\text{Na}^+$  concentration and the **sympathetic nervous system**.

**Erythropoietin** stimulates the proliferation of red blood cells in both bone marrow and spleen.

Renal secretion of this is stimulated by anoxia, anemia, androgenic hormones and **cobalt**.

#### Pineal Gland, p. 438

The only structure in humans to synthesize melatonin, which inhibits the secretion of the luteinizing hormone, is involved in inducing ovulation in mammals.

The pineal gland contains a high level of the enzyme HIOMT, which catalyzes the formation of melatonin from serotonin [p. 335]

#### Acidophilus, p. 703

Kefir, kumis and yoghurt, various fermented milks contain tremendous numbers of lactic acid-producing bacteria, believed by some to replace the intestinal bacteria with lactic acid organisms, assumed favorable to health.

Other ferments also supply these, such as **sauerkraut, pumpkin pie**

#### Alkaline tide, p. 448, 710, 853

Specimens of urine taken at intervals usually vary a great deal in their acidity.

Soon after meals the urine secreted is quite alkaline for awhile due to hydrogen ions being secreted in great quantity in the gastric juice.

#### Saliva, p. 442

Secretion is entirely under the control of the nervous system, no hormonal control.

Resting pH is 6.4-6.9, whereas saliva obtained during active stimulation of the glands is neutral to slightly alkaline, pH 7.0-7.3 [becomes more alkaline with chewing, thus **neutralizes HCl**].

Moistens and lubricates the food, permitting it to be swallowed easily, has a cleansing action on teeth, gums and buccal mucosa, owes its viscous and lubricating property to its content of mucin, present as an alkaline salt to protect the mucosal lining of the mouth, the GI tract and the inner surfaces of other body cavities. It has a certain excretory function, having certain elements and drugs found in it after administration such as mercury, lead and potassium iodide. The parotid and submaxillary salivary glands have been implicated in the deiodination of the hormone thyroxine and hence in the regulation of the thyroxine level of the blood. The iodine thus released is excreted in the saliva and is reabsorbed in the small intestine re-use, completing an iodine cycle.

The principal enzyme of human saliva is an amylase, ptyalin.

### Carbohydrates, p. 512

Provide 50-60% of the energy of the typical American diet.

Polysaccharides and disaccharides cannot be utilized until digested to the monosaccharide stage.

When introduced directly into the bloodstream, **they act as foreign bodies...**

A dirth of nonutilizable carbohydrates, cellulose, lignin, agar-agar, gums, etc, [constitute a large part of the fiber of food, the indigestible fraction that gives bulk to the feces], tend to produce constipation, such as a high refined carb diet. An overabundance can lead to irritation of the intestinal mucosa.

These plus certain intestinal bacteria that are capable of decomposing hemicelluloses and mixed polysaccharides have a stimulating peristaltic effect and induce bowel movements.

**Lack of food fiber is associated with:** hernias of the GI tract, hemorrhoids, gallbladder disease, appendicitis, varicose veins and obesity.

Food fiber **has a hypocholesteremic effect** by **binding bile acids and cholesterol in a nonabsorbable complex**, thus **increasing the fecal excretion** and **draining plasma and tissue cholesterol levels**.

After absorption, monosaccharides utilized are converted to glucose, then utilized after being converted to glycogen or fat.

### Gastric juice, p. 443

“...99.4% water, **hydrochloric acid**, mucins...**pepsin** and **lipase**. p. 478: **Little or no lipid digestion occurs in the mouth or stomach since no significant amount of lipase is present in the secretions of these organs...Furthermore, the acid pH of gastric secretions is not conducive to lipid digestion.**”

Gastric emptying: the stomach DOES NOT retain its contents until gastric digestion is completed. Soon after food has reached the stomach, some material is ejected into the duodenum and intestinal digestion and absorption begins.

Gastric acidity may be decreased by saliva and water, amongst others.

Gastric mucosa does NOT digest protein in neutral solution containing pepsinogen.

Acidified and able to digest protein and containing pepsin, then made alkaline to pH 8.3, then acidified to pH2 or less **now is incapable of digesting protein**.

**Histamine** is a powerful gastric secretory stimulant.

#### Pancreatic juice, p. 450

Fluid is pH8.3 from sodium bicarbonate.

Secretions digest carbohydrate, fat and protein.

#### Autointoxication, p. 473

It is doubtful that enough is absorbed to cause harmful effects, for example, 1 gm of indole given by mouth produces no symptoms, and 2 gm only a slight headache and dizziness.

What is the basis, then for autointoxication, the symptoms of which often accompany constipation-mental laziness, malaise, headache, dullness, coated tongue, poor appetite, and biliousness? Current opinion is that most of these symptoms result from mechanical distention and irritation of the rectum by the fecal masses and their effects are caused by reflex action, many of which can be reproduced by simply packing the rectum with cotton.

The body can detoxify [p. 732] fairly large quantities of toxic substances such as muscarine, neurin, cadaverine and putrescine.

**p. 732: the term “detoxication” is a misnomer from one point of view: the detoxified product is sometimes more toxic than the original substance...**

#### Putrefaction

The stomach doesn't know when the acid first phase of animal protein digestion is completed

Only when it's small enough and liquid enough it passes into the small intestine, which is alkaline

If the body hasn't completed the first phase of digestion, it can't complete the second phase

If it doesn't complete the second phase, it putrefies

Some putrefactive poisons are absorbed into the circulation

**The detoxified product is sometimes more toxic than the original substance [p. 732]**

From lecithin and sphingomyelin, choline is split off and converted into neurine, both of which are toxic [p. 467]

Decomposition of proteins by anaerobic organisms is termed putrefaction, formed from partly digested food residues, unabsorbed amino acids or cellular detritus and dead bacteria [p. 469] in the large intestine. Indole and skatole give the characteristic odor [p.471]

Putrescine and cadaverine may be produced, which can **lower blood pressure**, and tyramine, which can **raise it** [p. 472]

Indole and skatole can cause **headache and dizziness** [p. 473].

These, thus, act as neurotoxins.

Therefore, fasting off animal proteins for a few days can clear the system of the neurotoxins and symptoms.

#### Sugar and protein digestion

Don't use sugar with protein meal: It inactivates hydrochloric acid and so interrupts digestion

When stomach Ph goes over 5, enzymes converts back to proenzyme, which can't be reconverted again

Hydrochloric Acid: Ph under 2 activates proenzyme

Don't drink much with meal or during digestion, as it dilutes stomach acid and raises Ph

#### Don't combine carbs with animal proteins

There isn't any enzyme secretion in the first 2/3 of the stomach, which is a holding area

Salivary amylase/ptyalin is secreted in the mouth, pancreatic amylase in the duodenum, and digests only plant starches in an **alkaline** environment

Pepsinogen is converted into the active pepsin in the last 1/3 of the stomach in a **sub-2 pH**

Animal protein is preferentially shunted ahead of complex carbohydrates for first phase of animal protein digestion [matrixed]

In the heat and moisture of the stomach, carbohydrate ferments and forms alcohol, one of the few substances that can be absorbed directly into the circulation from the stomach → **immaculate intoxication** and **autologous fatty liver formation**

#### Matrixed vs globular proteins

Animal proteins are matrixed with connective tissue

Vegetable proteins are globular and don't need acid digestion of the stomach

#### Dry heat cooking, p. 527

Dry heat seems to have a deleterious effect, particularly on the proteins of cereals: apparently lysine becomes less available, although it is not destroyed. A linkage may result in the formation of an unnatural peptide linkage that cannot be split by the digestive enzymes, or a resistance to enzyme cleavage sometimes called the "**browning reaction.**"

As a result of heating, **the protein is thus so altered that the rate of release of the particular amino acids is slowed up, resulting in less efficient amino acid mixtures.**

The importance of these observations lies in the widespread use of **toasted and "puffed" cereals** in the American dietary.

#### AMMONIA, p. 300

Ammonia is extremely toxic and is converted to nontoxic metabolites for reutilization or excretion, needing.

Magnesium acts in the conversion of Ammonia for re-use.

An excess of ammonia causes fatigue

### Homogenization of milk, p. 703

Accomplished by forcing the milk through very small apertures under high pressure-are approximately 1/6 their original diameter.

### XANTHINE OXIDASE

This molecule escapes digestion and is absorbed directly through the gut lining with an abundance of **XANTHINE OXIDASE**, which damages arterial walls, leading to atherosclerosis to mend the damage,

### RANCIDITY

Most triglycerides on exposure to air develop an unpleasant odor and flavor, resulting from slight hydrolysis of the fat and leading to liberation of **VOLATILE FATTY ACIDS** having rather unpleasant odors known as RANCIDITY. Simultaneous oxidation of the unsaturated acid occurs with the formation of the oxidation products. Light, heat, moisture and bacterial action tend to bring about rancidity of fats and oils and having distinct unphysiological effects of oxidizing some essential dietary substances such as vits. A and E, carotene and linoleic acid.

Present in the NONSAPONIFIABLE fraction are substances that inhibit the auto-oxidation of fats called ANTIOXIDANTS. Compounds possessing this property include certain phenols, naphthols and quinines. The most common one is vit. E.

#### **VOLATILE FATTY ACIDS**

Measured by Reichert-Meissl number

#### **DEGREE OF UNSATURATION**

Measured by Iodine Number

#### **AVERAGE LENGTH OF CARBON CHAINS**

Measured by Saponification number

#### **HYDROXYL FATTY ACID CONTENT**

Measured by Acetyl number

### ESSENTIAL FATTY ACIDS, p. 904, 514-15

Linoleic, Linolenic and Arachidonic acids [strictly speaking only Linoleic is essential-is necessary to transform  $T_4 \rightarrow T_3$ ]

Administration has curative properties for skin affections caused by lack of  $B_6$

Lack causes:

1. Skin lesions-scaley skin
2. Retarded growth
3. Scaly skin

Kidney lesions with **bloody urine, high capillary permeability** and **low capillary resistance**, remedied by diets containing linseed oil or linoleic acid.

Protect against harmful action of x-ray irradiation

Arachidonic Acid from precursor linoleic acid is a precursor for the **Prostaglandins PGE<sub>2</sub> and PGF<sub>2</sub>**.

