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WHAT'S IN A NAME?

The term "nutraceutical" was coined by the Foundation for Innovation in Medicine, New York in 1989.¹ A nutraceutical is defined as any food or part of food that provides medical or health benefits, such as preventing or treating disease, in addition to its basic nutritional content.

Some examples of nutraceuticals are:



FUNCTIONAL FOODS.

Sometimes referred to as designer foods or engineered foods, these nutraceuticals are foods enriched with micro or macro nutrients. Examples include omega-3 eggs with added omega-3 fatty acids, produced by feeding flaxseed to hens, to improve brain health; bread with added fiber for satiety and digestive health benefits; and iodized salt, which has added iodine to help the body make thyroid hormones.



FUNCTIONAL BEVERAGES.

Think of orange juice with added vitamin D and calcium to provide bone health benefits or smoothies with added whey isolate powder to boost protein for energy and muscle building. Other examples include energy drinks, sports drinks, fortified juices and fortified dairy beverages.



DIETARY SUPPLEMENTS.

This group includes multivitamins, minerals, gummy vitamins, herbal supplements such as plant extracts, algae extracts, phytochemicals, fatty acids, protein powders and fiber supplements.



MARKET SNAPSHOT

FAST FACTS

With the rise of the preventive health movement, the nutraceuticals market in the United States has become a robust opportunity projected to see continued growth. Here are some fast facts about the size and scope of the market:

- Americans are one of the largest consumers of nutraceuticals in the world.²
- Functional foods, functional beverages and dietary supplements are the top nutraceutical formats consumed.³
- In 2015, the U.S. nutraceutical market opportunity was \$64.8 billion, and it is expected to reach \$102.6 billion by 2024, assuming a compound annual growth rate (CAGR) of 5.30 percent from 2016-2024.³
- Research analysts forecast that competition in the nutraceuticals sector will heat up significantly. The top five companies in the market—General Mills, The Nature's Bounty Company, Amway, Herbalife and DSM—only held a 15.8 percent share of the market in 2015. That leaves lots of room for more small, medium and large-sized enterprises to enter.³

KEY FACTORS DRIVING GROWTH

Demographics.

Baby Boomers are the largest consumers of nutraceuticals. That's no surprise, given that they represent a disproportionately large piece of the overall population pie. Interestingly though, the fastest growing group of nutraceutical consumers is Millennials.

Psychographics.

Baby Boomers are motivated by maintaining a healthy weight, satiety, nutrition and energy, whereas Millennials are concerned about becoming healthy and choosing product formats that are sustainable, environmentally-friendly and non-GMO.⁴

Rising consumer interest in preventive health.

More people today are focused on "health span," healthy aging and living well for as long as possible, rather than lifespan, the number of years they will be alive. Staying well over the long run not only feels good and avoids illness, it also helps reduce healthcare expenses, an increasingly important consideration as the U.S. healthcare insurance and payer system continues to undergo major changes.⁵



The fastest growing group of nutraceutical consumers is Millennials.

Demand for more convenient formats.

Millennials are increasingly seeking healthier products at convenience stores.⁶ Baby Boomers are looking for alternatives to complement, reduce or delay the need for prescription medicines, and to alleviate "pill fatigue" from years of taking vitamin supplements and medications in pill format.⁷

Innovations in food manufacturing.

Advances in food processing technologies, including non-thermal food processing, which preserves more nutrients and flavor; nano-encapsulation of bioactive compounds; particle engineering; and novel extraction and processing methods, have provided more opportunities to create foods and beverages with added nutritional value.

HOTTEST NUTRACEUTICAL TRENDS

The hottest nutraceuticals are foods and beverages that provide added health benefits while satisfying the growing demand for convenience, and delivering excellent taste and texture. They also address the increasing desire for healthier alternatives to junk foods and sugary beverages. Here are the biggest trends to watch for:^{6,8,9}



BONE BROTH.

Your mom was right—drinking bone broth might cure what ails you. Drinking broth made from beef and chicken bones is a trend that took off recently in the U.S. and Australia as a nod to the Paleo diet. Foodies tout a range of health benefits from the vitamins, minerals and proteins in broth, including maintaining strong bones, reducing joint pain and inflammation, warding off infections like the common cold and promoting healthy digestion.



POWERED BY PLANTS.

Demand for protein is growing, especially sources of protein derived from plants rather than animals. The most recent U.S. Dietary Guidelines emphasize a shift away from red meat towards nuts, seeds and pulses, which include dry beans, peas, chickpeas and lentils. More consumers are also avoiding the consumption of red meat since research has found that people who eat more have a higher risk of developing some cancers.



MAINTAINING DIGESTIVE WELLNESS.

