

NUTRACEUTICAL



**CRITICAL SUPPLEMENT FOR BUILDING A
HEALTHY BANGLADESH.**



History



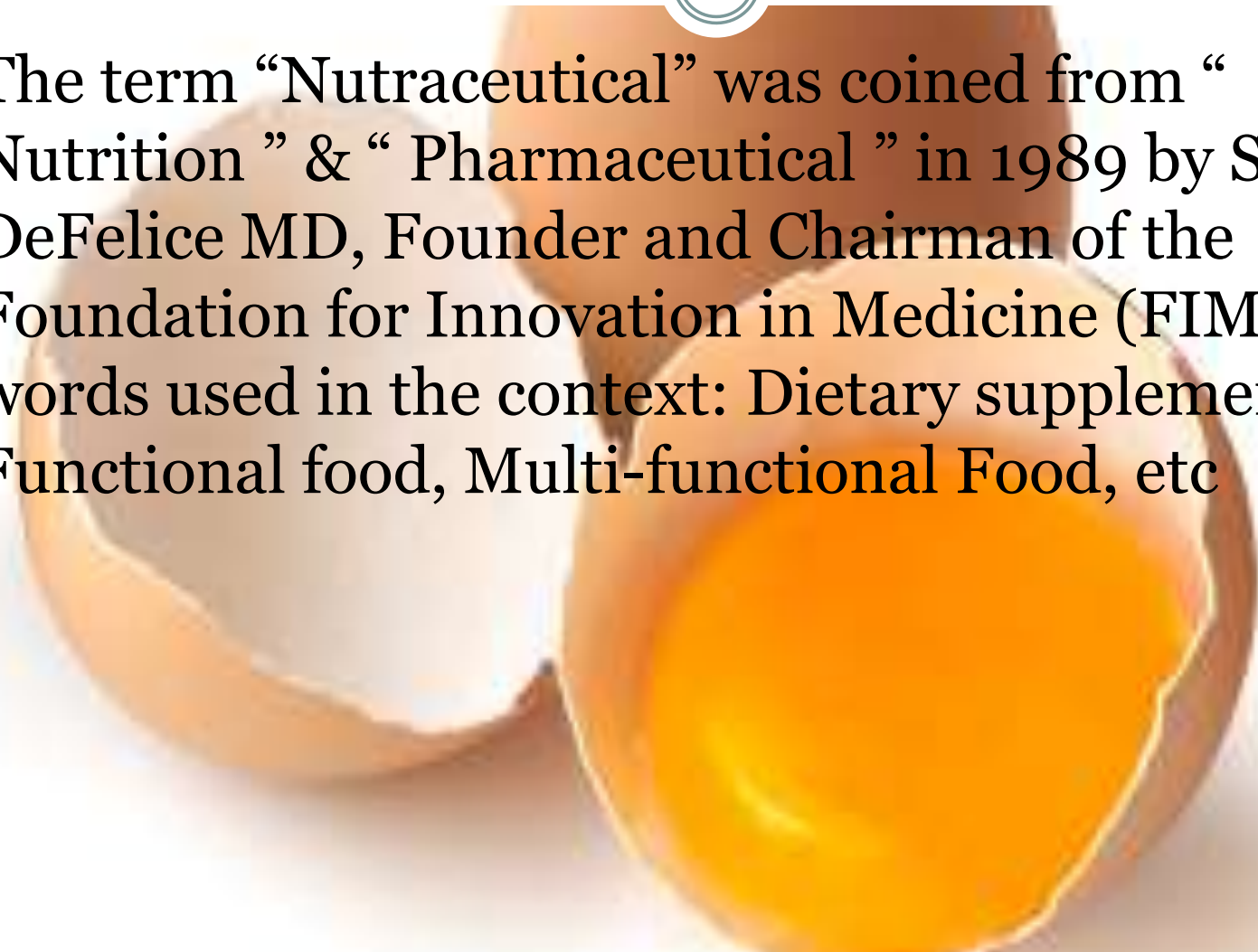
- Greek Physician Hippocrates, Known as Father of Medicine. (said several centuries ago) “Let Food be Your Medicine & Medicines be Your Food” The Philosophy behind is: “Focus on Prevention.”