$\alpha$ -linoleic acid, the plant isomer is ineffective in curing dermal lesions, but is slightly active in promoting growth in animals deficient in linoleic acid.

$\gamma$ -linoleic acid, the animal form, is effective in both respects.

Children with eczema have serum lipids a low content of unsaturated fatty acids and administration of suitable fats cleared up the skin lesions in many cases. Another disease with symptoms closely resembling those described can be produced by withdrawal of pyridoxine from the diet. Apparently there is a relation between the essential fatty acids and pyridoxine because animals deprived of both the vitamin and the linoleic acid can be relieved by the administration of either. The nature of the relationship is unknown.

Storage is chiefly in adipose tissue.

#### Lipids, p. 514

Fat furnishes an average of 35-45% of the caloric intake in the typical American diet. 20-25% is a more acceptable level.

#### Cholesterol, p. 281

Almost all tissues, especially the liver and intestinal mucosa, are able to synthesize cholesterol. The various enzymes involved are located in the cytoplasm.

Cholesterol is converted to vit. D, Bile salts, Cholesteryl esters/plasma proteins, used in membrane formation and steroidogenesis [adrenals].

Bile salts represent the major mode of cholesterol disposal as much as 80% of the cholesterol utilized per day is converted to cholic acid and excreted as bile.

The rate-limiting step in the biosynthesis of cholesterol is inhibited by cholesterol, providing an effective product feedback inhibition for controlling its formation.

#### **Fasting decreases cholesterol biosynthesis.**

Feedback control of the hepatic biosynthesis is dependent on the total available cholesterol regardless of source, so dietary cholesterol may also serve to reduce its biosynthesis.

Bile salts are essential to the intestinal absorption of cholesterol. Regulation of blood cholesterol level is the result of control at the hepatic and intestinal levels: if bile salts are low in deficient in the intestinal

contents, the absorption of dietary cholesterol into the lymph will be reduced. Decreasing the delivery of cholesterol to the liver will enhance hepatic synthesis of cholesterol and the reduced level of bile salts will enhance intestinal biosynthesis of cholesterol.

Cholesterol acts as a special transport agent for unsaturated fatty acids.

Hydroxylations of cholesterol to cholic acid require Vit. C and  $O_2$ , which require both hepatic microsomal fractions and mitochondria. The conversion nets dehydroascorbic acid and  $H_2O$ . Vit. C deficiency decreased conversion of cholesterol to bile acids. Reduced cholesterol metabolism leads to hypercholesterolemia and accumulation of cholesterol in the liver.

Only diets almost devoid of cholesterol net a fall in blood cholesterol, and then it is quite dramatic.

Populations that traditionally ingest a low-fat diet such a South African Bantus and certain Orientals have significantly lower blood cholesterol levels than do Americans. The incidence of atherosclerosis in these populations is considerably lower too.

A study of American Irish who ate less, were less physically active, smoked heavier and exhibited hypertension were heavier and fatter and had higher levels of serum cholesterol than those in Ireland who consumed more calories and ate more starch and animal fat. The death rates from coronary disease were higher in the US.

In another study, atherosclerotic lesions were produced by introducing large colloidal particles of foreign substances: pectin, gum Arabic, etc. into the bloodstream of animals.

#### **CANCER, p. 286**

Potter first suggested that an impairment of metabolic feedback control might lead to a cellular proliferation and therefore be a cause of cancer. Subsequently, Siperstein demonstrated that cholesterol feedback control was lost in a spontaneous mouse hepatoma. This metabolic lesion was also observed in trout hepatoma caused by **aflatoxin**, a potent carcinogen, produced by the mold *Aspergillus flavus*, exhibiting a functional defect in the hepatic feedback mechanism for the biosynthesis of cholesterol well before the earliest pathologic appearance of malignancy. A loss of feedback control has also been observed in human hepatomas.

Next to the liver, the intestinal mucosa is the most important source of endogenous cholesterol. The biosynthetic pathway is comparable to that in the liver, but isn't under the feedback control of cholesterol, rather by cholic acid instead.

#### **Tocotrienols**

Have tocopherol action.

#### **PROTEIN, p. 515**

The most important foodstuff because it's required by every cell and is the basis of protoplasm.

More is required in children, pregnancy, lactation and long-continued heavy muscular work, probably for growth and replacement of muscle tissue.

Is used for energy purposes unless sufficient “protein spacers” carbohydrate and fat is available.

Liver hypertrophies after high protein feeding, the result of an addition of functioning liver tissue.

Casein [milk] is a very good protein

Gliadin [wheat] is moderately low in lysine and tryptophan

Zein [corn] is very low in glycine, lysine and tryptophan.

Subjects on low protein diets were able to do just as much physical and mental work as before and their general health and athletic prowess were usually improved.

Excess intake might actually lead to various pathologic states such as intestinal toxemia, liver disease, gout and rheumatism.

For growth to occur in young animals, growth hormone and insulin are required [p. 398], favoring positive nitrogen balance.

Other hormones concerned in regulation of protein metabolism are the thyroid hormones, testosterone, adrenal glucocorticoids and ACTH.

A lack of tryptophan, histidine or phenylalanine is one cause of **cataract** formation.

Other effects of tryptophan deficiency are defects in teeth, alopecia, hypoproteinemia, hypochromic anemia, atrophy of the testes and other effects on the reproductive organs.

Some amino acids are essential/nondispensable.

Some are semi-indispensable because they are synthesized by man, but not at an optimal rate [p.520-22]

#### **BIOFLAVONOIDS, p. 621**

Hesperidin, Rutin, Quercetin [Vitamin P for Permeability]

Antioxidants [Chelating of heavy metal oxidative ions], protecting Ascorbic Acid from oxidative destruction.

Good sources: in the juice, peel and pulp of citrus fruits, tobacco leaves, buckwheat, currants and many other fruits and vegetables

#### **CONDITIONED VITAMIN DEFICIENCY, p. 623**

An interference with their production, ingestion, absorption, or utilization

#### **ANTIBIOTICS**

Bacteria produce large amounts of vit. K and biotin

Synthesis in the tryptophan-niacin transformation

Continued use of antibiotics orally has been found to result in vitamin deficiency signs in many cases the destruction of vitamin-elaborating organisms in the GI tract.

#### **BILE**

Bile isn't secreted properly, either produced or blocking of the duct, so fat-soluble vitamins aren't absorbed properly

#### **DIARRHEA**

Nutrients are rushed through the GI tract too quickly to be absorbed

#### **UNDIGESTED FAT**

From Gall Bladder or Pancreatic issues.

**Prevents absorption of fat-soluble vitamins.**

**7<sup>th</sup> hour:**

#### **MINERALS**

#### **Sodium, Potassium and Chloride, p. 531**

Animals normally don't get a good amount in food and search out "salt licks".

Lack of sodium results in retarded growth, somatic and skeletal, atrophy of muscles and testes and diffuse degenerative changes in many other tissues.

Deficiency of potassium produces poor somatic growth, fragility of bones, sterility of both males and females renal hypertrophy, paralysis and bradycardia.

Chloride deficiency results in poor growth.

Loss of sodium chloride by fluid loss results in weakness, fatigue, lack of appetite, nausea and a diminution of mental acuity with impairment of renal function with delayed diuresis following. A thirst that can't be allayed by drinking follows, but salt alleviates it.

Chloride is an essential anion, connected closely with sodium in foods and body tissues and fluids and excretions and is important in the Chloride Shift, an important mechanism in the transport of CO<sub>2</sub> [p. 800], and the formation of gastric hydrochloric acid [p.446].

Adrenal insufficiency, acidosis, diarrhea and excessive perspiration call for supplementation of these electrolytes.

No other cation can entirely replace potassium for the performance of a great number of cellular functions. It can move in and out of most cells more easily than sodium. For building of cells, potassium ions are taken up, appearing to be essential for growth. During muscular contraction there is a loss of potassium from the muscle cells to the extracellular fluid, related to the contractile process rather than to the neuromuscular transmission of the stimulus, which subsequently returns to the muscle tissue.

This is the condition in cardiac contraction, for potassium ions are **essential to heart rhythm**.

Potassium is necessary for nerve activity and the same type of movement of the ion occurs here. When the nerve is stimulated, potassium diffuses into the surrounding fluid very rapidly, during rest, it diffuses back, associated with a change in potential that occurs during the conduction of the nerve impulse.

Diabetic acidosis exhibits loss of potassium from the cells, while being normal in the blood, there follows an increased excretion of potassium in the urine if the kidneys are operating efficiently. Often there is vomiting with further loss of potassium. With insulin administration, potassium is shifted into the cells and a hypokalemia occurs, leading to several alarming symptoms, including paralysis of the respiratory muscles.

Is in a balance with Zn and Mg

If K is low, Mg is low and vice versa

K lowers blood pressure, thus prevents 25% of strokes

Is in 22% of enzymes

<b>Fe, p.538</b>
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Is a constituent of many tissues besides blood, such as myoglobin of muscle.

Is essential for the composition of catalysts such as the cytochromes, peroxidase and catalases.

Is a constituent of non-heme iron-containing proteins as ferredoxin and adrenodoxin.

Is involved in methemoglobin reduction, NADP<sup>+</sup> reduction, pyruvate metabolism and **nitrogen fixation**.

Is made bioavailable by **Tannic Acid** [found in high amounts in Tea]

Needs Cu to form Heme

Heme is a Porphyrin with Fe in the center

Chlorophyll is a Porphyrin with Mg in the center

Deficiency causes Hypochromic Anemia

Hyperchromic Anemia can be helped by donating blood or drinking a lot of tea or coffee or caffeine

Is necessary to transform T<sub>4</sub> → T<sub>3</sub>

Good sources: widely distributed in plant and animal tissues.

Excretion is normally from oversupply.

Hypochromic anemias typically occur from losses of blood.

Defective absorption is normally from hypochlorhydria, achlorhydria or diarrhea.

Absorption involves the release of food iron by gastric hydrochloric acid as  $[Fe^{++}/\text{ferrous}]$ , which then chelates with ascorbic acid and certain sugars and amino acids, which remain soluble in the more alkaline fluids of the duodenum and jejunum, and absorption is thus enhanced.

