



**Centurion**  
**UNIVERSITY**

# NUTRACEUTICALS

1



***AN APPLE A DAY KEEPS THE  
DOCTOR AWAY.***



**GREEK PHYSICIAN HIPPOCRATES,**  
KNOWN AS FATHER OF MEDICINE.  
(SAID SEVERAL CENTURIES  
AGO)

**“Let Food be Your Medicine”**

The Philosophy behind is:

**“Focus on Prevention”**

- ' 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:
- Scope of Nutraceuticals,
- Classification of N’ceuticals
- Categories in which they categorised .. Continued..

- ' Various N'ceuticals available in market,(nutrients , Herbals, Vitamins , Phytochemicals,etc)
- ' Method to enhance active components in foods
- ' Some healthiest fruits and vegetables
- ' Conclusion



**PHYTOCHEMICALS**











# **'Nutraceutical can be defined as**

“A food or part of food or nutrient, that provides health benefits, including the prevention and treatment of a disease.”

# SCOPE OF NUTRACEUTICALS

Disease	Nutraceuticals	Source
1) Joint health	Glucosamine	➔
	Chondroitin	➔
2) Cardiovascular health	Co Q-10	➔
	Melatonin	➔
	DHA	➔ Fish oil
	Reseveratrol	➔ Grapes, red wine
	Carotenoids	➔ Carrot ,Sweet potato
	Catechin	➔ Tea extracts



Disease	Nutraceuticals	SOURCE
3) <b>Eye health</b>	DHA	 Linseed (flax oil),fish oil
	Pycnogeal	 Barley
	Lotein	 Spinach
4) <b>Cancer prevention</b>	Caretonoids	 Carrot ,sweet potatoes
	DHA	 Flax seed,linseed,fish oil
	Resveratrol	 Red wine,grapes
	Lycopene	 Tomatoes ,grape fruit
	Tea extracts (ellagic acid)	 Strawberry ,Raspberry



# CLASSIFICATION OF NUTRACEUTICALS

<b>Class / components</b>	<b>Source</b>	<b>Potential benefit</b>
<b>1. Fatty acids</b> <b>CLA</b>	<b>Milk &amp; Meat</b>	<b>Improve body composition, reduce cancers</b>
<b>n-3 FA(DHA, EPA)</b>	<b>Fish oils, berseem &amp; maize fodder,mustard,linseed, rapeseed</b>	<b>Reduce CVD &amp; improve mental, visual function</b>

<b>Class / components</b>	<b>Source</b>	<b>POTENTIAL BENEFIT</b>
<b>2. Polyphenols</b>		
<b>Anthocyanidin e</b>	<b>Fruits</b>	<b>Nutralises free radicals, reduce risk of cancer</b>
<b>Catechins</b>	<b>Tea,babul pods,mustard cake,rape seed,salseed</b>	
<b>Flavonone</b>	<b>Citrus</b>	
<b>Flavones</b>	<b>Fruits, vegetables,soya bean</b>	
<b>proanthocyanidine</b>	<b>Cocoa, chocolate,tea,rape seed</b>	<b>Reduce CVD</b>

### **3. SAPONINS**

**Soybeans, GNC, lucerne, chick pea**

**Lower cholesterol  
anti cancer**

### **4. Probiotics / Prebiotics /**

### **Synbiotics**

**Lactobacillus**

**Dahi, yogurt**

**Improve GI health**

**Fructo -  
oligosaccharides**

**Whole grains,  
onions, combination of Pro  
& Prebiotics**

### **5. Phytoestrogen**

**Daidzein ,  
Zenistein**

**Soybean, flax,  
lentilseed, maize,  
berseem, lucerne, sub abul  
fodder**

**Reduce menopause  
symptoms, □ bone health**

**Lignans**

**Flax, rye, vegetables**

**Reduce cancer and heart  
diseases**

## 6. Carotenoids

□ -carotene

Berseem, lucerne, oat & maize  
fodder, Carrots,  
vegetables, fruits

Neutralises free  
radicals

Luteine

vegetables

Healthy vision

Zeoxanthine

Eggs, citrus, corn

Lycopene

Tomatoes

Reduce prostate  
cancer

## 7. dietary fiber

Insoluble fiber

Wheat bran

Reduce breast,  
colon cancer

□ -glucan

Oats

Reduce CVD

Whole grain

Cereal grains

# CATEGORIES OF NUTRACEUTICALS

- ' Nutraceuticals are non specific biological therapies used to promote wellness, prevent malignant process and control systems . These can be grouped into the following three broad categories:
- ' Substance with established nutritional functions , such as vitamins , minerals , amino acids and fatty acids- Nutrients

- ' Herbs or botanicals products as concentrates and extracts – Herbals
- ' Reagents derived from other sources(eg. pyruvate , chondroitin sulphate , steroids hormone ,precursors)serving specific functions , such as sports nutrition , weight loss supplements and meal replacements – Dietary supplements.