With new learnings about the microbiome and how digestive imbalance is related to conditions including brain disorders, respiratory conditions, liver problems and cardiovascular illnesses, ¹⁰ functional foods and beverages like non-dairy milks and yogurts with probiotics and snacks made with beetroot and kale are growing in popularity. Kombucha drinking vinegars—effervescent teas that have been fermented with symbiotic colonies of bacteria and yeast (SCOBYs) and therefore contain probiotics—are tracking

to be a hot category in this market segment. Consumers are also looking for ways to increase fiber to help maintain regularity, promote satiety, and lower blood sugar and cholesterol. Manufacturers are incorporating inulin, a fiber derived from chicory root, into granola bars, cheesecake, cottage cheese, brownies, fruit-flavored snacks and cookies.



ADDRESSING AGE-RELATED CONDITIONS.

Look at the top diseases and health conditions associated with aging, such as heart disease, cancer, obesity, type 2 diabetes, osteoporosis and arthritis, and you'll find supplements and functional foods that promise to alleviate symptoms and complement or help reduce reliance on prescription medications. For example, heart disease, arthritis and cancer have an underlying inflammation component. Demand is surging for products that include turmeric, a spice that's purported to calm inflammation. Another new hot product for aging adults is Longevinex, a dietary supplement that contains resveratrol. A recent study found that it can reduce the dark adaptation time—the time that it takes for eyes to adjust to the dark—in older adults, a known marker for the onset of macular degeneration.¹¹



ENERGY DRINKS.

With sleep deprivation on the rise, most adults struggle to keep their energy levels high throughout the day, fueling continued demand for energy and sports drinks. Caffeine, an ingredient long used to boost energy and alertness, is now being re-engineered with micro-bead technology to deliver a time-released energy-lift, solving the problem of the jitters from ingesting too much all at once. Consumers are also looking for non-caloric sweeteners such as stevia, monk fruit and erythritol. They also seek more natural ingredients like coconut water and organic aloe vera to rehydrate and restore electrolytes after exercise.

CHALLENGES AT THE INTERSECTION OF FOODS AND HEALTH CLAIMS

Are nutraceuticals foods or drugs? Although they may contain pharmaceutical-grade and standardized nutrients, in the U.S., nutraceuticals are regulated as foods by the Food and Drug Administration (FDA) under the Federal Food, Drug and Cosmetic Act.¹²

Depending on the product format (dietary supplement or functional food), the ingredients, the health claims and how a nutraceutical is marketed, different regulations come into play. Rules, regulations and guidelines for best practices have a significant impact on all steps in the product lifecycle, from R&D to manufacturing, supply chain management, labeling, advertising, sales, and monitoring product safety and adverse events once nutraceuticals hit the marketplace.

Here are some of the major regulations that affect nutraceuticals:

THE DIETARY SUPPLEMENT HEALTH AND EDUCATION ACT 1994

This FDA statute defines and regulates all dietary supplements sold in the U.S. The Dietary Supplement Health and Education Act (DSHEA) defines a dietary supplement as a product intended to add a vitamin, mineral, herb, botanical, amino acid or other dietary substance to a regular diet. The FDA advises that dietary supplements are not intended to treat, diagnose, cure or alleviate the effects of diseases, and that by federal law, every dietary supplement must be labeled "dietary supplement" or use a substitute word for the main ingredient it's providing, like "herbal supplement" or "calcium supplement." ¹³

You might be surprised to learn that supplement manufacturers do not have to prove to the FDA that their products are safe before launching them in the marketplace. However, they are still on the hook to make sure their products are safe before selling them to the public, as the FDA does get involved if a supplement is adulterated, misbranded or poses a significant risk of illness or injury to consumers. The FDA mandates and monitors the reporting of serious adverse events by dietary supplement companies and voluntary reports by consumers and healthcare professionals.¹⁴

FOOD SAFETY MODERNIZATION ACT

The FDA Food Safety Modernization Act (FSMA) became U.S. law in January 2011. A sweeping update to existing food safety laws more than 70 years in the making, it represented a major shift from responding to contamination in the food supply to preventing it. Under FSMA, food manufacturers must evaluate potential safety hazards, identify and implement prevention steps, monitor controls and keep monitoring records, and conduct verification activities. Supplement companies also fall under FSMA. They must register with the FDA under section 415 of the Food, Drug and Cosmetic Act and they are subject to Current Good Manufacturing Processes (CGMP), Hazard Analysis, Risk-Based Preventive Controls for Human Food Rule, and supply chain program and record-keeping requirements.¹⁴

CURRENT GOOD MANUFACTURING PROCESSES

In 2010, the FDA extended the concept of Current Good Manufacturing Processes (CGMP), long used in the pharmaceutical sector for drugs, to all U.S. dietary supplement manufacturers. Companies are subject to FDA inspections to ensure compliance and to look for violations, such as a failure to ensure that a finished batch of supplements meets product specifications for identity, purity, strength or composition. Reputable manufacturers wishing to register their manufacturing facilities to demonstrate their commitment to consumers to produce safe products under CGMP can file for third-party facility registration, which involves scheduled audits by FDA inspectors. ¹⁵