Copper is involved in the intestinal transport of iron, absorbed by the intestinal mucosal cell, but its transfer to the plasma is impaired without it. Therefore copper is required for the release of ferrous iron into the plasma for subsequent utilization.

The copper-containing protein ceruloplasmin may promote the incorporation of ferric iron into transferrin, and hence its utilization by serving as a ferroxidase.

Iron in foods isn't all equally available, iron in the heme combination is not as assimilable as salts of the metal. Ferrous iron is preferable, but ferric is usually converted to ferrous in the body and absorbed. Therefore, the total iron content of any food does not necessarily represent the amount available.

Normal gastric acidity and cooking make iron available.

Raw and alkaline inhibit absorption.

Any element that forms insoluble precipitates with the ferric or ferrous ions tends to prevent the absorption of these ions, so phosphate or phytate in abundance inhibits iron absorption, and a paucity of these groups or a sufficient amount of calcium ions to combine with them increase the possibility for iron absorption.

Only 10% of the daily intake of iron is absorbed.

Vit. E plays an indirect role in the conservation of body iron stores by increasing the resistance of the erythrocyte membrane to hemolysis [p. 582], decreasing the rate of turnover of hemoglobin.

Vit. E deficiency leads to hemolysis of red blood cells with concomitant anemia.

There is a regulatory mechanism that hinders unlimited absorption no matter how much is available, which depends on ferritin.

Iron levels are ideal at about 120.

**Tannic acid** binds iron and zinc and doesn't allow them to be absorbed.

Foods that are high in tannic acid are tea and coffee.

Green tea is the same as regular tea, but it is not fermented.

Other herbal teas are also high in tannic acid [tannins].

Menstruating women and others who are iron deficient should avoid drinking coffee and tea.

Menstruating women are recommended to eat grapes, because they are high in iron.

Iron in grapes is not bioavailable, and is not absorbable...

**Ferritin, p. 540**

Is a protein that may contain as much as 23% iron by weight.

The iron is present as micelles or colloidal particles composed of a ferric hydroxide-ferric phosphate complex bound firmly to the protein, apoferritin.

Ferritin is found in bone marrow, spleen, liver and GI mucosa, formed in response to iron feeding. Feeding brings about the formation of the particular protein that combines with it.

As iron of the food passes down the GI tract, it is reduced to the ferrous state, if it isn't already in that state by gastric acidity, sulfhydryl groups, ascorbic acid or other reducing agents in the food and secretions. The ferrous iron is absorbed into mucosal cells of the duodenum and jejunum which regulate iron absorption by maintaining within the other tissue cells of the body a level of ferrous iron, governed by the oxidation-reduction potential of the cells.

Only ferrous iron can pass into the blood and the reductant responsible for this action is ascorbic acid.

Hemosiderin is another form of iron storage, less soluble than ferritin and not used until ferritin has reached a low level.

#### Copper, p. 544

Necessary for the formation of hemoglobin.

Loss of copper is mainly due to menstruation.

At least 11 enzymes, all oxidases, contain copper, including superoxide dismutase.

Deficiency: straightened hair, loss of hair pigment to grayish white, ataxia, gross brain abnormalities, swayback and aneurysms of the aortic arch or abdominal aorta, anemia, hyperirritability, catatonic posture, convulsive seizures [defects and pathological lesions in the vascular system, brain, and nervous tissue from an impairment in phospholipid synthesis].

Copper is essential as a catalyst for the cross-linking of collagen, interacting with ascorbic acid [p. 657], and plays a role in the absorption and utilization of iron [p. 540]

Molybdenum salts interfere with copper metabolism and cause black and white stripped wool in sheep.

Occurrence: occurs in many foods.

In hemochromatosis, large amounts of iron and copper are retained in hemosiderin.

#### Cobalt, p. 546

↓Cu → ↓Co

↑↑Co → Polycythemia

Co may be substituted for Mn as an activator of certain enzymes

Co is a specific activator of glycylglycine dipeptidase and perhaps others

Found in B<sub>12</sub>, necessary for hemoglobin formation

Occurrence: buckwheat, figs, cabbage, lettuce, spinach, beet greens, watercress and smaller amounts in other vegetable and animal products.

#### **Manganese, p. 546**

Deficiency: male sterility, testicular degeneration, reduction in size of pancreas, diabetes-like tolerance curve [administration results in the gradual development of a normal tolerance to glucose

An activator of several different enzymes, phosphatases in particular.

Other enzymes are more active in the presence of manganese, such as phosphoglucomutase, intestinal peptidases, cholinesterase, isocitric dehydrogenase, the carboxylases, arginase and adenosine triphosphatase. For most of them, although manganese is considered the physiologic activator, other ions such as magnesium and cobalt may replace it, but several important enzymes demand manganese exclusively, including the peptidases [intestinal enzymes], prolidase [splits the dipeptide glycylproline] and succinic dehydrogenase [involved in the citric acid cycle-p. 188].

Occurrence: occurs rather widely in plant and animal tissues. The richest sources are liver, kidney, muscle, lettuce, spinach and whole-grain cereals.

#### **Zinc, p. 547**

Deficiency in young men causes stunted growth, anemia [from concomitant Fe deficiency], enlarged liver and spleen and underdevelopment of genitals and secondary sex characteristics.

Other symptoms: hyperirritability, anorexia, retardation of growth, loss of hair and changes in the skin and cornea.

Zinc is important in several different enzymes such as carbonic anhydrase, carboxypeptidase, alkaline phosphatase, lactic acid and alcohol dehydrogenases [occurring in the eye],

The eye, testes and teeth contain a considerable amount of it. There is a small amount in the pancreas and accompanies insulin-diabetic pancreatic tissue contains only half as much zinc as does normal tissue. Curiously, zinc is present in the insulin molecule but isn't essential to the activity of insulin [p. 425].

Low levels are associated with impairment of acuity of the senses of taste and smell.

Zinc plays an important role in protein biosynthesis and utilization, and in growth. This may result from a failure in adequate RNA synthesis as zinc apparently inhibits the enzyme ribonuclease, so in zinc deficiency excessive destruction of RNA could occur, which might result in the defects of protein synthesis .

Made biounavailable by a diet high in phytic acid, heavy perspiration or by blood loss with parasitic infection.

Elevated Zn lowers Cu and vice-versa

#### **Cu/Zn balance**

If Cu is high, Zn is low and vice versa

Elevated Zn lowers Cu, which lowers vit. C and makes you susceptible to colds

#### **Chromium, p. 551**

Selenium salts prevent or cure degenerative changes in the liver.

Trivalent form is "**Glucose Tolerance Factor**", found in very highest amounts in **Brewer's Yeast**.

Minute quantities of chromium and insulin [but neither alone] were found to be essential in promoting the utilization of glucose by epididymal tissue for fat synthesis.

Chromium III acts as a cofactor for insulin in increasing not only glucose utilization but also the transport of amino acids into cells [heart, liver and diaphragm].

It also lowers serum cholesterol levels.

#### **Molybdenum, p. 551**

A component of xanthine oxidase and aldehyde oxidase.

It may increase utilization of iron.

#### **Nickel, p.551**

An activator of liver arginase and helps maintaining the conformation of membranes, consistently found associated with RNA.

#### **Selenium, p. 551**

Is an Antioxidant, an essential factor in tissue respiration as a component of the electron-transfer system in cells.

Protects against hepatic necrosis, along with cystine and vit E.

Selenium salts are 500 times more effective than vit. E and 250,000 times more than L-cystine.

The muscular system is particularly dependent on it and vision may also be involved.

Raw kidney beans may cause muscular dystrophy because they contain a heat-labile antiselenium or antivitamin E. factor or both.

Like vit. E, selenium and sulfur-containing amino acids are potent inhibitors of lipid peroxidation. In this way they're involved in maintaining the integrity of biologic membranes, as of the mitochondria, microsomes and lysosomes. Selenium salts increase the reduction of cytochrome C by glutathione and plays a role in the action of glutathione peroxidase as its active site.

#### **Silicon, p. 552**

Enter the body as silicates chiefly in vegetables.

Soluble silicates are easily absorbed.

Excess is rapidly excreted by the kidneys.

Varying quantities are found in different organs and tissues, the lungs being the highest because of inhalation of particles [silicosis]

Silicon appears to be necessary for calcification, growth and mucopolysaccharide formation as a cross-linking agent.

**Tin, p. 552**

Largest quantities are in the kidney and skin.

Promotes and may function as the active site of several metalloenzymes.

It may contribute to the tertiary structure of some proteins.

**Vanadium, p. 552**

May be involved in the mineralization of bones and teeth and in catecholamine and lipid metabolism

Increases resistance of teeth to dental caries.

**Bromide, p. 553**

Sometimes found in table salt and certain vegetables, are absorbed, distributed and eliminated by the body in almost exactly the same manner as chlorides.

Are absorbed from the GI tract, pass into the various body fluids, penetrate the red cell but not other cell membranes and are eliminated by the kidney, just as chlorides are.

Bromide tends to replace chloride in the body.

It has a sedative effect on nerve tissue, which may be a result of the decrease in concentration of chloride displaced by bromide in the extracellular fluid.

Bromide poisoning, known as bromism, is fairly common.

Advanced stages are characterized by mental and neurologic disturbances.

**Cadmium, p. 553**

Had a hypertensive effect, being present in the kidneys and urine of hypertensive patients in relatively high concentrations.

Has been incriminated as a factor in soft drinking water statistically correlated with cardiovascular mortality, apparently dissolved in increased amounts from pipes by the soft water.

**Lead, p. 553**

Found especially in drinking water [and calcium supplements]

Stored in the bones [absorbed in favor of calcium], and to a lesser extent in the liver

Lead phosphorus and vit. D from a system of lead deposition analogous to the deposition of calcium in bones.

Is an inhibitor of certain enzymes dependent on sulfhydryl groups for their activity such as  $\delta$ -Aminolevulinic acid dehydratase, involved in the biosynthesis of heme [p. 782]

Elevates blood pressure.

<b>Lithium, p. 553</b>
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Inhibit the release of norepinephrine and serotonin.

Effective in mania and related mental disorders in which there is a disturbance of amine metabolism.