History



- The term “Nutraceutical” was coined from “Nutrition ” & “ Pharmaceutical ” in 1989 by Stephen DeFelice MD, Founder and Chairman of the Foundation for Innovation in Medicine (FIM). Other words used in the context: Dietary supplements, Functional food, Multi-functional Food, etc



Definition of Nutraceutical



The term “nutraceutical” combines the word “nutrient” (a nourishing food or food component) with “pharmaceutical” (a medical drug). The word “nutraceutical” has been used to describe a broad list of products sold under the premise of being dietary supplements (i.e. a food), but for the expressed intent of treatment or prevent of disease.

According to American association of nutritional chemists



- **The product that has been isolated or purified from food and generally sold in medicinal forms not usually associated with food.**

With passage of dietary supplement, health and education act (dshea)

- ❖ Is a product (other than tobacco) that is intended to supplement the diet that bears or contains one or more of the following dietary ingredients: a vitamin, a mineral, an herb or other botanical, an amino acid, a dietary substance for use by man to supplement the diet by increasing the total daily intake, or a concentrate, metabolite, constituent, extract, or combinations of these ingredients.
- ❖ is intended for ingestion in pill, capsule, tablet, or liquid form.
- ❖ is not represented for use as a conventional food or as the sole item of a meal or diet.

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- ❖ Is labelled as a “dietary supplement.”
includes products such as an approved new drug, certified antibiotic, or licensed biologicals that was marketed as a dietary supplement or food before approval, certification, or license (unless the Secretary of Health and Human Services waives this provision)

Simply, Nutraceuticals means , NUTRITIVE + PHARMACEUTICAL



A food stuff(as a fortified food or dietary supplement) that provides health benefits. The functional food concept can be defined as “Food products to be taken as part of the usual diet in order to have beneficial effects that go beyond basic nutritional function.”

CLASSIFICATION



1. NUTRACEUTICALS BASED ON THEIR

Source:	Nutraceuticals:
Plants	<ul style="list-style-type: none">•Tomato•Garlic•Momordica
Animals	<ul style="list-style-type: none">•Shark liver oil•Cod-liver oil
Minerals	<ul style="list-style-type: none">•Calcium•Magnesium•Phosphorus
Micro-Organism	<ul style="list-style-type: none">•Bifidobacterium•Lactobacilli

2. Nutraceuticals used in various disease condition



Conditions	Nutraceuticals
•Allergy relief	•Ginkgo biloba
•Arthritis support	•Glucosamine
•Cancer prevention	•Flax seed , Green tea
•Cardiac disease	•Garlic
•Cholesterol lowering	•Garlic
•Digestive support	•Digestive enzymes
•Diabetic support	•Garlic , Momordica
•Female hormone support	•Black conosh , False Unicorn
•Immunomodulators	•Ginseng

3. nutraceuticals as per the chemical groupings

CLASS/CHEMICAL GROUPINGS	EXAMPLES
•Inorganic mineral supplements	•Minerals
• Vitamin supplements	•Vitamins
•Digestive enzymes	• Enzymes
•Probiotics	•Helpful bacteria
•Prebiotics	•Digestive enzymes
•Dietry fibers	• Fibers-fruits, cereals

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CLASS/CHEMICAL GROUPINGS	EXAMPLES
Cereals and grains	Wheat, Soya bean
Health drinks	Fruit juice and vitamins
Poly unsaturated fatty acids PUFA	Fish oil
Antioxidants	Natural antioxidants
Phytochemicals-	
a) Flavonoids-	Bioflavonoids
b) Isoprenoids-	Carotenoids
c) Proteins	Soya proteins

EXAMPLES OF FUNCTIONAL COMPONENTS



- A Glossary of Terms...
- **Amino acid:** One of the building blocks of protein.
- **Antioxidant:** A substance that blocks or inhibits the actions of free radicals, molecules that speed up the aging process and contribute to illness. Free radicals are found in rancid fats and oils and environmental hazards.
- **Arteriosclerosis:** Condition in which the walls of arteries become hard and thick, sometimes interfering with blood circulation.
- **Coffeic acid :** An acid obtained from coffee tannin, as a yellow crystalline substance.
- **Carotenoids :** One of the most widespread groups of naturally occurring pigments. These compounds largely are responsible for the red, yellow and orange color of fruits and vegetables and also are found in many dark green vegetables.

