NEW ERA OF MEDICINE: ROLE OF NUTRACEUTICALS IN TREATMENT AND PREVENTION OF VARIOUS DISEASES

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ABSTRACT

Nutraceutical is a term coined to describe substances which are not traditionally recognized nutrients but which have positive physiological effects on the human body. Nutraceuticals are derived from various sources such as medicinal plants, marine organisms, vegetables and fruits. Since ancient times mankind has believed in role of appropriate amount of nutrition for maintaining proper health. In the past few years the increasing interest is seen among the consumers, as they feel that it is a relatively safer way to good health. The potential of nutraceuticals/additional foods/fod supplements in mitigating health problems. Nutraceuticals are alternative to modern medicine. Development of better characterized and research proven products will help enhance consumer confidence in nutraceuticals. In this review, an attempt has been made to discuss all aspects of nutraceuticals; definition, categories, classification their use in various diseases.

Keywords: Dietary supplements, health problems, medicinal plants, Nutraceuticals.
Nutraceuticals have the potential to reduce levels of LDL cholesterol by modulating cholesterol production in the liver (i.e. monacolin, policosanol, red yeast, rice etc.), binding cholesterol within the intestines and/or increasing LDL-c receptor uptake in the liver (i.e. berberina, phitosterols etc.). Excessive consumption of foods that are calorie dense, nutritionally poor, highly processed, and rapidly absorbable can lead to systemic inflammation, reduced insulin sensitivity, and a cluster of metabolic abnormalities, including obesity, hypertension, dyslipidemia, and glucose intolerance. Polyphenols found in grapes and grape derivatives, cocoa and tea are of interest in the prevention of CVD. Phenolic compounds are found in grapes and these include anthocyanins, flavanols, flavonols, stilbenes and phenolic acids. Anti-oxidants, Dietary fibres, Omega-3 poly unsaturated fatty acids, Vitamins, minerals for prevention and treatment of CVD.

2. Nutraceuticals against Alzheimer’s disease (AD)
Alzheimer’s disease is the most common and feared form of dementia representing circa 70% of all dementia cases and displaying a dramatic epidemics due to the enormous growth of the aged population worldwide. Advanced age is often characterized by a decline in a large spectrum of cognitive abilities including reasoning, memory, perceptual speed, and language. Botanical extracts with anti-amyloidogen activity, including green tea catechins, turmeric, Salvia miltiorrhiza, berry anthocyanins, and Panax ginseng have demonstrated significant efficacy in Alzheimer’s diseases. Bacopa monniera has been demonstrated as an Ayurvedic nerve tonic, indicating a potential role in helping prevent dementia and serving as a novel memory enhancer. Also, astaxanthin-rich algal biomass, fish oil including omega-3 fatty acids (PUFAs) and krill oil have demonstrated a potential role in preserving memory, sustaining cognitive functions and preventing neuro-inflammatory, neuro-motor and neurodegenerative disorders in humans and animals.

3. Nutraceuticals for Diabetes
Diabetes is a chronic metabolic disorder, where the body is unable to utilize carbohydrate due to absolute or relative lack of insulin, a hormone naturally produced by the β cell of the islets of langerhans in pancreas. Isoflavones are phytoestrogens have a structural/functional similarity to human estrogen and have been consumed by humans worldwide. Cinnamon and green tea can help people suffering with diabetes. Dietary fibers from psyllium have been used for glucose control in diabetic patients and to reduce lipid levels in hyperlipidemia.Omega-3 fatty acids supplementation in type 2 diabetes has a favorable impact in lowering triglycerides and VLDL-cholesterol, and reducing blood pressure and inflammatory markers.

4. Nutraceuticals in Parkinson’s disease
Parkinson’s disease (PD) is characterized by the progressive loss of dopaminergic neurons in the substantia nigra pars compacta and other parts of the brain, leading to motor impairment, cognitive impairment, and dementia. Nutraceuticals can provide neuroprotection via a wide range of proposed mechanisms, such as scavenging of free radicals and ROS, chelation of iron, modulation of cell-signaling pathways, and inhibition of inflammation. These nutraceuticals include vitamins C, D, E, coenzyme Q10, creatine, unsaturated fatty acids, sulfur-containing compounds, polyphenols, stilbenes, and phytoestrogens. Researchers found that curcumin...
decreases synuclein toxicity and the generation of reactive oxygen species (ROS), which are found to be involved in the programmed cell death. It also increases neuronal survival in the substantia nigra that is present in the midbrain and have a function in movement. Zingerone is an extract obtained from the ginger root. Researchers found that zingerone inhibits the dopamine reduction in mouse model.