**8<sup>th</sup> hour:**

<b>Magnesium, p. 538</b>
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Deficiency causes increased irritability, thus is a Sedative

It's the essential mineral in chlorophyll and therefore is in all green plants

Occurs in bones, muscles and nervous tissue

Competes for same binding site as Ca

Is Ca sparing and can replace calcium to some extent.

There is a large amount of magnesium loss during diabetic acidosis and in alcoholism

In great amounts it is a central depressant having anesthetic and anticonvulsant effects that are completely antagonized by calcium, which hasn't been explained.

Low serum concentrations of either magnesium or calcium lead to the same pharmacologic effects, namely hyperirritability and convulsions.

Deficiency can also cause a decrease in growth, a decrease in the efficiency of food utilization [failure to thrive] and a **striking vasodilation**, cardiovascular, renal and neuromuscular damage can occur.

Is in 50% of enzymes, particularly those requiring ATP.

Lowered K lowers Mg

Prevents 50% of heart attacks

<b>Mg/K</b>
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Potassium is active as a metalloenzyme **in 22% of known enzymes**. Magnesium is active as a metalloenzyme **in 50% of known enzymes**.

Together they influence 72% of known enzymes

When one is deficient, the other is deficient.

Magnesium is necessary for hydration inside cells.

Potassium excretes excess hydration as a diuretic.

Potassium is normal in the blood of diabetics, but depleted within the cells.

### Calcium, p. 533

Is a Sedative

If the ionic calcium of the blood falls, the nervous system becomes hyperirritable, leading to cramps or even tetany.

Calcium is involved in the contraction and relaxation of muscle [p. 678]

**Taking calcium early in the day causes relaxation/sleepiness, but at night aids sleep.**

Doctors and nutritionists telling patients/clients to take large amounts of Calcium early in the day cause them to be tired for several hours-**CHRONIC FATIGUE SYNDROME.**

Ca is usually given with vit. D to help absorption, but Ca combines with lipids/fats in the heat and moisture of the intestines they undergo saponification [makes soap], and becomes inert and unabsorbable. Vit. D must first undergo changes in the liver, then the kidneys to get into its active form after absorption.

Is necessary for blood clotting [p. 809]

Most Ca supplements have elevated amounts of Pb, Cd, Al and Cu heavy metals

Pb is absorbed preferentially to Ca in bone

As Patient ages and undergoes bone atrophy/osteopenia/osteoporosis, Pb is liberated into the blood and elevates blood pressure

Good sources: Legumes and green leafies are lime foods [high in calcium]. Vegetables generally have more calcium than animal foods.

Countries that have the highest milk consumption also have the highest osteopenia and osteoporosis because of the high phosphorous/anion levels.

Absorption: calcium forms insoluble salts with a number of anions that occur in the intestinal tract, thus are precipitated as the phosphate, carbonate, oxalate or sulfate or as calcium soaps, which are also insoluble and therefore unabsorbable.

This depends on the amount of soluble calcium salts present, the negative ions, the pH and the state of digestion and absorption.

Calcium salts are more soluble in acid than in basic solutions.

Calcium of different vegetables aren't absorbed uniformly, and in some cases the vegetables actually tend to depress the absorption of calcium from other foods.

This may be caused by the presence or formation of oxylates or phosphates or to an influence on the pH of the intestinal contents.

Insoluble calcium soaps form of fatty acids are present in large amounts, resulting in diminished calcium absorption. [Vit. D, for example, binds with calcium, forming an insoluble soap and preventing absorption of both].

Look closely at taking any lipid [or fat-soluble supplement] with any metallic supplement [Ca, Mg, Fe, Zn, Cu, etc.], as saponification occurs and prevents absorption of both.

Phytic acid [such as found in whole grains] and its compounds also interfere with the absorption of calcium.

Calcium excretion in the urine is increased by the ingestion of carbohydrates, particularly glucose and sucrose, favoring calcium salt precipitation.

Oxidized vit. C and oxylates [high in spinach] can cause kidney stones.

Best absorbed as hydroxyapatite [bone crystals], which from bovine sources in Australia and New Zealand are lowest in heavy metal concentrations.

Calcium-lowering Parathyroid hormone calcitonin/thyrocalcitonin is opposite of parathormone.

#### Blood calcium, p. 430

Of the total calcium in blood serum about  $\frac{1}{2}$  is bound to serum proteins, but only the free calcium ions are biologically active, important for controlling the irritability of nerve cells, blood clotting contraction and relaxation of muscle, adhesion between cells, production of milk and mineralization of bones and teeth.

Deficiency leads to tetany, excess bradycardia, ventricular arrhythmias and fibrillation.

Calcitonin responds to hypercalcemia [stimulating osteoblasts], Parathormone to hypocalcemia by increasing the resorption of bone, the absorption of calcium from the intestine and the renal reabsorption of calcium [stimulating osteoclasts, requiring the active form of vit. D<sub>3</sub>, p. 572, which induces the biosynthesis of a calcium-transporting protein].

PTH is given in **chronic lead poisoning**, depositing lead in bone by displacing calcium.

**Therefore lead in calcium supplements is deposited in bone preferentially to calcium and is released in osteopenia and osteoporosis, causing elevated blood pressure.**

#### Mg/Ca

Mg/Calcium compete for same binding site, so one blocks the other from absorption, therefore don't take large amounts of each together

Mg is Ca sparing

Don't use D with calcium or magnesium, as it saponifies and forms an insoluble soap that cannot be absorbed

### Phosphorous, p. 536

Is acidic in urine

Is in Phytates

Phosphorous is found in those foods containing phosphoproteins, nucleoproteins, phospholipids and glycerophosphates as well as the inorganic phosphates, chiefly calcium and sodium

Since quantitatively the greatest proportion of the phosphorus is used to form the bone salt, which is largely calcium phosphate, evidently the phosphorus intake should bear an optimal relation to the calcium intake. The foods richest in calcium are also richest in phosphorus, namely milk, cheese and beans. Eggs, cereals, fish and meats are also high in this.

Phosphorus is present in foods also as phytates. A large proportion of the phosphorus of vegetables is in this form.

Phytates are quite insoluble mixed calcium and magnesium salts of phytic acid. Phytic acid is in turn a hexaphosphate of inositol.

Phytic acid and its compounds interfere with the absorption of calcium, zinc and iron from the intestinal tract. Unrefined cereals are rich in phytates. Where unrefined cereals form a large part of the diet and little calcium is consumed, the interference with calcium absorption may result in serious deficiencies of calcium, including the development of so-called "**cereal rickets**". The phosphate and inositol of these substances are, for the most part, unavailable nutritionally.

Diet high in Phytates, such as whole wheat, cause loss of Ca

Human milk is 1:1 P to Ca, Cow's milk is 4:1

Societies with highest Cow's milk ingestion has highest rate of Osteoporosis

I've made it a habit of asking people with worst radiological bone density if they drink milk, and the worst ones state they have ingested a lot daily their whole life

### Sulfur, p. 556, 336

Is necessary for formation of certain cystine and methionine amino acids

Is high in animal proteins and plant proteins

Is a constituent of proteins, mucopolysaccharides, heparin, thiamin, biotin, lipoic acid, detoxication

Is acidic in urine

Occurrence: plant and animal protein

### Boron

Necessary for bone density

<b>THYROID, p. 401</b>
------------------------

Produces Thyroxine [T4] and Triiodothyronine [T3] from 2 Diiodotyrosine [DIT] and one DIT plus one MIT, respectively

T4 converts to T3 requiring TSH, Fe, Linoleic Acid and B6

Thyroid produces 80% T4 to 20% T3

T3 is 4 times as active as T4

T3 takes 6 hours to activate, T4 4-6 days

T3 lasts 2 days, T4 10 days

Much of T4 is converted to T3 inside the cells of the body

Halogens such as Perchlorates, Chlorine and Fluoride act as Goitrins/Goitrogens, preventing Iodine absorption.

**Hypothyroid** symptoms can include fatigue, weight gain, hair loss, cold intolerance, constipation, decreased concentration, depression, dry skin, infertility, hyperlipidemia, irregular or heavy menses, memory impairment and muscle aches

**Hyperthyroidism** arise from the elevated levels of thyroid hormones produced by the overactive thyroid gland or excessive intake of thyroid hormones. Characteristic symptoms include a rapid heart rate, excessive sweating, intolerance to heat, tremor, nervousness, or agitation. Other symptoms can include fatigue, weight loss, hair loss, increased appetite, problems with concentration, frequent bowel movements, and irregular or decreased menstrual blood flow in women. Sometimes, thyroid nodules or an enlarged thyroid gland (goiter) are apparent. With severe hyperthyroidism, cardiac arrhythmias, fever, high blood pressure, and heart failure can develop.

**Clinical/Physiologic Hypothyroidism** nets a normal blood level of all Thyroid hormones, but the patient has several of the Hypothyroid symptoms

Paoletti, J. Differentiation and Treatment of Hypothyroidism, Functional Hypothyroidism, and Functional Metabolism. International Journal of Pharmaceutical Compounding Nov/Dec 2008; 487-497.

Brownstein D. Overcoming Thyroid Disorders. West Bloomfield, MI: Medical Alternatives Press; 2004:19-21:26-27.

Milner m. Hypothyroidism: Optimizing Medications with Slow-Release Compounded Thyroid Replacement. International Journal of Pharmaceutical Compounding Jul/Aug 2005; 268-273.

TSH [Thyroid Stimulating Hormone] provokes the production of T4 [Thyroxine], which is then converted to T3 [Triiodothyronine].

The transition of T4 to T3 requires iron, B6 and Linoleic Acid.

T3 is many times more active than T4.

Blood levels can be normal when a person is hypothyroid, as determined by prevalence of symptoms. This is termed "Clinical" or "Physiologic" Hypothyroidism. The hormones are there, but not functioning properly.

Similarly, 95% of Diabetics have too much insulin [hyperinsulinemic], but the insulin isn't working properly.

#### **Fluorides, p. 549**

Widely distributed in nature in water and food.

High intake causes tooth mottling with white patches, the entire tooth may be chalky, pitted and may have a brown stain.

It causes fragility of teeth and bones [hip fractures in the elderly] showing that it affects calcium and phosphorous metabolism.

It is an inhibitor of various enzymes, notably enolase and inhibits glycolysis.