Chelation



- A process that wraps or binds the minerals in amino acids, it uses an agent, such as the chemical compound EDTA, to remove heavy metals from the body.
- Complementary and alternative medicine (CAM): A group of diverse medical and health care systems, practices and products that presently are not considered part of conventional medicine. Complementary medicine is used together with conventional medicine. Alternative medicine is used in place of conventional medicine

Enzyme



- A complex protein produced by cells that acts as a catalyst in specific biochemical reactions.
- **Ferulic acid:** A compound, $C_{10}H_{10}O_4$, related to vanillin and obtained from certain plants.
Flavanoids: A class of water-soluble plant pigments.
- **Genetically engineered food:** A food substance that has foreign genes inserted into its genetic code. Genetic engineering can be done with plants, animals or microorganisms. Scientists can move desired genes from one plant into another and even from an animal to a plant, or vice versa.

Holistic medicine

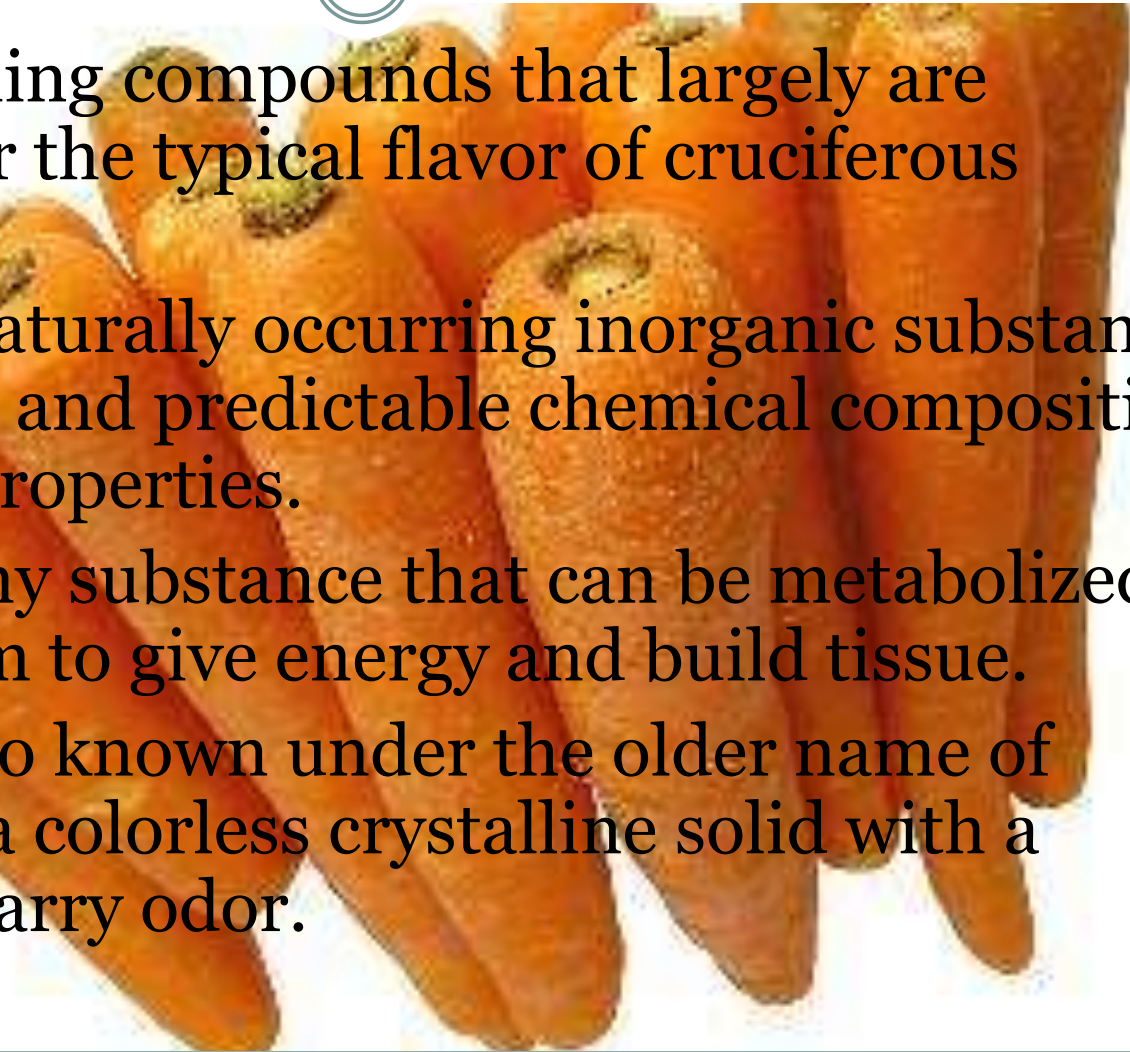
A glass of orange juice is the background for the slide. At the top center, there is a circular graphic element consisting of two concentric circles. A horizontal dashed line runs across the slide, passing through the center of the circles.

