

Physiologically Functional Foods: Where do Meats Fit In?

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Thomas Edison once said, "The doctor of the future will give no medicine, but will interest his patients in the care of the human frame, in diet, and in the cause and prevention of disease." Before Edison, the great philosopher and early revolutionary of modern medicine, Hippocrates made statements that translate to, "... let food be your medicine and medicine be your food." While this concept that diet has influences on health is not new, it is evolving. Research in the middle of this century focused primarily on the nutritional needs in terms of vitamins and minerals. The evolution continues today. Currently, science is beginning to uncover the secrets of physiologically active components within foods that benefit our health beyond meeting the traditional basic nutritional needs.

First, let's step back and look at the terminology that is being used to describe these physiologically active components and the definitions of those terms. There are many words, or coined phrases, being used to describe the "diet and health" relationship that Thomas Edison and Hippocrates identified so many years ago. The most frequently used are functional foods and nutraceuticals. One of the newest terms in the media is wellness food. Other terms include: designer foods, hyper-nutritious foods, pharmafoods, power foods, foodiceuticals and smart foods. While no regulatory definition has been established, a sampling of the definitions used are as follows: Functional foods are defined by the International Food Information Council as foods containing significant levels of biologically active components that impart benefits beyond basic nutrition when consumed in typical or optimal serving sizes. The Institute of Medicine in the 1994 report "Opportunities in the Nutrition and Food Sciences," defines functional food as foods that include, "any modified food or food ingredient that may provide a health benefit beyond the traditional nutrients it contains." The NFA, in its 1990 policy discussion paper of functional foods describes them as, "... similar in appearance to conventional foods and intended to be consumed as part of a normal diet, but modified to serve physiological roles beyond the provision of simple nutrient requirements." In 1989, Dr. Stephen DeFelice coined the

term nutraceutical, which he says is "any substance that may be considered a food or part of a food and provides medical or health benefits, including the prevention and treatment of disease." As stated earlier, there is no regulatory definition for a functional food; in most cases they would just be considered "food" as defined in section 201 of the Federal Food, Drug and Cosmetic Act of 1938. The term nutraceuticals as defined by Dr. DeFelice above, would be considered a "drug" by the same Federal Food, Drug and Cosmetic Act of 1938. It is somewhere in between the ever narrowing gap between "food" and "drug" that most functional foods fit. For simplification, this paper will use functional food as an all encompassing term referring to any relationship between dietary intake and a health benefit, as well as the positive message it brings to the foods we eat.

The renewed awareness to the health benefits of foods is being driven by the consumer, in particular, the aging baby boomers and their commitment to maintaining good health well into their golden years. Additional contributing factors include: increasing healthcare costs, advances in technology in the food industry, regulatory changes, new marketing opportunities, and maybe most importantly, the science to discover and verify the relationship of diet and health. Although the science is in its infancy stages, much proof has already been documented. In 1988, the Surgeon General's Report on Nutrition and Health, diet was implicated in six of the ten leading causes of death in the U.S., including cancer, coronary heart disease, stroke, diabetes, atherosclerosis, and liver disease. It is encouraging that consumers believe these findings. In a study done by *Prevention Magazine* and the Food Marketing Institute in 1996 measuring the attitudes and concerns about nutrition and health of 1000 shoppers, it was found that 96% believe food has an influence in high cholesterol, 93% believe food influences heart disease, 92% believe food influences hypertension, 81% to stroke, and 74% to diabetes. In addition, the perception of food influencing other diseases such as colon cancer, osteoporosis, prostate cancer, and breast cancer ranged from 64% down to 37%. These types of findings have made functional foods the number one consumer trend impacting new product development today according to *Food Processing* magazine, a trade magazine to the food industry. Another documentation of the science behind functional foods is the Block et al study, published in *Nutrition Cancer* in 1993 entitled *Fruit, Vegetables and Cancer Prevention: A Review of the Epidemiological Evidence*. This study found that a statistically significant, protective effect of fruit and vegetable consumption was found in 128 of 156

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Reciprocal Meat Conference Proceedings, Volume 52, 1999.

dietary studies. For most cancer sites, persons with low fruit and vegetable intake experience about twice the risk of cancer compared with those with high intake. The science does suggest a health benefit of phytochemicals, and it is with continued sound and accurate science that these relationships will continue to be understood further.