Enamel of sound teeth contains more fluoride than that of carious teeth, the only element known to vary in such a manner. Either it imparts caries-resistant properties or it inhibits bacterial action on food particles and on dental tissue or both

#### **LIVER, p. 465**

Hormones are degraded here

#### **KIDNEYS, p. 705**

Hormones are excreted here

#### **TANNINS, p. 469**

Should be ingested away from proteins, Fe and Zn, as they shrink proteins and bind to Fe and Zn, making them bioavailable

#### **Digestion, p. 445**

Experiments and Observations on the Gastric Juice, and the Physiology of Digestion, William Beaumont

A Civil War soldier named Alexis St. Martin got a hole shot in his stomach and survived. There was a flap over his abdomen so digestive processes could be observed, which Beaumont did.

#### **ALLERGIES: PULSE**

**EMMANUEL CHERASKIN, PHD AND MARSHALL RINGSDORF, PHD: THE VITAMIN C CONNECTION: THOSE WHO TAKE MULTI- SUPPLEMENTS LIVE AS LONG AS THOSE WHO DON'T, BUT THEY DIE SUDDENLY IN GOOD HEALTH, WHEREAS THE OTHERS GRADUALLY DECLINE AND DIE IN VERY POOR HEALTH**

**LINUS PAULING**

**OSCAR RASMUSSEN, PHD**

## BLOOD SUGAR BALANCE

Thesis

**KIDNEY:** CARROTS AND JUNIPER BERRIES

**LIVER:** MILK THISTLE, BLACK CHERRY JUICE AND DANDELION

**ADRENAL:** SARSAPARILLA, MEXICAN WILD YAM, RED RASPBERRY TEA

**PANCREAS:** INFLAMMATION: CHLOROPHYLL

STONES AFTER REMOVAL OF GALL BLADDER

**LUNGS:** Comfrey for bleeding

**TONSILS:** Toothbrush and apple cider vinegar

**THYMUS:** Produces antibodies

**PITUITARY:** Master gland, controlled by: **HYPOTHALMUS**

**OVERWEIGHT:** WATER, ADRENALS, FAT

**ENZYMES:** COOKING, denatured above 60°C [140° F]

**FIBER:** PEEL AND SEEDS

**TRACE MINERALS AND ANTIOXIDANTS:** FOUND MAINLY IN PEEL AND SEEDS

## GALL STONES, p. 464

May be as many as 2000 calculi in

Cholesterol, Pigment, Calcium carbonate

Bladder bile is normally more acid than is liver bile

Infection can lead to precipitation of gall stones

**BILE SALTS** have solvent action on cholesterol

## OSTEOPOROSIS

Is loss of connective tissue in [punched out lesions] and mineral stores

Vits. D and C, Cu, Bor, Ca, Mg, avoid milk, phytates and high phosphorous diet, moderate resistance exercise

## OSTEOPENIA

Is loss of mineral stores

Vits. D, Bor, Ca, Mg, avoid milk, phytates and high phosphorous diet, moderate resistance exercise

**HEAVY METALS**

Remove with chelates

**Mastitis**

Colloidal silver

**Seasonal fatigue syndrome**

Avoid milk and wheat products

**Sinusitis, chronic**

Avoid blowing nose in the shower and it will stop

**Chronic vaginal infections**

Avoid tub baths with soap, which flows in and out of vagina

**Pollen allergies and continual allergy shots**

Avoid milk and wheat products

**Recurrent inner ear infections**

Avoid milk

**Gum Infections**

Extract of lobelia

**Warts**

Make a vit. C paste and cover with a bandaid, virus-lemon juice

**Jock itch**

Coat it with Vaseline and it will disappear

**HERBS**

**ESSENTIAL OIL(S)**

LINOLEIC ACID ONLY, AFTER 40 SOME CAN'T CONVERT TO GAMMA LINOLEIC ACID [FOUND IN LARGE AMOUNTS IN EVENING PRIMROSE OIL AND BORAGE SEED]

**ESSENTIAL AMINO ACIDS**

10 IN CHILDREN, 8 IN ADULTS

ESPECIALLY NEEDED FOR GROWTH: LYSINE AND TRYPTOPHAN

**ALLERGIES/HYPERSENSITIVITIES/FOOD SENSITIVITIES AND INTOLERANCES**

ALKALINE TIDE: OCCURS AFTER ANIMAL PROTEIN MEAL BECAUSE OF HCL

**PARADOXICAL ACIDOSIS**

OCCURS IN KIDNEYS BECAUSE OF ALKALOSIS

**DON'T EAT SUGAR WITH ANIMAL PROTEIN**

SUGAR INACTIVATES THE HCL AND INTERFERES WITH ACID DIGESTION

**GROWTH HORMONE NEEDS INSULIN TO WORK**

**GLOBULAR PROTEINS** ARE FOUND IN PLANTS

**MATRIXED PROTEINS** ARE FOUND IN ANIMALS

**NIACIN:** NAD, NICOTINAMIDE ADENINE DINUCLEOTIDE

**RIBOFLAVIN:** FAD, FLAVIN ADENINE DINUCLEOTIDE

**THIAMIN:** TPP/THIAMIN PYROPHOSPHATE

**DHEA** NEEDS NAD

**ACETALDEHYDE** as byproduct of candida infection: absorbed by activated charcoal

**POTASSIUM AND MAGNESIUM** ARE IN A BALANCE, IF ONE IS TAKEN, THE OTHER DECREASES

**MAGNESIUM AND CALCIUM** COMPETE FOR THE SAME BINDING SITE, SO DON'T TAKE TOGETHER IN LARGE AMOUNTS

**SAPONIFICATION**

FATS, LIPIDS AND METALS: TAKEN TOGETHER, IN THE INTESTINAL TRACT IN THE HEAT AND MOISTURE THEY UNDERGO **SAPONIFICATION**, BECOME INERT AND AREN'T ABSORBED WELL

VITS. A, D, E, K [LIPIDS] SHOULD NOT BE TAKEN WITH MAGNESIUM OR CALCIUM [METALS]

**FRACTURES**

**HORSETAIL** HEALS FRACTURES IN ¼ THE TIME

**EPITHELIAL TISSUE**

**ALOE BARBADENSIS MILLER** IS THE MOST ACTIVE IN HEALING POWER OF THE ALOES: HAS BIGGEST EFFECT ON EPITHELIAL TISSUE, SUCH AS SKIN

**POTATO PEEL** IS VERY HIGH IN ORGANIC SILICA AND HELPS STRENGTHEN AND HEAL SKIN

**FUNGUS IS KILLED BY SALT WATER** AND MANY SKIN CONDITIONS MISTAKEN FOR OTHERS ARE ACTUALLY FUNGAL, SUCH A RINGWORM, PSORIASIS, SEBORRHEA, ETC.

### SINUSITIS

**ACROLEIN/ACRYLALDEHYDE** IS FORMED BY BURNING [HIGH HEATING] OF FATS/LIPIDS AND HAS A CHARACTERISTIC ACRID SMELL

### RANCIDITY

FAT EXPOSED TO OXYGEN FORMS OXIDES: **VOLATILE FATTY ACIDS**, TERMED "RANCID"

### CHOLESTEROL OXIDES

**STALENESS** OF FOOD CAUSES FORMATION OF CHOLESTEROL OXIDES/OXYCHOLESTEROL

OXYCHOLESTEROL IS FORMED BY HIGH HEATING OF FATS/LIPIDS **IN THE PRESENCE OF OXYGEN** [UNCOVERED BAKING, GRILLING, ROASTING, ETC.]

### 9<sup>TH</sup> hour:

HOW TO EFFECTIVELY ADDRESS BLOOD SUGAR ISSUES AND METABOLIC SYNDROME

### HOW TO EFFECTIVELY ADDRESS ULCERS AND REFLUX ESPHOPHAGITIS

Marshmallow and Slippery Elm

Chlorophyll and glycerine alkalinizes

Avoid animal protein for 3 weeks

Avoid peppermint tea

### Vit. U

Occurrence: vegetables such as cabbage either raw or fresh, its juice, Sauerkraut, celery, parsley, carrot, onion, beets, peppers, alfalfa asparagus, tomatoes, spinach and the turnips. It is also present in the green tea as well as the juices made from raw potatoes

BASIC BIOCHEMISTRY ISSUES ARE CAUSED BY:

LACK OF A NUTRIENT IN THE CELL

LACK OF SECRETION OR EXCRETION OF SUBSTANCES FROM THE CELL

LACK OF A NUTRIENT IN THE CELL IS CAUSED BY:

LACK OF INGESTION OF THE NUTRIENT: DOESN'T EAT OR DRINK IT

LACK OF ABSORPTION OF THE NUTRIENT THROUGH THE GUT: NOT BIOAVAILABLE

LACK OF ABSORPTION OF THE NUTRIENT INTO THE CELL: CIRCULATION/CAPILLARY ISSUES; CELL WALL ISSUES; HORMONAL ISSUES [PHYSIOLOGIC/CLINICAL OR LACK OF PRODUCTION]; ENZYME ISSUES

LACK OF METABOLISM OF THE NUTRIENT IN THE CELL: LACK OF STRUCTURED WATER: TOO MUCH WATER TENSION/LACK OF SURFACTANT

LACK OF SECRETION OR EXCRETION OF SUBSTANCES FROM THE CELL IS CAUSED BY:

HORMONAL ISSUES/FAULTY METABOLIC RATE

ENZYMATIC ISSUES: LACK OF ENZYMES/FAULTY ENZYME STRUCTURE WHICH PREVENTS LOCK AND KEY MECHANISM

FAULTY LYMPHATIC DRAINAGE/AUTOINTOXICATION

FAULTY HORMONE IS CAUSED BY:

DENATURING BY OVERHEATING

PH IS TOO HIGH OR LOW

FAULTY ENZYME STRUCTURE IS CAUSED BY:

DENATURING BY OVERHEATING

PH IS TOO HIGH OR TOO LOW

**NONI** HAS SUBSTANCE TO CORRECT

INACTIVATION OF ENZYME DIGESTION IS CAUSED BY:

LOWERED PH BECAUSE OF:

DILUTION

INACTIVATION BY SUGAR

## CHRONIC FATIGUE SYNDROME

CAN BE CAUSED BY:

LACK OF:        PROTEIN

                  CARBOHYDRATE

                  FAT

FAULTY METABOLISM OF:        PROTEIN

   CARBOHYDRATE

   FAT

FAULTY METABOLISM OF A NUTRIENT IS THE SAME AS LACK OF THE NUTRIENT

FAULTY METABOLISM OF PROTEIN:        NOT DIGESTED PROPERLY

   NOT METABOLIZED PROPERLY

EXCESS AMMONIA CAUSES FATIGUE: FAULTY BREAKDOWN AND/OR EXCRETION OF PROTEIN

High intake of Calcium early in the day

High intake of tannic acid [drinking a lot of tea], which binds and prevents absorption of Fe and Zn

#### Garlic

Parasites, infections and cancer

Lowers blood pressure

Can clean arteries

#### Lily family allergies

Chives, Onions, Garlic, Aloes

Onions for tear ducts

Citrus family allergies

Nightshades for arthritis

Cabbage family/Crucifers, Mustard contain large amounts of Mustard oil: failure to breakdown and secrete or excrete will cause inflammation, including arthritis

#### Aloe Vera

Aloe Vera Barbadensis Miller has the highest level of medicinal properties of aloes. Aloe Vera is a natural laxative. The healing properties are in the gel. Without proper stabilization, the healing properties of Aloe gel are depleted within 24 hours after being expressed from the leaf.