- An approach to medical care that emphasizes the study of all aspects of a person's health, including physical, psychological, social, economic and cultural factors.
- **Homeopathy:** A complementary and alternative medical system. In homeopathic medicine, there is a belief that small, highly diluted quantities of medicinal substances are given to cure symptoms, when the same substances given at higher or more concentrated doses actually would cause those symptoms.
- **Isoflavones:** A class of organic compounds and bio molecules related to the flavonoids . They act as phytoestrogens , which are thought by many to be useful in treating cancer.

sothiocyanates



- Sulfur-containing compounds that largely are responsible for the typical flavor of cruciferous vegetables.
- **Mineral:** A naturally occurring inorganic substance with a definite and predictable chemical composition and physical properties.
- **Nutrient:** Any substance that can be metabolized by an organism to give energy and build tissue.
- **Phenols:** Also known under the older name of carbolic acid, a colorless crystalline solid with a typical sweet tarry odor.



Phytoestrogens



- Compounds that occur naturally in plants (phyto) and under certain circumstances can have actions like human estrogen.
- **Plant stanols and sterols** : Essential components of plant cell membranes that resemble cholesterol structurally. Plant sterols are present naturally in small quantities in many fruits, vegetables, nuts, seeds, cereals, legumes, vegetable oils and other plant sources. Plant stanols occur in even smaller quantities than plant sterols in many of the same sources.
- **Polyols**: Chemical compounds containing multiple hydroxyl groups. Sugar alcohols, a class of polyols, commonly are added to foods because of their lower caloric content

Prebiotics



- Food substances that promote the growth of certain bacteria (generally beneficial) in the intestines.
- **Probiotics:** Dietary supplements containing potentially beneficial bacteria or yeast.
- **Saponins:** Any of various plant glucosides that form soapy lathers when mixed and agitated with water. They are used in detergents, foaming agents and emulsifiers.
- **Sulfides:** Refers to several types of chemical compounds containing sulfur.
- **Thiols:** Compounds containing the functional group composed of a sulfur atom and a hydrogen atom.
- **Vitamin:** An organic substance essential in small quantities to normal metabolism.

Broadly can be defined as



- **Nutrients** : Substances which have established Nutritional functions e.g. Vitamins, Minerals, Amino Acids, Fatty acids, etc.
- **Herbals/Phytochemicals** : Herbs or Botanical products
- **Dietary Supplements** : Probiotics, Prebiotics, Antioxidants, Enzymes, etc.

NUTRIENTS



- **Most common Nutrients used/ supplemented as Nutraceutical are: Minerals and Vitamins. OR in combination OR in combination with other antioxidants**



Vitamins Fat Soluble Vitamins



- **Vitamin A** :Acts as antioxidant, essential for growth and development, maintains healthy vision, skin and mucous membranes, may aid in the prevention and treatment of certain cancers and in the treatment of certain skin disorders.
- **Vitamin D**: Essential for formation of bones and teeth, helps the body to absorb and use calcium.

