Nutraceuticals: A Re-emerging Health Aid

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Abstract—The term "nutraceutical" was coined from "nutrition" and "pharmaceutical" in 1989 by Stephen DeFelice. Drugs shows various side effects and adverse effects due to which consumers are generally moves to take food supplements to improve health. Such products may range from isolated nutrients, dietary supplements and diets to genetically engineered "designer" foods, herbal products and processed foods such as cereals, soups and beverages. Nutraceuticals used in various diseases, Alzheimer’s disease, cardiovascular disease, obesity disease, cancer etc. This review focus on definition, history, comparing with various other terminologies, classification and various marketed products.

Keywords— Nutraceutical, Dietary Supplements, Functional food, Marketed nutraceutical etc.

I. INTRODUCTION

Due to risk of toxicity or adverse effect of drug, consumers are turning massively to food supplements to improve health where pharmaceutical fails. This resulted in a worldwide nutraceuticals revolution. The term "nutraceutical" was coined from "nutrition" and "pharmaceutical" in 1989 by Stephen DeFelice, MD, founder and chairman of the Foundation for Innovation in Medicine (FIM), Cranford, NJ. According to DeFelice, nutraceutical can be defined as, "a food (or part of a food) that provides medical or health benefits, including the prevention and/or treatment of a disease". However, the term nutraceutical as commonly used in marketing has no regulatory definition. Such products may range from isolated nutrients, dietary supplements and diets to genetically engineered "designer" foods, herbal products and processed foods such as cereals, soups and beverages. Presently over 470 nutraceutical and functional food products are available with documented health benefits. Many of these new products that are being promoted to treat various diseases find their origin in the plant kingdom. This is an obvious choice as many plants produce secondary compounds as alkaloids to protect themselves from infections and these constituents may be useful in the management of human infection. Many of the phyto medicines are the typical examples. The old proverb “an apple a day will keep the doctor away” is now replaced by “a nutraceutical a day may keep the doctor away”. The idea behind the mode of action of nutraceuticals is to provide functional benefits by increasing the supply of natural building blocks in the body. Replacement of these building blocks can work in two ways: to diminish disease signs or to improve performance. Nutraceuticals is a broad term used to describe any product derived from food sources that provides extra health benefits in addition to the basic nutritional value found in foods. These nutraceuticals normally contain the required amount of vitamins, lipids, proteins, carbohydrates, minerals, or other necessary nutrients, depending on their emphases. Nutraceuticals on the market today consist of both traditional foods and non-traditional foods. Traditional nutraceuticals are simply natural, whole foods with new information about their potential health qualities. There has been no change to the actual foods, other than the way the consumer perceives them. Example includes lycopene in tomatoes, omega-3 fatty acids in salmon. Non Traditional nutraceuticals, are foods resulting from agricultural breeding or added nutrients and/or ingredients, to boost their nutritional values. Examples include β-carotene-enriched rice, and soybeans, orange juice fortified with calcium, cereals with added vitamins or minerals.

II. HISTORY

The original idea in these concepts goes back three thousand years ago. Hippocrates (460–377 BC), the well-recognized father of modern medicine, stated “Let food be thy medicine and medicine be thy food” to predict the relationship between appropriate foods for health and their therapeutic benefits. The truth in this saying is widely recognized today. The concept of nutraceuticals is not entirely new, although it has evolved considerably over the years. In the early 1900s, food manufacturers in the United States began adding iodine to salt in an effort to prevent goiter, representing one of the first attempts at creating a functional component through fortification. Today, researchers have identified hundreds of compounds with functional qualities, and they continue to make new discoveries surrounding the complex benefits of phytochemicals (non-nutritive plant chemicals that have protective or disease preventive properties) in foods. In Japan, England and other countries, nutraceuticals already have become part of the dietary landscape. Consumer interest in the relationship between diet and health has increased the demand for information on nutraceuticals. Rapid advances in science and technology, increasing health care costs, changes in food laws affecting label and product claims, an aging population and rising interest in attaining wellness through diet are among the factors fueling U.S. interest.

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in nutraceuticals. Credible scientific research indicates many potential health benefits from food components. These benefits could expand the health claims now permitted to be identified by the Food and Drug Administration.

III. NUTRACEUTICALS VS OTHER TERMINOLOGIES

There is a lot of confusion regarding the terminologies like “nutraceuticals”, “functional foods”, “dietary supplements” “designer foods”, “medical foods”, “pharmafoods”, “phytochemicals” etc.

“Pharmaceuticals” may be considered as drugs used mainly to treat diseases, while “nutraceuticals” are those that are intended to prevent diseases. Within European Medicines law a nutraceutical can be defined as a medicine for two reasons: It can used for the prevention, treatment or cure of a condition or disease or be administered with a view to restoring, correcting or modifying physiological functions in human beings.

Both pharmaceuticals and nutrients can cure and prevent disease(s) but only pharmaceuticals have governmental sanction. Drugs are subject to an approval process prior to marketing. To be approved, a drug must demonstrate safety and efficacy for its intended use. Nutraceuticals are not drugs simply because they have not gone through an approval process. Many pharmaceuticals have their origin in plants and animals and are no less "natural" than nutrients. Classic example of nutrients is synthetic vitamins.