The biggest effect of the aloe is on the surfaces of the body: skin inner and outer surfaces of the internal organs and intestines, surfaces of the joints, etc.

#### 2 conditions cause chemically-induced disease outside of psychosomatic, genetic or poison/mutagen:

Not enough of a substance: deficiency

Can't breakdown and excrete a substance

#### Chlorophyll

A great natural **alkalizer**: overacidity conditions, esp. of stomach

**Anemia**: porphyrins: body plucks out the magnesium and puts in iron to create hemoglobin

**Pancreatitis**: Acute and Chronic

#### Glycerine/Glycerol

Acts as a cure-all because it has solvent properties to allow substances into the cell and waste out of it

Great alkalizer

Use on corns and callouses

### Apple Cidar Vinegar

Prevents sore/painful/ticklish throat from turning into **throat infection**

Hot fomentation applied to **cellulitis** cures it

Rub in with tongue to cure **canker sores**

Hot fomentation applied to **varicose veins** causes regression

### Lemon

Juice applied to **bruising** cures it

Effective against **viruses**

### Runny Sinuses

Take 5gm of Ca Ascorbate 4-5x's/da [usually the first dose will stop it]

### Insulin Substitutes

- **HCl for Diabetes**
- **Vit C for Diabetes:** acidic diet converts ascorbic to dehydroascorbic acid, which acts like vit. C deficiency
- **Vit E for Diabetes:** Freezing and PUFAs destroy
- **Dessicated Liver for Diabetes**

### Things that clear Arterial Plaques

**Lecithin** emulsifies fats and thus can help clear arteries

**Vit. C** deficiency can cause plaque deposition in arteries

**Garlic** can clear plaque from arteries

### Cancer

**Comfrey leaf tea** contains a large amount of allantoin, which suppresses bad cell growth and enhances good cell growth

**Poke Root** reduces tumor size

Colloidal silver accentuates healing

Avoid foods high in Folic Acid

Avoid acid diet of animal proteins and grains

Utilize alkalinizing diet of fresh, raw fruits and vegetables

### Goitrogens and weight gain

Supposedly healthful foods to lose weight can cause hypothyroid and weight gain, such as:

- **cruciferous vegetables**
- **peaches**
- **pears**
- **spinach**

Kelp?

**Nail fungus**

Salt water soaks, 5 minutes 2 or 3 times per day, rinse in Listerine, thin coat of Vick's Mentholadum

Skin fungus/skin conditions: salt water pool

**12<sup>th</sup> hour:**

**Pulse test**

**SINUSITIS:**

NETTI POT [saline solution] – it is a fungal condition, not a bacterial infection  
LIQUID VITAMIN C, 50:50 with distilled water, SHOOT UP NOSTRILS WITH EYE DROPPER

**PROLONGUED SORE THROAT AND LARYNGITIS:**

AVOID SALTWATER GARGLE – it worsens it  
USE APPLE CIDAR VINEGAR GARGLE, deep, when first tickle, itch or pain is felt  
SWALLOW POWDERED GARLIC  
If it gets deep and bad, may need to use EVERCLEAR IN SIPS

**NSAIDS:**

DOUBLE HEART ATTACKS  
DOUBLE STROKES  
CAUSE OVER 50% OF ACUTE AND CHRONIC LIVER CONDITIONS  
CAUSE CHRONIC HEADACHES  
CAUSE CHRONIC BACK PAIN  
INDISCRIMINATELY DEPOSITE SCAR TISSUE THROUGHOUT BODY

**LOSS OF CIRCULATION IN LEGS**

HOT PACKS OVER SOLAR PLEXUS

CAYENNE PEPPER  
NICOTINIC ACID FORM OF B3  
GOTU KOLA  
MESQUITE/CHAPPARRAL FOR LYMPHATIC DRAINAGE

**SEIZURES:**

HIGH FAT DIET [AT LEAST 30%]

**DIZZINESS/VERTIGO/MOTION SICKNESS**

GINGER=DRAMAMINE

**ASTHMA**

EXTRACT OF **LOBELIA** IS A SPECIFIC FOR THIS  
IF THAT ISN'T EFFECTIVE, SAGE AND THYME, 1 TSP. EA. IN 2 CUPS OF DISTILLED WATER AT A  
BOIL, STEEP FOR 20 MIN, STRAIN, TAKE AS HOT AS POSSIBLE, THEN GET IN HOT TUB FOR 15  
MIN, THEN JUMP UNDER 5 COVERS IN BED FOR ½ HOUR.  
REPEAT UNTIL ASTHMA HAS RECEDED  
AVOID MILK PRODUCTS AND WHEAT PRODUCTS

**SKIN CONDITIONS**

**Potato peel broth** [organic silica]: peel a russet potato down to ¼" under peel, throw middle  
away, boil in 2 cups of distilled water for 20 min, strain, take one cup in the morning, one in the  
evening for 3 weeks.

**MOLD FORMS TO BAD EXTENT IN FOOD**

EAT WITHIN 24 HOURS OF PREPARATION, ELSE TOO MUCH MOLD FORMS-TOXIC

**TIME FOR ALLERGIC REACTION**

INHALING [COD, CHICKEN] TO SECONDS TO 72 HOURS [4 DAYS IN MY EXPERIENCE]

**TOOTH PAIN**

CLOVES

**DIARRHEA**

JELLO OR VEGETABLE PECTIN ABSORBES INTESTINAL TOXINS  
DRINK A HOT OR COLD BEVERAGE  
PSYLLIUM  
COLLOIDAL SILVER  
GARLIC  
PROBIOTICS/FERMENTS  
**LUGOL OF IODINE**  
**LACTASE**

## CONSTIPATION

### DRINK A HOT OR COLD BEVERAGE

FIG NEWTONS

PER DIEM

PSYLLIUM

SENNA

CASCARA SAGRADA

PROBIOTICS/FERMENTS

GLYCERINE

USE EAR SYRINGE WITH WARM DISTILLED WATER

## NSAIDS

DOUBLE HEART ATTACKS

DOUBLE STROKES

CAUSE OVER 50% OF ACUTE AND CHRONIC LIVER CONDITIONS

CAUSE CHRONIC HEADACHES

CAUSE CHRONIC BACK PAIN

INDISCRIMINATELY DEPOSIT SCAR TISSUE THROUGHOUT BODY

## FUNGUS

DANDRUFF: LISTERINE

ATHLETE'S FOOT: SALT WATER SOAK

TOENAIL: [IF IT'S THICK, SOMETIMES NEED TO SAND THE UPPER NAIL LAYERS OFF]

SALT WATER SOAK

LISTERINE RINSE

VICK'S MENTHOLADUM

RINGWORM OR UNRESPONSIVE PSORIASIS:

SWIM IN SALTWATER POOL OR OCEAN OR SOAK IN SALTWATER TUB

### 10<sup>th</sup> hour:

## BLEEDING

MENSTRUAL CYCLE: LONG AND/OR HEAVY PERIODS

CHRONIC NOSE BLEEDS

BLEEDING ULCERS

BLEEDING FROM LUNGS

- **AVOID CHOCOLATE**
- **CAYENNE PEPPER FOR ACUTE BLEEDING ULCER**
- **COMFREY TEA FOR BLEEDING LUNGS IS A SPECIFIC**

## INSECT BITES: BEE, WASP, SPIDER

POULTICE OF RAW GRATED POTATOES, apply covered with gauze till dry, repeat till well

### **MONONUCLEOSIS**

5 gm vit. C, 5xs/da

1 tbspn colloidal silver 5sx/da

### **PORK POISONING: [BODY SWELLS WITH PURPLE SPLOTCHES]**

LEMON JUICE AND LEMON POULTICE

### **ABNORMAL HORMONAL LEVELS**

EXTRACT OF SARSAPARILLA

MEXICAN WILD YAM CREAM: BEHIND EARS, NAPE OF NECK, LOWER ABDOMEN, PALMAR WRISTS

AVOID PLASTICS [FOOD AND DRINK CONTAINERS, UTENSILS, CUPS AND PLATES]

AVOID CONTACT WITH RECEIPT TAPE

RUB AND RINSE FOODS UNDER RUNNING WATER

DRINK RED RASPBERRY TEA: SUCH AS STARTING 6 WEEKS PRIOR TO DELIVERY

### **FIBROMYALGIA**

DISTILLED WATER ONLY FOR DRINKING AND COOKING

TAKE NIACIN

AVOID TAKING DHEA

### **INSOMNIA**

EAT TURKEY [HIGH IN TRYPTOPHAN]

TAKE CALCIUM JUST BEFORE BED [SEDATIVE EFFECT]