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- **Vitamin K** : Essential for blood clotting.
- **Vitamin E** : Antioxidant, helps to form blood cells, boosts immune system



Water Soluble Vitamins



- **Vitamin C** : Antioxidant, necessary for healthy bones, gums, teeth and skin. Helps in wound healing, prevent from common cold.
- **Vitamin B 1** : Helps in carbohydrate metabolism, essential for neurological function.
- **Vitamin B 2** : Energy metabolism, maintain healthy eye, skin and nerve function.

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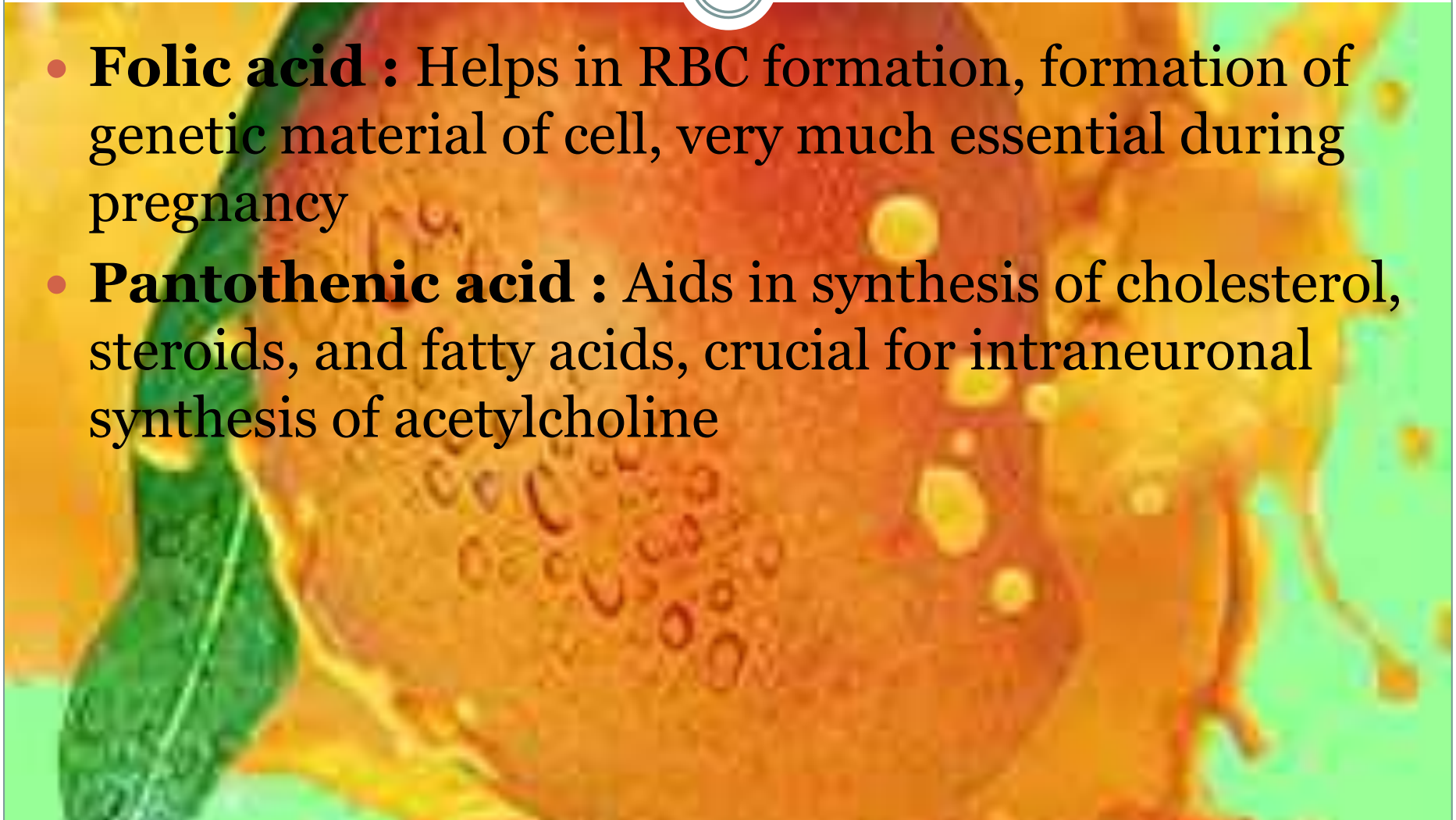
- **Vitamin B 3** : Energy metabolism, brain function.
- **Vitamin B 6** : Helps to produce essential proteins, convert proteins in to energy.
- **Vitamin B 12** : Help in producing genetic material, formation of RBC, maintenance of CNS, synthesis of amino acids, involved in metabolism of protein, fat and carbohydrate.