HAZARD ANALYSIS CRITICAL CONTROL POINT

Hazard Analysis Critical Control Point (HACCP) is a system for analyzing food safety by evaluating and controlling biological, chemical and physical hazards, from producing, purchasing and handling raw ingredients, to manufacturing, distribution and consumption of the final products. HACCP mostly consists of guidelines for industry rather than regulations, except for regulations in place to ensure safe and sanitary processing of fruit and vegetable juice.¹⁶

NEW DIETARY INGREDIENTS NOTIFICATION PROCESS

For most health claims on supplements, companies do not have to prove that they are accurate or truthful before they appear on product labels. However, the FDA does review substantiation for claims "as resources permit." Recently, the FDA instituted the New Dietary Ingredients (NDI) Notification Process under the Federal Food, Drug and Cosmetic Act, which requires manufacturers of novel dietary supplements to notify the FDA and to include information that shows that the ingredient is reasonably expected to be safe as recommended or suggested on the product label.¹⁷

HEALTH CLAIMS MEETING SIGNIFICANT SCIENTIFIC AGREEMENT

For functional foods, the FDA regulates health claims made on package labels under The Food Labelling Guide. The regulations change frequently and the onus lies with the food industry to stay up to date. Under the Health Claims Meeting Significant Scientific Agreement, there are specific rules for claims about the relationship between food ingredients and their impact on health. This includes, for example: plant sterols and the risk of coronary heart disease; calcium, vitamin D and osteoporosis; fiber and the risk of cancer and coronary heart disease.

MINI CASE STUDIES

Companies depend on employees who can innovate the next generation of nutraceuticals, ensure the highest levels of quality control in safety testing and manufacturing processes, collect the right evidence to substantiate health claims to consumers and navigate the complexity of the evolving regulatory environment to ensure compliance. Here are three mini case studies that illustrate how nutraceutical companies depend on top science and medical talent:

PLANT-STEROL FORTIFIED MARGARINE

Heart Disease And High Cholesterol

Heart disease, which includes heart failure, heart attack and stroke, is the leading cause of death for both women and men in the U.S.²⁰ According to the American Heart Association, nearly 1 in 3 American adults has high levels of LDL cholesterol—the "bad" kind that is a risk factor for heart disease.²¹ While 75 percent of cholesterol is made by the body, 25 percent originates from the diet.²² A healthy diet is one of the key factors people can modify to manage elevated cholesterol levels. Statins, medications to reduce



Plant sterols can partially block the absorption of cholesterol cholesterol, are among the most commonly prescribed drugs in America. They are highly effective, but they may produce some unwanted side effects like muscle pain, digestive problems and memory loss.

Nutraceutical Innovation

Scientists discovered that plant sterols—substances found naturally in fats and oils, whole grain breads and cereals, fruits, vegetables and nuts—can partially block the absorption of cholesterol from the intestines into the bloodstream. They found that it's necessary to consume 2 grams daily to realize a 10 percent reduction in LDL cholesterol, an amount that's impossible to achieve with a typical diet.²³ What's more, they determined that consuming 2 grams daily has an additive effect in people with high cholesterol who take statins, equivalent to doubling the dose of the statin.²⁴

To capitalize on the food science and increasing consumer demand for statin alternatives, food giant Unilever developed Promise Activ Light Spread, a margarine that incorporates plant sterols. The product's health claim states that it is "specially formulated with plant sterols and has been clinically proven to significantly reduce cholesterol as part of a healthy diet low in saturated fat and cholesterol."

Making a sophisticated functional food like this requires a team of employees with expertise in nutrition clinical research, chemistry, biology, food engineering, product development, product safety testing, consumer marketing and regulatory compliance.

VITAMIN D FORTIFIED FOODS

More Than Bone Benefits?

Although vitamin D can be made naturally from sunlight on skin, there are growing concerns about the risk of skin cancer from sun exposure. Vitamin D is involved in many body processes, but so far, it's only proven to help maintain healthy bones. It is found in small amounts in fatty fish, beef liver and egg yolks, but it is nearly impossible to get enough from unfortified foods alone. Back in the 1920s, it was added to dairy milk to prevent rickets in children²⁵ and as a result, the soft bone condition became a rare disease in the U.S.²⁶ Today, older adults are interested in maintaining adequate vitamin D levels to reduce the risk of fractures due to osteoporosis.

According to the National Institutes of Health, most Americans get enough vitamin D,²⁷ but other organizations, like the Vitamin D Council, claim that a large group of people does not.²⁸ Regardless, many people are boosting their intake of vitamin D, reacting to the flood of health studies suggesting a link between vitamin D deficiency and heart disease, cancer, diabetes, metabolic disorders, arthritis, depression, infectious diseases, autoimmune diseases and more.