NORMALLY ALL AAs COMPETE AT THE BLOOD-BRAIN BARRIER. EAT CARBOHYDRATES WHEN WANTING TO SLEEP, AS INSULIN DRIVES ALL AAs OUT OF THE BLOOD AND INTO THE CELLS, EXCEPT TRYPTOPHAN, WHICH IS CARRIED BY WHITE BLOOD CELLS [THIS LEAVES TRYPTOPHAN UNOPPOSED TO CROSS BLOOD-BRAIN BARRIER-CONVERTED TO **SEROTONIN** IN THE CSF, WHICH MAKES YOU TIRED]

### **ATRIAL FIBRULATION**

AVOID NIACIN

HAWTHORN BERRY

### **DEPRESSION**

AVOID NICOTINAMIDE MOIETY OF B3

### **OSTEOPOROSIS/OSTEOPENIA/OSTEOMALACIA**

AVOID HIGH PHOSPHOROUS FOODS: ANIMAL PROTEIN AND GRAINS [phytates]

EAT FRESH, RAW FRUITS AND VEGETABLES, ESPECIALLY GREEN LEAFIES AND PULSE [BEANS, PEAS AND LENTILS-LIME FOODS] [LIME DEPOSITS ARE CALCIUM DEPOSITS]

**ELEVATED BLOOD PRESSURE**

AVOID FOODS HIGH IN TYRAMINES

EAT: CELERY, GREEN LEAFY'S [EXCEPT ICEBERG LETTUCE]

NO ANIMAL PROTEINS FOR 3 WEEKS, THEN NO MORE THAN 1 PER 5 MEALS

AVOID CERTAIN CALCIUM SUPPLEMENTS [HIGH IN LEAD, WHICH WHEN OSTEOPOROSIS OR OSTEOPENIA OCCURS AT ADVANCED AGE, IS LIBERATED AND CAUSES HYPERTENSION]

EAT GARLIC

**HYPOTHYROID**

**AVOID** FOODS HIGH IN GOITROGENS

TAKE LUGOL OF IODINE

AVOID WHEAT

**HYPERTHYROID**

**EAT** FOODS HIGH IN GOITROGENS

TAKE LUGOL OF IODINE

AVOID WHEAT

**ARTHRITIS**

DISTILLED WATER

CHERRIES

AVOID MUSTARD OIL FOODS

AVOID ACID FOODS

AVOID NIGHTSHADE FOODS

LOWER ANIMAL PROTEIN AND GRAIN DIET

RAISE FRESH, RAW FRUIT AND VEGETABLE DIETS

**PINK EYE**

COLLOIDAL SILVER

**CORNS**

GLYCERINE COVERED WITH BAND AID

**WARTS**

DRY SKIN ORIGIN: GLYCERINE UNDER BAND AID [SOFTENS AND PEELS OFF]

VIRAL ORIGIN: LEMON JUICE UNDER BAND AID [TURNS BLACK AND FALLS OFF]

**11<sup>th</sup> hour:**

**FUNGUS**

**DANDRUFF-fungal**

**LISTERENE**

**ATHLETE'S FOOT: fungal**

SALT WATER SOAK

**TOENAIL: [IF IT'S THICK, SOMETIMES NEED TO SAND THE UPPER NAIL LAYERS OFF]**

SALT WATER SOAK

LISTERINE RINSE

VICK'S MENTHOLADUM

RINGWORM OR UNRESPONSIVE PSORIASIS:

SWIM IN SALTWATER POOL OR OCEAN OR SOAK IN SALTWATER TUB

**SKIN RASH-weeping/seborrea**

LIQUID VIT C AND GLYCERINE

**HEART ISSUES**

HAWTHORNE BERRY

AVOID MILK PRODUCTS

AVOID ANIMAL PROTEIN FOR 3 WEEKS, THEN NO MORE THAN 1 PER 5 MEALS

Avoid LICORICE because it decreases potassium, which can cause heart issues

Potassium and Vit. E significantly decrease second heart attacks

**CORNS**

GLYCERINE COVERED WITH BAND AID

IF DOESN'T TAKE CARE OF IT IN ABOUT 3 DAYS, SHAVE WITH RAZOR TILL CORE IS OUT AS WELL,

AND KEEP UP WITH THE GLYCERINE UNTIL NORMAL

**SKIN TAGS ON NECK**

TRACTION AND CUT AT BASE WITH CUTICLE SCISSORS OR NAIL CLIPPERS

**COLIC**

MOTHER AND CHILD EGG ALLERGY [BAD GAS]

**LIVER ISSUES**

DANDELION

BLACK CHERRY JUICE

MILK THISTLE

**KIDNEY ISSUES**

JUNIPER BERRIES  
CARROT JUICE

**Calcium sources** are generally high in lead, cadmium, aluminum and copper [request MSDS sheet]

**Colloidal mineral sources** are generally high in lead, cadmium, aluminum and copper [request MSDS sheet]

**Get the MSDS sheet on any supplement to find out the levels of heavy metals**

Calcium levels are ideal at about 10.

### Kidney Stones

Avoid taking calcium with foods high in oxylates, as they may form kidney stones.

Avoid taking old, oxidized vitamin C will make one susceptible to form kidney stones.

### Antibiotics

**Fruit juice** is normally taken to help one get well, but it neutralizes antibiotics when taken together, and makes one more susceptible to the infection.

Selenium helps vitamin E [tocopherol] to work.

Selenium depletion keeps vitamin E from functioning.

Vitamin A protects skin, is necessary for night vision, and is a natural antibiotic and lubricates joints. The body converts beta carotene to vitamin A, except in Diabetics, who need to take straight vitamin A. depletion makes one more susceptible to infection.

Vitamin C is an integral part of connective tissue, thus helping healing, mediates 2% of chemical reactions in the body without enzymes, is necessary [with B12] to convert folic acid to its active form of tetrahydrofolic acid, and acts as an insulin replacement.

Vitamin E is necessary to make cell walls flexible, thus preventing scar tissue formation and allowing other nutrients and oxygen into the cell and waste out of the cell. Vitamin E is an insulin replacement and prevents second heart attacks. When it is depleted, it can mimic deficiency of any other nutrient.

### Fibromyalgia

Fibromyalgia is widespread scar tissue in muscles causing pain.

Those with fibrocystic breast disease and fibromyalgia should avoid caffeine, as it can cause scar tissue proliferation

**Caffeine causes scar tissue, especially in the breast.**

Abstaining from coffee causes a reversal of fibrocystic breast disease.

Tea, especially **brewed tea**, and many soft drinks are high in caffeine.

**Guarana** is the highest in caffeine, 2.5-5% by weight.

Caffeine is found in high amounts in **energy drinks**.

#### Caffeine

Caffeine ingestion can cause **urinary leakage** and **elevated blood pressure**.

Caffeine causes **ADHD** in children

#### Caffeic Acid

Is a potent pain causer, isn't removed with caffeine

#### Tyramines

Bananas are high in potassium.

Potassium lowers blood pressure.

Doctors recommend eating bananas to lower blood pressure.

Bananas are high in tyramines.

Ripe bananas are even higher.

Banana bread is mad with over-ripe bananas.

Tyramines raise blood pressure....

### ALLERGIES/HYPERSENSITIVITIES/FOOD SENSITIVITIES AND INTOLERANCES

#### CANDIDA VAGINAL YEAST INFECTION: Candida is a pseudo-yeast, actually a fungus

Vinegar douche irritates it

SODIUM BICARBONATE douche cures it in short order

#### CANKER SORES

Instead of lysine, put a small amount of Apple Cidar Vinegar in your mouth and rub it in with your tongue. It will sting a bit, but it will be gone in a few days, no matter how long you've had it!

#### PORPHYRIA

CHLOROPHYLL and HEMOGLOBIN have porphyrin rings

If someone gets sick from red meat or green leafies, they probably have a lesser porphyria

#### Uric acid and Gouty arthritis

Is associated with heart conditions

Can be brought under control by vit. C

## ASPIRIN AND HEART ATTACKS, STROKES, ETC.

When research was announced that aspirin reduces heart attacks, suddenly doctors all over the country were recommending 2 aspirin per day for prevention of heart attacks. Then it was reduced to 1 aspirin per day. Then ½ aspirin per day. Then a baby aspirin per day.

What you most likely didn't hear about was that the doctor that did the research immediately wrote a letter to the editor of the research publication that his research was being taken out of context. He said that the research showed that aspirin reduced *non-fatal* heart attacks in an insignificant manner, fatal heart attacks *not at all*, and *statistically significantly increased fatal strokes!!!*

The slow regression in the amount of the amount of aspirin recommended per day was to not bring attention to the very embarrassing and very public mistake of making it in the first place, and the second reason was because of the extreme increase in the amount of side-effects that were occurring **secondary to the high amount of people taking too much aspirin each day**: hospitalizations and deaths due to

- ulcers
- blood-thinning effects
- strokes
- tinnitus (ringing in the ears)

### NSAIDS (over the counter pain killers)

### NON-STEROIDAL ANTI-INFLAMMATORY DRUGS

Fatalities (200-2,000) from ulcers and hospitalizations (1,500-15,000) from ulcers rose by *ten times* from 1992 to 2002. *Ingestion* of NSAIDS rose by a similar amount during the same time period.

*Heart attacks* and *strokes* are *doubled* by the ingestion of NSAIDS in general.

At least **25%** of individuals on *kidney dialysis* are there because of NSAIDS in general.

Certain NSAIDS (*ibuprophen*) are responsible for *over 50%* of *acute and chronic liver inflammation*.

### Eczema

By adding pure **lard** to the diet will cure this

### POISON IVY

When I was young, I played and rolled around in Poison Ivy without adverse effect. When I hit my mid thirties, I started having reactions for several years when I went to my parents' farm. Then I noticed that

I didn't **always** have a reaction. I had been getting a large ice cream cone on the way to the farm, but when I didn't get one, I had no reaction to the poison ivy.

Usually, cortisone cream was necessary to stop the reaction.

A Doctor of Naturopathy I knew said to use the homeopathic remedy **rhus tox**, but not to do it after cortisone, or it wouldn't work. It did indeed work. I have used both approaches on many patients with great results. Most of them had been reactive all their lives, and **no longer reacted when removing milk from their diets**.

