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Eating patterns, diet quality and energy balance
A perspective about applications and future directions for the food industry

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HIGHLIGHTS

- The food industry and consumers often have divergent goals for foods.
- Consumers express desire for healthy foods but more often purchase foods based on taste, price, and convenience.
- Nutrition guidelines are changing with a paradigm shift in macronutrient priorities from the Food Guide Pyramid to MyPlate.
- The food industry will be challenged to deliver protein in foods that are convenient, affordable, and desirable.
- Carbohydrates are an inexpensive raw ingredient favored for processing by the food industry but a nutrient that needs to be limited in the food supply to reduce risks for obesity and diabetes.
- The food industry must develop new concepts for healthy snacks.

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ABSTRACT

The food industry is the point of final integration of consumer food choices with dietary guidelines. For more than 40 years, nutrition recommendations emphasized reducing dietary intake of animal fats, cholesterol, and protein and increasing intake of cereal grains. The food industry responded by creating a convenient, low cost and diverse food supply that featured fat-free cookies, cholesterol-free margarines, and spaghetti with artificial meat sauce. However, research focused on obesity, aging, and Metabolic Syndrome has demonstrated merits of increased dietary protein and reduced amounts of carbohydrates. Dietary guidelines have changed from a conceptual framework of a daily balance of food groups represented as building blocks in a pyramid designed to encourage consumers to avoid fat, to a plate design that creates a meal approach to nutrition and highlights protein and vegetables and minimizes grain carbohydrates. Coincident with the changing dietary guidelines, consumers are placing higher priority on foods for health and seeking foods with more protein less sugars and minimal processing that are fresh, natural, and with fewer added ingredients. Individual food companies must adapt to changing nutrition knowledge, dietary guidelines, and consumer priorities. The impact on the food industry will be specific to each company based on their products, culture and capacity to adapt.

1. Introduction

Providing an industry perspective about future directions related to energy balance, eating patterns, and diet quality is a difficult task. The food industry is a diverse set of companies ranging in size and breadth including commodity companies focused on single foods like eggs or almonds, mega-food companies like Kraft and Nestle, quick-serve restaurants like McDonald's and Subway, and grocery stores like Whole Foods and Walmart. Many food companies spend millions of dollars monitoring market trends, surveying consumers, constructing focus groups, and paying expert consultants to predict the future. This article will not attempt to present a collective vision about the industry's view of the future. Instead, I will focus on major factors that I see evolving in nutrition research and in the thinking of health conscious consumers and translate these trends into challenges and opportunities facing the food industry.

Major changes in our understanding of an optimal diet include new emphasis on protein needs for adults to maintain muscle health and body composition, the need to reduce total carbohydrate intake especially high glycemic sugars, flours and starches, a new focus on macronutrient balance at each meal, and the role of snacks in a healthy lifestyle. These changes represent philosophical shifts away from the Food Guide Pyramid designed to reduce consumption of animal fats and cholesterol and to increase consumption of grains. How will new ideas about diet quality and changing dietary guidelines about optimum food patterns influence the food industry?

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2. Divergent goals for consumers versus the food industry

Consumers are changing their expectations about food. Health, sustainability and safety are becoming more important in food choices. Adults' desire to be more pro-active in health care and food choices are becoming a reflection of healthy lifestyle choices. With rising costs of health care and the desire to live long, active, and productive lives, consumers are beginning to focus more on health implications and environmental sustainability of foods. Consumers express greater desire for fresh, natural foods with minimal processing. They want simple ingredient labels with minimal content of chemical-sounding additives. They want foods produced locally with a more direct line-of-origin from the farm to the table. They are questioning the safety and sustainability of broccoli shipped from Mexico, blueberries from Chile, and hamburger from Argentina. Health conscious consumers desire a food industry that is transparent and produces all of their food on a small family farm with organic food practices.

Contrary to consumer ideals, the food industry is largely driven by volume and efficiency. The bottom line for any company is profit. If the company does not make money, it goes out of business. From an industry perspective, the important questions are: What will consumers buy, and what can a company successfully sell? Within those questions are embedded issues of obtaining raw materials, creating uniqueness in the marketplace, managing wastes, maintaining profit margin, and maybe enhancing health. How an individual food company weighs each of these factors depends on the products they sell and their culture. A food company focused on fresh foods such as fish, dairy, meats, eggs, vegetables, or fruit will have a different perspective than a company focused on snacks and indulgent eating.

Complicating the industry challenge is the schizophrenic nature of consumers. Among adults, 64% say that health is an important consideration during food purchases, but most surveys such as a recent report by the International Food Information Council revealed that taste, price and convenience are the dominant factors at point-of-purchase [1]. Food insecurity remains an important issue for many Americans and obtaining the most food for the lowest price still drives sales. Quick-Serve Restaurants featuring high calorie meals at low prices remain a major part of daily life for many individuals and families. So what factors should the industry consider and which ones are going to drive changes?