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- **Folic acid** : Helps in RBC formation, formation of genetic material of cell, very much essential during pregnancy
- **Pantothenic acid** : Aids in synthesis of cholesterol, steroids, and fatty acids, crucial for intraneuronal synthesis of acetylcholine



Vitamins like Compounds



- **L- Carnitine** : Helps in oxidation of fatty acids, role in oxidative phosphorylation .
- **Choline** : Lipotropic agent, used to treat fatty liver and disturbed fat metabolism .
- **Inositol** : For amino acid transport and movement of Potassium and sodium.
- **Taurine** : Helps in retinal photoreceptor activity, bile acid conjugation, WBC antioxidant activity, CNS neuromodulation, platelet aggregation, cardiac contractibility, sperm motility, insulin activity .

Minerals

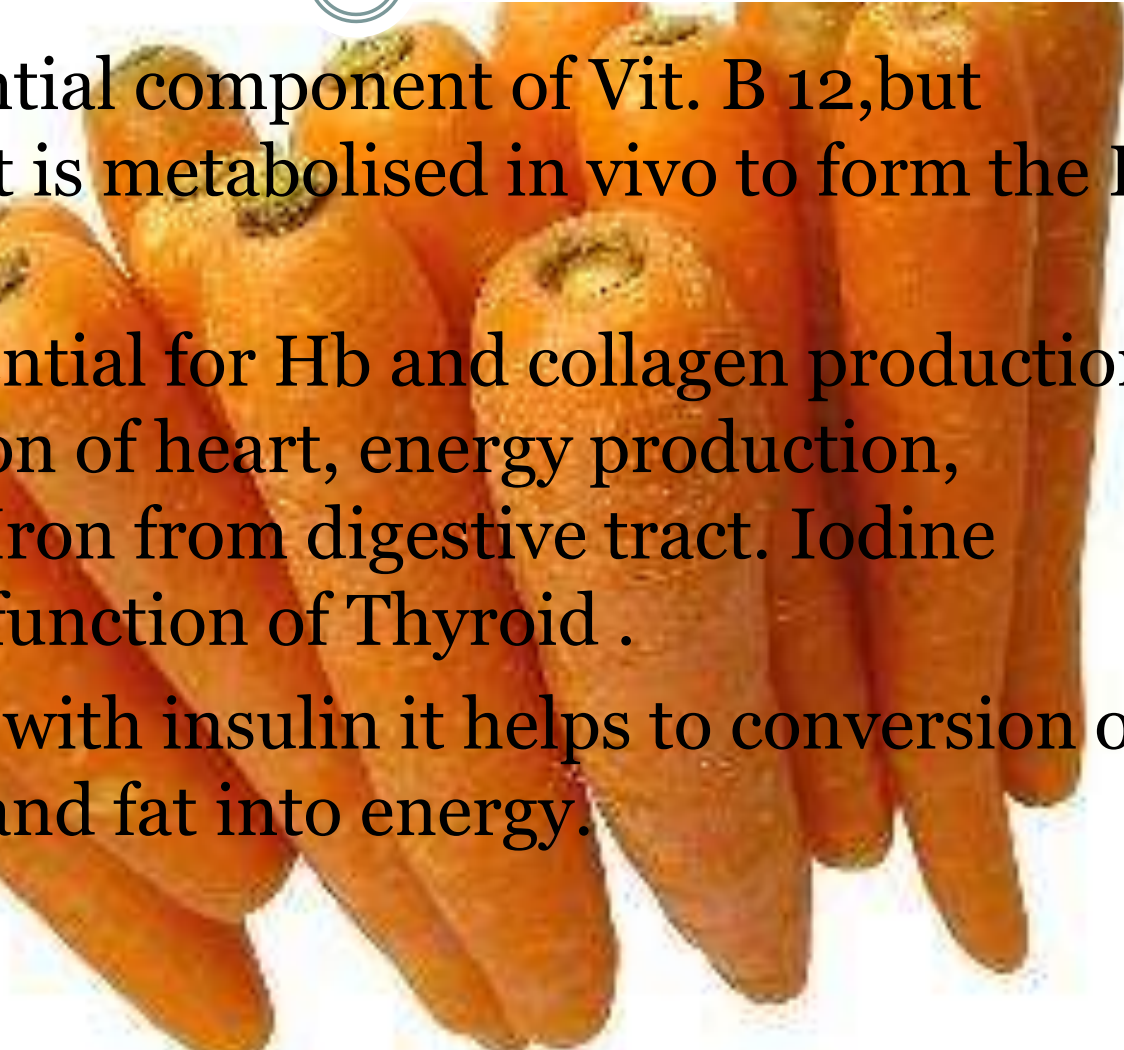