5. Nutraceuticals in Hypertension
Hypertension as “a common condition in which the force of the blood against artery walls is high enough that it may eventually cause health problems, such as heart disease.” Many natural compounds in food, as well as certain nutraceutical supplements, vitamins, antioxidants, or minerals, can mimic drugs, functioning in a similar fashion to a specific class of antihypertensive medications. Melatonin, Hesperidin, pomegranate juice and grape seed extract have shown to be helpful in reducing BP.

6. Nutraceuticals with Anti-inflammatory activities
Inflammation is a process by which the body’s white blood cells and substances they produce protect us from infection with foreign organisms, such as bacteria and viruses. It is the response of body tissues to injury or irritation, characterized by pain and swelling and redness and heat. Rheumatoid arthritis (RA) is a chronic inflammatory disease characterized by elevated oxidative stress and inflammatory biomarkers. Various studies were conducted by many researchers on fish oil, primrose oil, curcumin, fenugreek, liquorice, coriander, tomato, carrot, sweet potato, broccoli, green tea, rosemary, hazelnut, walnut, wheat germ, beet roots, cucumber fruits, spinach leaves and date for anti-inflammatory properties. During these studies, changes in inflammatory biomarkers (erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), seromucoids, fibrinogen, tumor necrosis factor-α (TNF-α), prostaglandin E2), oxidative stress (malondialdehyde), antioxidant status (total antioxidant capacity, vitamin C, vitamin E, retinol, β-carotene), the level of copper (Cu) and zinc (Zn) and colonic microflora in response to the administration of nutraceuticals have been assessed. Studies concluded that the majority of nutraceuticals studied possess beneficial effect toward chronic inflammatory diseases, which might be due to the presence of one or more of the above-mentioned phytochemicals.

7. Nutraceuticals in Obesity
Obesity leads to chronic, excessive adipose tissue expansion resulting in an increase in the risk for cardiovascular disease, type 2 diabetes mellitus, and other metabolic abnormalities. Herbal stimulants, such as ephedrine, caffeine, ma huang-guarana, chitosan and green tea help in body weight loss. Capsaicin, a biologically active ingredient found in red chili peppers leads to alteration of thermogenesis and lipid metabolism-related proteins in white adipose tissue and skeletal muscle. Thereby it induces thermogenesis and fat oxidation. A blend of glucosamman, chitosan, fenugreek, G sylvestre, and vitamin C in the dietary supplement signify cantly reduced body weight.

8. Nutraceuticals in Cancer
As concluded by many researchers’ nutraceuticals, mostly phytochemicals derived from dietary or medicinal plants such as soya bean, garlic, ginger, tea, honey and others, may have chemopreventive activities. Soyfoods sources of isoflavones, curcumin from curry and soya isoflavones possess cancer chemopreventive properties. People using large amount of lutein-rich foods such as chicken eggs, spinach, tomatoes, oranges and leafy greens experienced the lowest incidence of colon cancer.

Lycopene prevents cancer, cardiovascular disease, and gastrointestinal tract. It concentrates in the skin, testes, adrenal and prostate where it protects against cancer. Flavonoids which block the enzymes that produce estrogen reduce of estrogen induced cancers. Isoflavones are a group of phytochemicals that are predominant constituents of a soy-based diet. Among isoflavones, the three major constituents that have been shown to have remarkable influences in cancer prevention and therapy are genistein, diadzein, and glycitin.

CONCLUSION
Nutraceuticals are the isolated product obtained from foods, and play a vital role in improving health, provides protection against diseases. Nutraceuticals are widely being used rather than medicines because they reduce side-effect and have positive physiological effects on the human body. Since ancient time people were aware of the importance of the “right amount of nutrition” in maintaining a healthy lifestyle. Nutraceuticals are currently receiving recognition for treatment of many diseases such as coronary heart disease, obesity, diabetes, cancer, osteoporosis and other chronic and Parkinson’s and Alzheimer’s diseases. In the present scenario of self-medication nutraceuticals play major role in therapeutic development. However for the successful use of nutraceuticals emphasis should be given on their quality, purity, safety and efficacy. In order to have scientific knowledge about the nutraceuticals, publics should be informed/ educated regarding therapeutic efficacy and correct daily doses. There is need to establish a vibrant nutraceuticals research community which is necessary to obtain enormous benefits from the available potential nutraceuticals for all of us.

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