“Medical foods” are a specific category of therapeutic agents that are intended for the nutritional management of a specific disease. An example of medical foods is formulations intended to manage patients with inborn errors in amino acid metabolism. Newer medical foods are designed to manage hyperhomocysteinemia, pancreatic exocrine insufficiency, inflammatory conditions, cancer cachexia, and other diseases. Food is generally recognized as safe whereas Nutraceuticals may contain substances that are “natural” but may not be generally recognized as safe.

Nutraceuticals sometimes referred as “functional foods”, have caused heated debate because they blur the traditional dividing line between food, and medicine. Nutraceuticals slightly differ from functional foods. When food is being cooked or prepared using "scientific intelligence" with or without knowledge of how or why it is being used, the food is called Functional food. Thus, functional food provides the body with the required amount of vitamins, fats, proteins, carbohydrates, etc. needed for its healthy survival. When functional food aids in the prevention and/or treatment of disease(s) and/or disorder(s) other than anemia, it is called a Nutraceutical. (Since most of the functional foods act in some way or the other as anti-anemic, the exception to anemia is considered so as to have a clear distinction between the two terms, functional food and nutraceutical.)

Examples of nutraceuticals include fortified dairy products (e.g. milk) and citrus fruits (e.g. orange juice) and vegetables.

The Dietary Supplement Health and Education Act (DHSEA), defined "dietary supplement" using several Criteria.

A. dietary supplement

1. 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 vita-min, 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.
2. is intended for ingestion in pill, capsule, tablet, or liquid form.
3. is not represented for use as a conventional food or as the sole item of a meal or diet.
4. is labeled as a "dietary supplement."includes products such as an approved new drug, certified antibiotic, or licensed biologic 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).

Thus, nutraceuticals differ from dietary supplements in the following aspects:

1. Nutraceuticals must not only supplement the diet but should also aid in the prevention and/or treatment of disease and/or disorder.
2. Nutraceuticals are represented for use as a conventional food or as the sole item of meal or diet.

A ray of “cure preference” in the mind of common patients revolves around nutraceuticals because of their false perception that "all natural medicines are good." Also, the high cost of prescription pharmaceuticals and reluctance of some insurance companies to cover the costs of drugs helps nutraceuticals solidify their presence in the global market of therapies and therapeutic agents

IV. REGULATIONS

Nutraceuticals have no official meaning and do not constitute a distinct category of foods. Most often, they are simply natural, whole foods consumers have been eating for thousands of years. As a result, the FDA regulates them in the same way they regulate all foods: The safety of ingredients must be assured in advance, and all claims must be substantiated, truthful and non misleading. In 2005, the National Academies Institute of Medicine and National Research Council created a blue-ribbon committee to create an improved framework for the Federal Food & Drug Administration to evaluate dietary

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supplements. Though the improved framework fails to distinguish between "nutraceuticals" and "dietary supplements". With the continued use of a broad definition and lacking greater distinction, a cost-effective and scientifically based framework was needed to evaluate the safety of "dietary supplements" including those consumer products recognized internationally as "nutraceuticals".

V. CONCLUSION

At present, nutraceutical represent the fastest growing segment of today’s food industry. Although it may be many years before the new designer foods will be stocked on supermarket shelves, the ongoing program will lead to a new generation of foods, which will certainly cause the interface between food and drug to become increasingly permeable. The importance of nutraceuticals to the human organism is that they provide all the essential substances that should be present in a healthy diet. Very often the daily hustle and our diet lead to unhealthy way of life. The right administration of nutraceuticals provides for better quality of life, healthier life, better mood and self-confidence, better working capacity, better social environment. Thus, in the future we will see the emergency of nutraceutical soups, nutraceutical processed meat, bread and sausage. And many of these foods might be genetically produced. The use of nutraceuticals, as an attempt to accomplish desirable therapeutic outcomes with reduced side effects, as compared with other therapeutic agents has met with great monetary success. 'The movement 'from treatment to prevention' stimulates demand for nutraceuticals as they offer additional health benefits beyond basic nutrition,' says Ewa Hudson, head of health & wellness research at Euromonitor. The preference for the discovery and production of nutraceuticals over pharmaceuticals is well seen in pharmaceutical and biotech companies. Presently the nutraceutical industry in the US is about $86 billion. This figure is slightly higher in Europe and in Japan represents approximately a quarter of their $6 billion total annual food sales- 47% of the Japanese population consume nutraceuticals. The expanding nutraceutical market indicates that end users are seeking minimally processed food with extra nutritional benefits and organoleptic value. Many scientists believe that enzymes represent another exciting frontier in nutraceuticals. For diseases expected to increase in number, but can be prevented by lifestyle change, such as metabolic syndromes, the patients are required to positively change their lifestyles. One of the solutions is to change their diet. Nutraceuticals should contribute to prevention of such diseases. The research strategy of the world towards nutraceuticals should be in future for living life healthy and improve quality of life.

REFERENCES