Ready To Capitalize On Promising Research?

Supplement manufacturers are meeting the growing demand for vitamin D by developing drops, chews and gummies. Functional food manufacturers are incorporating it into an expanding range of foods and beverages, like orange juice, dairy-free milks, breakfast cereals, cheese, margarine and yogurt. For now, the FDA limits health claims in foods to stating that "adequate calcium and vitamin D as part of a well-balanced diet may reduce the risk of osteoporosis." But findings from a large, prospective clinical trial may soon shed light on more health benefits. The VITAL Study at Brigham and Women's Hospital in Boston is investigating whether taking 2000 IU of vitamin D3 daily can reduce the risk of developing cancer, heart disease and stroke. The results may provide the evidence needed to substantiate new health claims to drive future sales and profits.²⁹

Nutrition researchers, product development scientists, and regulatory experts at nutraceutical companies must follow newly-published scientific research and updates in food regulation rules very carefully to help their employers load the product development pipeline with new products boasting the most current health claims in demand.

FOOD ENGINEERING INNOVATIONS TO BOOST FIBER AND PROTEIN

ESSENTIAL MACRONUTRIETS

Dietary fiber helps to maintain a healthy weight, lower cholesterol and blood sugar levels, and keep healthy bowel habits. These benefits reduce the risk of developing heart disease, diabetes and colorectal cancer. Fiber is easy to find in whole-grain products, fruits, vegetables, nuts and beans, but most Americans don't consume enough fiber. In fact, 76 percent of American adults do not consume the recommended daily amount of fruit, and 87 percent do eat enough vegetables.³⁰ Fiber supplements like Metamucil (ground psyllium husk) or Citrucel (methylcellulose fiber) are powders that can be added to a glass of water or taken in capsule form with a drink.

Protein, another essential dietary component, provides essential amino acids that cannot be made by the body but are necessary to support growth and to repair cellular damage. It promotes longer-lasting satiety compared to carbohydrates, a key benefit for those wanting to lose weight and keep it off. Protein also helps the body grow lean muscle mass, a consideration for people who want to stay buff and for older adults who want to protect against muscle mass loss as they age.

FOOD ENGINEERING TO THE RESCUE

Nutraceutical companies are taking advantage of innovations in food engineering technologies to boost fiber and protein in foods and beverages.

For example, IFP's Whey Protein and Whole Grain Shake is a powder that contains whey protein and oat bran fiber. It was designed with agglomeration technology, which makes it possible for water to flow between the powder particles better so it mixes more evenly.³¹ Without this technology, the powder would clump making the beverage look and taste bad.

To develop and test tasty new product formulations that deliver added nutritional value and satisfying texture, nutraceutical companies rely on food scientists in the lab. Food scientists collaborate with food processing engineers and the consumer marketing team to produce test products for consumer research, verify product safety during production, and ensure regulatory compliance for manufacturing processes.

THE FUTURE'S SO BRIGHT: SKILLS IN DEMAND

The nutraceuticals market is a robust opportunity for job seekers and food and beverage companies alike.

To succeed, nutraceutical companies must operate well in the current market, incorporate advances in food processing technologies, navigate the latest regulations for manufacturing, selling, distributing, and promoting their products, and make plans to capitalize on the consumer trends that will drive future sales.

Nutraceutical companies are actively recruiting people with medical and science expertise for a variety of positions to help deliver high performing products and maximize the bottom line. The best job candidates will have post-secondary education degrees in chemistry, nutrition science, public health and medicine.

Here are some examples of the job opportunities:

- Food Chemist
- Regulatory Specialist
- Product Development Scientist
- Laboratory Technologist
- Nutritionist, Registered Dietician
- Researcher
- Food Processing Engineer
- Supply Chain Manager



ABOUT ADECCO MEDICAL & SCIENCE

Acquire cutting-edge medical talent in a field that demands it.

Let's face it. Everything medical and science-based moves fast. And that's a great thing—we're living longer, healthier lives. But for you to keep up, you must employ the sharpest, most adaptable staff to conduct modern research and treatment for your customers and patients. In a hyper- competitive market, you can rely on us to build that staff.

Abundantly Diverse Talent

You'll connect with a talent pool that's as varied and vast as the growing number of nutraceuticals at your local grocery store.

A Speedy Supplier

Our services are quick to take effect. You have a need and it's filled with great-fitting professionals, almost as fast as you can add protein powder to your morning smoothie.

A Long-Lasting Effect

You'll gain a partner that knows your culture and appreciates the important work you do, now, and far into the future, no matter what the latest food trends serve up.

Get in touch with our medical and science staffing experts to start building your team today.



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