## SHINGLES

An older woman had Shingles pain in her side for 27 years when she came to see me. I found multiple active trigger points and treated them, but it wasn't enough. I recommended **extract of Lobelia**, which is a Nervine herb, recommended taking 3 drops under the tongue 5 times daily and rubbing it into the painful area as many times. I also recommended a **Black Cohosh retention enema**, 15 minutes per day, 2 teaspoons in 1 pint (2 cups) of warm distilled water per day. In just a few weeks, the Shingles pain was gone for good!

## MULTIPLE SCLEROSIS AND ALS

FAST OFF ANIMAL PROTEIN FOR 3 WEEKS, THEN NO MORE THAN ONCE PER 5 MEALS

70-80% FRESH, RAW FRUITS AND VEGETABLES

DISTILLED WATER ONLY FOR DRINKING AND COOKING

## PAIN AND HOMEOPATHY

The homeopathic remedy for pain is **arnica**. I don't like drugs or remedies for pain unless there is no other way to go, especially for only a short period of time. If you cover up the pain, there is no way to get to the cause of the pain and correct it.

## DRY SKIN WITH OLD AGE CRUSTIES AND FIBROMYALGIA

Distilled water only for fluids and cooking

Avoid soap on body, use non-soap cleanser only [surfactant]

Eat peels and skins of all fruits and vegetables

Vit. A

Aloe Vera Barbadosensis Miller internally and on the skin

## FAILURE TO THRIVE

GIVE MARSHMALLOW TO MOTHER ENRICHES MILK

AVOID COW'S MILK

**12<sup>th</sup> hour:**

**Corn chip allergy, but not fresh corn**

**Honey allergy, but not bread**

**Wheat allergy causing allergy to apples and melons**

**Alcohol poisoning, vomiting blood-lemon juice stops**

**Hangover-thiamin or oxygen breathing cures**

**Repeated fainting spells with prodrome-oxygen therapy when feeling onset**

**Colicky child, take mother off eggs**

**Foul-smelling gas-keep off eggs**

**Hyperactivity and misbehaving-take off milk**

**Crime, delinquency and hyperactivity-take off milk**

**Addictions-low animal protein, high complex carbs, fresh raw fruits and vegetables**

**Daily migraines-artificial sweeteners, esp. aspartame**

**Food intolerance and abnormal weight loss-no milk, wheat or sugar, up fresh, raw fruits and veggies**

**Abnormal long and heavy menstrual flow, regular nose bleeds, bleeding hemorrhoids, bleeding ulcers: avoid chocolate**

**Leaky gut: caused by milk and NSAIDS**

**Auto immune diseases, actually body attacking foreign proteins that made it through leaky gut**

**Center for Human Functioning girl with too much C: hearing like out of a barrel, chronic fatigue, severe pain in hips**

**Arthritic pains from too much vit. E: discontinue and give a little junk food to deplete the excess**

**Drinking high amount of coffee over time: kidney and low back pain**

**Cinnamon lowers cholesterol quickly**

**Get off sugar and triglycerides lower quickly**

**When someone's on blood thinners, introduce a capsule of vit. E, they will lower the thinner, add another, they will lower again, etc. till they get them off it**

**Mistletoe spores can cause elevated blood pressure**

**Wheat lowers strength**

Milk lowers endurance

Formaldehyde and nosebleeds

Low ferrous fumarate-2 oz of raw beef per day for about 3 months

Distilled water for lame dogs and smoothing out animal fur

Garlic and honey for body infections

Ammonia for swollen sinuses

Lemon for shell fish poisoning

Pectin/jello for diarrhea

Chlorophyll for putrefactive poisons

Chlorophyll for bad breath

Heavy metal poisoning/fillings: totally puzzling symptoms

Elevated WBCs after meat meal

Diabetic pricks for drop of blood, then goes for a minute-skews test too high

Syphilis false positive

Other blood tests false positives

Vit. E for long-term infection

Tobacco for cuts

Getting off whole milk when drinking a lot, ears may fill up with wax

MS mucous filled urine bag several times

Burnt oils and sinuses acrolein

## BIOCHEMICAL INDIVIDUALITY

## FALSE POSITIVE AND FALSE NEGATIVE TESTS RESULTS

Many medical tests can show just the opposite of what is going on in the body. Only alert and knowledgeable Health Care Practitioners can discern by observation and knowledge when this occurs. This is why the term "Pathognomonic" is used only on certain test results.

**Pathognomonic:** A sign or symptom that is **so characteristic of a disease that it can be used to make a diagnosis.**

This simply means that **MOST tests are NOT pathognomonic**, and **can NOT be stand-alone reliable tests for a given diagnosis.**

Herein lay the axiom of the ART of healthcare in association with the SCIENCE of healthcare.

There exists an art AND a science because each relies on the other.

Healthcare is a PRACTICE because it is ever-evolving with new evidence. What is considered truth now may not hold up as truth in the future after observations of tens of thousands of patients.

For example, the doctor who introduced the Prostate Specific Antigen test (PSA) several years later admitted it was useless.

When I began practice, levels of cholesterol 300-350 were considered in normal range, now 160-200 is considered normal.

Levels of blood sugar to denote diabetes were considered normal at 120-150, now 80-100 is considered normal.

Some examples:

- 1) **Physiologic/Clinical Hypothyroidism** occurs when you have many of the symptoms of hypothyroidism, but **blood levels of TSH, T3, T4 and T7 are normal!** Why? The hormones are present in sufficient levels, but aren't working properly at the cellular level.
- 2) **95% of Diabetics have TOO MUCH insulin** (hyperinsulinemic), not too little! Why? Insulin is present in sufficient levels, but isn't working properly at the cellular level.
- 3) Diabetics show normal blood levels of potassium, but potassium is lacking in the cells!
- 4) Paradoxical **Aciduria**, where the body is actually too alkaline. (example follows)

## PARADOXICAL ACIDURIA

Paradoxical Aciduria, or unexpected acidic urine in the setting of a **patient with metabolic alkalosis**. The primary component of this phenomenon is that the metabolic alkalosis has an additional hypokalemia. A certain grade of hypokalemia is expected in metabolic alkalosis as potassium ion exchange and go intracellular as the hydrogen ions exit the cell. But if the metabolic alkalosis originated for example due to gastric secretions (i.e. vomiting, or suction), this would cause such an hypokalemia that the kidneys in order to maintain adequate potassium level instead of using Na/K pump in the distal tubule, the Na/H pump would be favored. Therefore, sodium is reabsorbed as hydrogen ions are excreted making the urine acidic, even when we really need to conserve and retain acid. Therefore this situation aggravates the state of metabolic alkalosis in the patient.

**STOMACH UPSET, HEADACHE, WEAKNESS?  
IT MAY BE YOUR TAP WATER OR YOUR TOOTHPASTE!**

## FLUORIDE SIDE EFFECTS

Some side effects of fluoride may not be reported. Always consult your doctor or healthcare specialist for medical advice. You may also report side effects to the FDA.

*Applies to fluoride: oral liquid, oral lozenge, oral solution, oral tablet, oral tablet chewable*

Get emergency medical help if you have any of these signs of an allergic reaction while taking fluoride: hives; difficulty breathing; swelling of your face, lips, tongue, or throat.

Call your doctor if you have any of the following side effects:

- discolored teeth;
- weakened tooth enamel; or
- any changes in the appearance of your teeth;
- **thyroid issues**

Less serious side effects of fluoride may include:

- stomach upset;
- headache; or
- weakness.

### Allergy cross-sensitivity

One substance can cause sensitivity to several other substances, such as wheat for apples and melons

### Hirsutism

Distilled water

## ALLERGIES AND BEDWETTING (ENURESIS)

The Mayo Clinic and others acknowledge that bedwetting youngsters they have treated stopped when offending foods were eliminated from their diets. Bedwetting started up again when the offending foods were re-introduced into the diet.

Dr. Douglas N. Tietjen, M.D., and Douglas A. Husmann, M.D. from the Department of Urology at the Mayo Clinic, state: “in a small minority of patients, nocturnal enuresis may be linked to dietary allergies that provoke bladder instability.”

The article on <http://www.mayoclinicproceedings.com/inside.asp?AID=3663&UID=> indicates an extremely small number of patients have *documented* food-provoked enuresis, so it *may* be

rare. This study has found it to be quite rare that food allergies *alone* is the cause of most bedwetting.

I used this on a 14 year old young man who always wet the bed, and he immediately quit bedwetting by eliminating primarily milk products, grains and eggs!

## **SEVERE HEADACHES, CHRONIC SEVERE, SHARP HIP PAIN, TROUBLE GETTING OFF FLOOR**

A gentleman came in with severe pain in his side and hip of 9 month's duration. I cleared out all the pain but from his hip after several visits. I asked if he continually said something like "that's a real pain in the butt" when he got discouraged or angry, and his wife (who was sitting in the corner) said "he says that at least a dozen times every day!

I told him about a research study that **Topeka's Menninger Clinic** did in the late 1980's/early 1990's. The study concluded that things that people stated in frustration such as "my aching neck!" or "my aching back!", etc. ended up manifesting itself in their bodies as neck pain or low back pain and arthritis.

I instructed him to give his wife, children, grandchildren, employees, etc. license to correct him if he ever said it again, then instructed him to say "boy that makes my butt feel good!" instead. His hip had now been in severe pain for about a year. The pain left in 3 weeks and never returned! Richard was now in his 60's.

## **UNABLE TO STRAIGHTEN KNEES**

A woman had rheumatoid arthritis of the knees and was barely able to walk even with crutches because her knees could barely straighten more than 110 degrees. Straight is 180 degrees. With treatments we got her to about 160 degrees and lengthened her crutches 4 notches. I asked her if she knew about the Menninger Clinic study, and she said a therapist had told her and she had practiced it. I asked her if she frequently said "I can't stand it!" and her mouth dropped open and her eyes went wide. She said it all the time! I told her to alter her speech to "I can stand it!"

## **CRAZINESS**

A young woman came to me with several issues. Over the time I treated her it became evident that she said "that makes me feel crazy" very nearly every other sentence. I commented on her habit and told her about the Menninger Clinic study and suggested she change her speech patterns. The next time she came in, a few days later, she said she went home and told her roommate what I said. Her roommate stated that she also frequently stated "that makes me want to die"!

She moved away and 4 or 5 years later I saw her selling Medical Books at a convention. Her whole demeanor and speech pattern had changed!