3. The changing nutrition landscape

New research discoveries are producing a conflict between the goals of the food industry and consumers. Since the end of World War II, the food industry and consumers have been enjoying a mutually beneficial relationship — at least superficially. Consumers wanted more choices. They wanted foods that were convenient, great tasting, low cost, safe, diverse, and readily available and the food industry demonstrated an incredible capacity to deliver on these desires. If you could imagine a food product, there was a good chance you could find it on the ever-expanding supermarket shelves.

Beginning in the 1970s, nutrition guidelines emphasized concerns about cardiovascular disease (CVD) and health risks of saturated fat and cholesterol. These perceived risks were translated into public health recommendations and the relationship between consumer and food industry became more intertwined. The “Fear of Fat” Era became entrenched with the appearance of the Dietary Goals for the United States [2] in 1977 and the USDA Food Guide Pyramid [3] in 1992. The Food Guide Pyramid visually represented the dietary goals to reduce fat intake, reduce cholesterol and animal products, and increase consumption of cereal grains. The industry rose to the challenge of the new guidelines and consumers were presented with thousands of new products including fat-free cookies, fat-free salad dressings, cholesterol-free margarines and low fat macaroni and cheese. There was an exponential expansion of food choices, especially the ones that were low in protein and fat.

Behind the scenes, these dietary guidelines created new opportunities for many food companies. In general, food companies create exceptional profit manufacturing products that use cheap raw ingredients that are simple to process, easy to package, and have long shelf life. Products that are high in carbohydrates and low in protein and fat are prefect for this segment of the food industry. On the other side of the ledger, the smallest profit margin in the food chain is with foods that are consumed fresh and travel direct from farm to market. There is no opportunity for value-added processing; transportation and storage often require expensive refrigeration; and spoilage is high. The dietary guidelines of the 80s and 90s recommending increased consumption of cereal grains were perfect for the segment of the industry developing processed food products.

Unfortunately, the dietary guidelines embodied in the Food Guide Pyramid had never been tested in long-term controlled prospective studies. The pyramid was assembled upon building blocks of epidemiology, assumptions and extrapolations. As intended, the guidelines reduced intakes of cholesterol and animal fats by reducing consumption of whole milk, red meats, and eggs but the unintended consequences were increased total calories, increased high glycemic starchy and sugary carbohydrates, and increased vegetable oils. These dietary trends combined with a sedentary aging population produced epidemic increases in obesity and diabetes [4].

Research evidence continues to accumulate about the risks of high glycemic carbohydrates including both sugars and flours. In preparation for the 2010 Dietary Guidelines, the advisory committee (DGAC) attempted to identify changes in the United States diet after 1985 when the incidence of obesity accelerated. They found that Americans increased energy consumption by more than 300 kcal/day and that the increased calories were derived from grain-based desserts and snacks, yeast bread, pasta, pizza, chicken products, and sodas and sports drinks [5]. These products represent high carbohydrate foods derived from processed grains.

Further, the emphasis on dietary cholesterol and saturated fat appears to have been overstated. While abnormal blood patterns of cholesterol represent cardiovascular risk, the relationship to dietary cholesterol is vague and inconclusive. Prospective clinical studies consistently show minimal or no relationship of dietary cholesterol with blood lipid patterns [6,7] leading most countries throughout the world to abandon dietary cholesterol recommendations [8]. Likewise, the relationship of saturated fat to CVD risk is being questioned. This relationship is complicated by total energy and carbohydrate intakes [9]. Hydrogenated oils containing trans fatty acids, and excess carbohydrates leading to increased endogenous production of palmitate [10,11], appear to be greater risks than animal fats [12].

Parallel with the appearance of research questioning long-held beliefs about cholesterol, saturated fat and carbohydrates, protein surfaced as a nutrient important for adult health. Previously, protein was considered relatively unimportant in diet policy and protein intakes above the minimum requirement of the RDA were considered unnecessary or even unsafe. Dietary guidelines relegated protein to a role as a minor energy nutrient (i.e. 12% to 16% of daily energy intake). However the past decade produced new knowledge about the importance of protein for muscle health, satiety, body composition, and daily energy expenditure (i.e. thermogenesis) [13,14]. The new understanding about protein arises from diverse clinical studies of sarcopenia, obesity and weight loss, type 2 diabetes and Metabolic Syndrome, and physical activity. Collectively, these studies demonstrate that aging reduces the efficiency of essential amino acid use resulting in increased need for dietary protein to maintain essential repair and replacement of muscle proteins.

While the full range of factors producing the obesity epidemic remains open for debate, there can be no argument that research studies about protein, carbohydrates, and fat are driving changes in the nutrition landscape. Following the report of the 2010 Dietary Guidelines