The message here is not that functional foods are a magic bullet to good health, but to suggest that there are no “good” or “bad” foods, just good and bad diets. A look at the U.S. Department of Agriculture and the U.S. Department of Health and Human Services’ Food Guide Pyramid suggests one such healthy diet. It has five food groups and each group provides some but not all of the nutrients one needs. No one food group is more important than another. The pyramid calls for, and the American Dietetic Association supports, eating a variety of foods to get the nutrients one needs. In November 1998, *Food Technology* magazine reporting on a survey by the USDA on What Americans Eat, showed that only 50% of men and 44% of women are consuming the recommended servings per day of vegetables. The numbers are even lower for eating enough fruit: 20% of men and 24% of women. Despite the overwhelming research available on the benefits of these two food groups, the statistics likely reflect lifestyle habits of fast and convenient. The servings of the fats/oils/sweets group are greater than any of the servings from the other groups. Remember, no one group is more important than the other. Only 49% of men and 21% of women are consuming the recommended servings per day of the meat, poultry, fish, dry beans, eggs, and nuts group. There is a definite need, and opportunity to improve information for consumers so that they can make decisions about their diets.

One positive message can be communicated about red meat. Meat is a nutrient dense food source, which means calorie for calorie it provides more important nutrients than many other foods. Meat is also a complete protein, having all the amino acids one’s body needs. Meat also is an important source of iron and other key nutrients, including zinc, the B complex vitamins thiamin, riboflavin, niacin, B6 and B12. Some of the suggested health benefits of iron and zinc include: contributes to normal brain development in babies and children, promotes normal growth and development, prevents anemia, helps fight infection and heal wounds, helps keep the immune system healthy, helps prevent memory loss in older people, and promotes concentration and learning abilities. The suggested health benefits of the B vitamins include: energy for the body, promotes healthy skin, hair, and eyes, develops healthy babies during pregnancy, and helps protect against heart disease. The protein in red meat helps children grow and build strong muscles, there are antioxidants to help prevent and repair problems due

to normal aging, and research suggests that the mono-unsaturated fats can help lower bad cholesterol. Red meat can be a functional food since a new paradigm of nutrition has identified other properties in meat. Antioxidant properties such as carnosine, glutathione, conjugated linoleic acid, and selenium that may promote health. Carnosine is a natural dipeptide which is present in large amounts in skeletal muscle. Carnosine has been found to be capable of inhibiting lipid oxidation due to iron, hemoglobin, lipoxidase, and singlet oxygen in vitro according to Chan, Decker and Means in the *Journal of Food Science*. Glutathione, a cysteine-containing tripeptide found in mammalian cells, plays an important role in detoxification and in the anti-oxidation of reactive oxygen species and free radicals according to Bray and Taylor in the *Cancer Journal of Physiol Pharmacology*. Selenium is essential mineral for humans—it can exhibit antioxidant properties through its role in various selenoprotein compounds. Recent investigations also indicate that selenium may reduce the risk of heart disease and certain types of cancer, according to Oldfield in *Nutrition Today*. Further research may identify other dietary components with antioxidant or other health promoting benefits.

Another way to increase the health benefits of meat is through processed meats with fillers and additives. There have been many ingredients shown to promote health beyond traditional nutrients. An example, is soy. Since studies suggest it may prevent and or treat the following: heart disease, cancer, osteoporosis, menopausal symptoms, kidney disease, hypertension, and gallstones. Garlic is well studied and the therapeutic effects are well supported by scientific and clinical evidence. Garlic has been shown to improve the circulatory system, and acts as an anti-carcinogen and antioxidant. It acts as an anti-inflammatory, is used with hypoglycemia, and more. Black pepper, the most commonly used spice, although not widely studied, has six compounds that have been found to lower blood pressure and four compounds to help prevent osteoporosis, according to James Duke, Ph.D., author of *The Green Pharmacy*. Again, an emphasis must be put on sound and accurate science. Quaker Oats supported clinical studies on the cholesterol-lowering effect of oat Beta-glucan and Quaker saw increased sales of their oatmeal after the FDA approved a health claim.

If you look at the cover article in the November 30, 1998 issue of *Newsweek*, it appears as though the meat industry is being pushed to the side of the plate in this functional food movement. However, there is a positive message: foods with health potential can be produced in a number of ways. The composition of meat can be influenced by formative breeding programs, feeding programs, and by additives in processing.