- **Calcium** : essential for building bone and teeth and maintaining bone strength, important in nerve, muscle and glandular function.
- **Iron** : Helps in energy production, helps to carry and transfer oxygen to tissues.
- **Magnesium** : for healthy nerve and muscle function, bone formation.
- **Phosphorous** : energy production, phosphorylation process, bone and teeth, for genetic material.

TRACE ELEMENTS



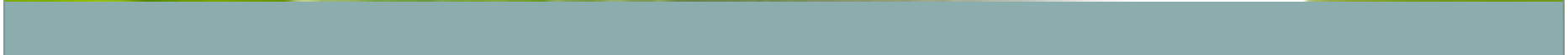
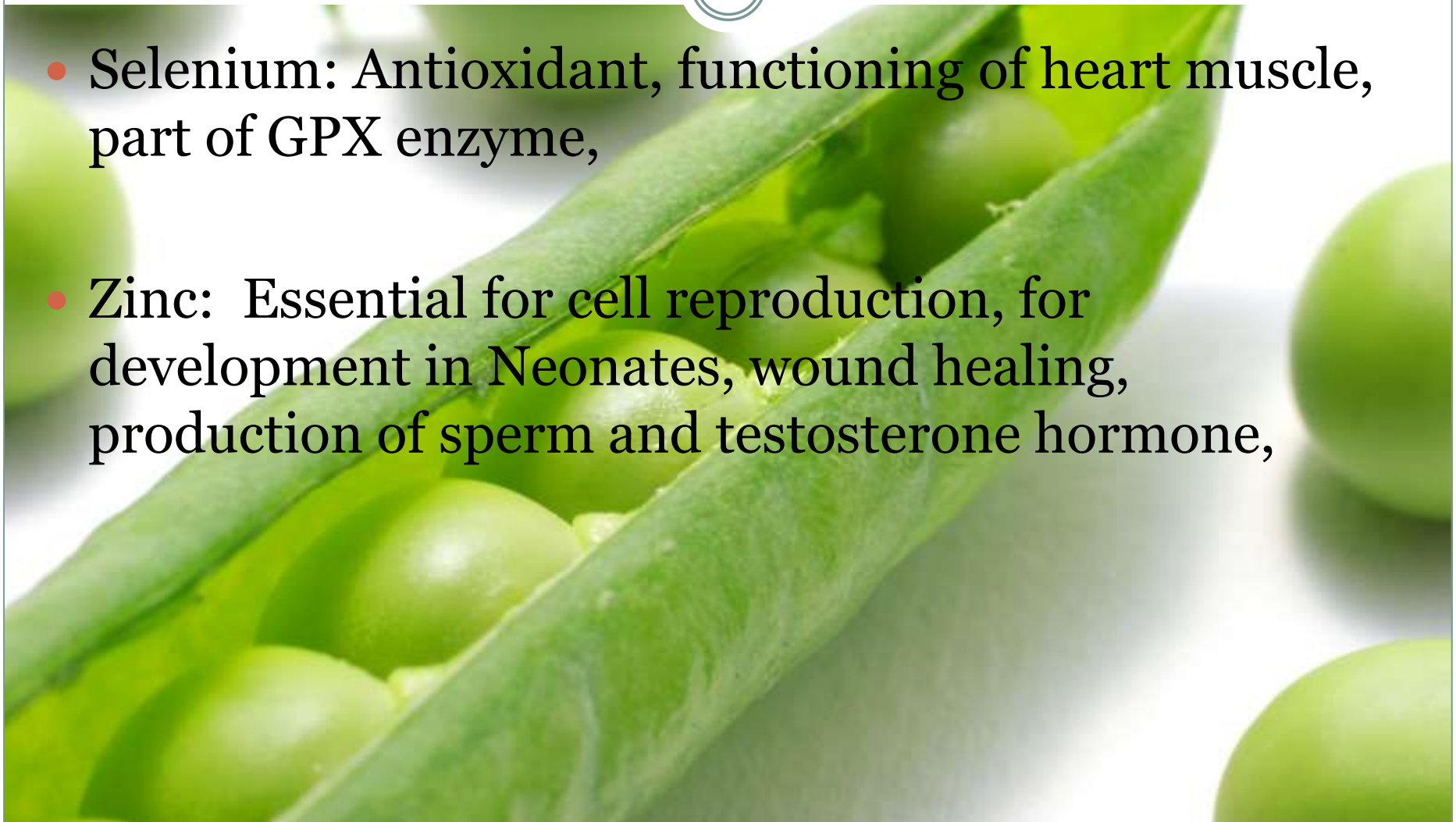
- **Cobalt** : essential component of Vit. B 12, but ingested cobalt is metabolised in vivo to form the B 12 coenzymes.
- **Copper** : essential for Hb and collagen production, healthy function of heart, energy production, absorption of Iron from digestive tract. Iodine proper gland, function of Thyroid .
- **Chromium** : with insulin it helps to conversion of carbohydrate and fat into energy.