# NUTRACEUTICALS AVAILABLE IN MARKET

<b>Brand name</b>	<b>Components</b>	<b>Function</b>
<b>Betatene</b>	<b>Carotenoids</b>	<b>Immune function</b>
<b>Xangold</b>	<b>Lutein esters</b>	<b>Eye health</b>
<b>Lipoec</b>	<b>lipoic acid</b>	<b>Potent antioxidant</b>
<b>Generol</b>	<b>Phytosterol</b>	<b>CHD reduction</b>
<b>Premium probiotics</b>	<b>probiotics</b>	<b>Intestinal disorder</b>
<b>Soylife</b>	<b>Soyabean phytoestrogen</b>	<b>Bone health</b>

<b>Brand name</b>	<b>Components</b>	<b>Function</b>
<b>Z-trim</b>	<b>Wheat</b>	<b>Zero calorie fat replacer</b>
<b>Linumlife</b>	<b>Lignan extract flax</b>	<b>Prostate health</b>
<b>Fenulife</b>	<b>Fenugreek galactomannon</b>	<b>Control blood sugar</b>
<b>Teamax</b>	<b>Green tea extract</b>	<b>Potent antioxidant</b>
<b>Marinol</b>	<b>□ 3 FA, DHA,EPA</b>	<b>Heart health protection</b>
<b>Clarinol</b>	<b>CLA</b>	<b>Weight loss ingredient</b>
<b>Cholestaid</b>	<b>Saponin</b>	<b>Reduce cholesterol</b>



## 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

# HEALTH BENEFITS OF DIFFERENT COMMON NUTRIENTS

## 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

✓ Vitamin E: Antioxidant, helps to form blood cells, boosts immune system

✓ Vitamin K: Essential for blood clotting

# 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.

✓ Vitamin B 3: Energy metabolism, brain function

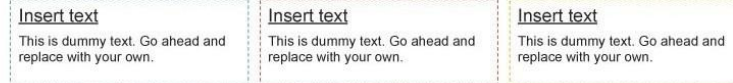
✓ Vitamin B 6: Helps to produce essential proteins, convert proteins to energy

✓ 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.

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

### Pills, Tablets and Vitamins



# 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, insuline activity,



# MINERALS:

Calcium: essential for bone and teeth, maintaining bone strength, nerve, muscle and glandular function, blood clotting,

Iron: energy production, Hb, oxygen transport,

Magnesium: for healthy nerve and muscle function, bone formation,

Phosphorous: energy production, phosphorylation process, bone and teeth, for genetic material,

✓ Cobalt: component of Vit. B 12 and B 12 coenzymes,

✓ Copper: Hb and collagen production, function of heart, energy production, absorption of Iron,

✓ Iodine: proper function of Thyroid gland,

✓ Chromium: with insulin it helps in conversion of carbohydrate and fat into energy, treatment of diabetes,

- ' 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

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

- 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**

# VARIOUS PHYTOCHEMICALS

<b>Phytochemicals</b>	<b>Source</b>	<b>Role</b>
Tocotrienols & tocopherols	Grains	Suppressed the growth of diverse tumors cell lines via initiation of apoptosis and concomitant arrest of cells in the G1 phase of the cell cycle
Carotenoids	Fruits & vegetables	Antioxidants, protects against uterine, prostate, colorectal, lung and digestive tract cancers, and protection to other antioxidants.



Limonoids

CITRUS FRUITS

Inhibiting phase I enzymes & inducing phase II detoxification enzymes in liver, provide protection to lung tissue.

Phytosterols

Various plants

Exhibit anti-inflammatory,

Phenolic constituents

Various plants, wholegrain

Flavonoids

GRAPES, WINES

Action against free radicals, free radicals mediated cellular signaling, inflammation, allergies, platelet aggregation, & hepatotoxins

Catechin & gallic acids

Grapes, berries, cocoa, green tea, acacia spp.

Antioxidants, free radical scavenging ability, inhibition of eicosanoid synthesis, reduces CHD

Treating cancers & osteoporosis

Isoflavonoids

Soybeans

Anthocyanidins

Fruits & flowers

Antioxidants & anti-mutagenic properties

Glucosinolates

Cruciferous

Activators of liver detoxification enzymes, inhibit the neoplastic effect of various carcinogens

Indoles

Reduces estrogen-dependent cancer risk,

Fiber

Various vegetables, fruits,

Protects against colorectal diseases,

# METHOD TO ENHANCE ACTIVE COMPONENTS IN FOOD

- Manipulating the diet to get maximum level of active components
- Combination of food ingredients rich in nutraceuticals
- Fortifying food with active ingredients
- By fermentation of food products
- Changing food habits to natural type of diet

# SOME HEALTHIEST FRUITS AND VEGETABLES

## VEGETABLES

## BODY BENEFITS

1) Broccoli

This food is loaded with sulphoraphane ,consisting 72 mg of calcium,78 mcg of folic acid and vitamin C

2) Cabbage

The indoles in a cabbage makes it a cancer fighter

3) Carrots

A stellar source of beta-carotene.one carrot contains twice the RDA for vit-A

4) Tomatoes

Technically consider as a fruit loaded with cancer fighting lycopene and a great source of vit-A

## FRUITS

## BODY BENEFITS

1) Apples

An apple's 3 gm of fibre help you meet your fibre goal of 20g to 30 g daily. High fibre diets can lower high disease risk

2) Apricots

A good source of beta carotene (which is converted to vit-A by the body)

providing the equivalent of 35% of RDA for vit-A

3) Bananas

They are the great source of potassium, which plays great role in heart and muscles function

4) Cherries

Heart protective anthocyanins are present and also gives colour

5) Papayas

Loaded with vit-C with beta-carotene and calcium

# 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

*THANK YOU*