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- Selenium: Antioxidant, functioning of heart muscle, part of GPX enzyme,
- Zinc: Essential for cell reproduction, for development in Neonates, wound healing, production of sperm and testosterone hormone,



Herbals



- **Aloe vera:** Anti-inflammatory, emollient, wound healing,
- **Evening Primrose oil:** Dietary supplement of linoleic acid, treatment of atopic eczema,
- **Garlic:** Antibacterial, antifungal, antithrombotic, antiinflammatory,
- **Ginger:** carminative, antiemetic, treatment of dizziness

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- **Ginseng:** Adaptogen,
- **Green tea:** Antioxidant, reduces risk of CVD, enhances humoral and cell mediated Immunity,
- Vegetables, fruits, whole grain, herbs, nuts and various seeds contain an abundance of phenolic compounds, terpenoids, sulphur compounds, pigments etc. that has been associated with protection / treatment of certain disease conditions,

Phytochemicals



- **Phytochemicals could provide health benefits as:**
 - 1. Substrate for biochemical reactions**
 - 2. Cofactors of enzymatic reactions**
 - 3. Inhibitors of enzymatic reactions**
 - 4. Absorbents that bind to & eliminate undesirable constituent in the intestine**
 - 5. Scavengers of reactive or toxic chemicals**

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- 6. Enhance the absorption and / or stability of essential nutrients**
- 7. Selective growth factor for beneficial bacteria**
- 8. Fermentation substrate for beneficial bacteria**
- 9. Selective inhibitors of deleterious intestinal bacteria**

CONCLUSION



- Nutraceuticals are present in most of the food ingredients with varying concentration .
- Concentration, time and duration of supply of nutraceuticals influence human health.
- Manipulating the foods, the concentration of active ingredients can be increased.
- Diet rich in nutraceuticals along with regular exercise, stress reduction and maintenance of healthy body weight will maximise health and reduce disease risk.

THANKS TO ALL



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