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Bend & Flex

The Global Market for Joint Health Supplements

Ingredient advances and an aging population mean the joint health market should be ripe for opportunity; manufacturers and marketers must be savvy about target markets, regulatory considerations and formulation challenges to take advantage of the road ahead.

by Brenda Porter-Rockwell

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Aging is inevitable; yet, most adults are quite lax at planning for that inevitability. The good news is there's a movement afoot focusing on long-term mobility and preventive care. Add in different consumer lifestyles and new ingredient introductions, and a broader target market for joint health supplements emerges.

"The good thing about managing joint health is that it's most likely not life threatening, it's just painful," said Stacey J. Bell, R.D., Ph.D., nutritional consultant and formulator. "And people know right away whether they are getting a benefit or not. If it doesn't work right away, it's not going to work, and you can move on. Joint health is easier to manage than other things like diabetes and lowering cholesterol, where it's harder to measure results."

According to Steve French, managing partner, Natural Marketing Institute (NMI), joint health awareness increased from 38 percent to 49 percent from 2005 to 2010 for a total growth rate of 29 percent.

Tried and Trusted

Joint health supplements are primarily targeted at those suffering from some form of arthritis. There are two main types that affect the joints—rheumatoid arthritis (RA) and osteoarthritis (OA). The first, RA, which is less prevalent, is a chronic inflammatory condition that can strike at a young age, affecting between 0.3 percent and 1 percent of the global population, causing a great deal of pain and destruction of the joints, according to the World Health Organization (WHO).

In contrast, OA is a localized degenerative joint disease associated with aging. Knee OA, followed by hip, are the two most common types of the disease. WHO marks OA as one of the 10 most disabling diseases in developed countries, affecting almost 10 percent of men and 18 percent of women over the age of 60 worldwide. One-quarter of sufferers are unable to carry out the full range of activities required by everyday life. These conditions are so prevalent that WHO, with support from 32 countries, dubbed 2000 to 2010 as the bone and joint decade.

Since 2005, French said, the awareness of joint health has increased, and consumers are shying away from over-the-counter (OTC) and pharmaceutical options. Instead, they are opting for natural solutions for relief. Among the top choices, chondroitin sulfate and glucosamine remain the most frequently and widely used ingredients for improving joint mobility and elasticity in persons suffering from

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either of the two types of arthritis. The two ingredients make up 44 percent of U.S. joint health supplement market sales, totaling \$705 million, according to Nutrition Business Journal.

NMI's 2011 Supplement/OTC/Rx Database reveals supplements that address joint pain and stiffness are the fourth most popular supplement for consumers reporting they are concerned about joint health versus those who are managing joint pain and stiffness. According to French, 14 percent of consumers surveyed said they are managing their joint pain with supplements. Of the 14 percent managing the condition, 76 percent said they are supplement users of glucosamine and chondroitin.

Consumer interest in chondroitin and glucosamine remains high, likely because those two ingredients have been around the longest and have been studied the most; surprisingly, the results of those many trials have not always shown the ingredients' effectiveness.

"The paradox is that the published clinical data on many thousands of patients has not shown the combination of the two—or even glucosamine on its own—to be effective at reducing joint pain and swelling and such," said Bell. "But don't bother the public with that fact because people are still buying it. What happens with any clinical study is there are people who don't respond to the treatment and people who do. I suspect that it works in a subset of people and that's why it's selling so well."

In fact, the 2006 GAIT (Glucosamine/Chondroitin Arthritis Intervention Trial) study, one of the largest trials to date, showed no overall effect on improvement of moderate to severe OA of the knee in the supplement group. The group taking prescription celecoxib noted a small improvement, while the placebo group netted a 60-percent response rate.

Nonetheless, Bell said, "The two combinations have been studied very well over the last 10 to 15 years. It would be my absolute number one recommendation for someone with achy joints."

Case in point, in vitro studies of glucosamine alone have been shown to stimulate regeneration of cartilage and proteoglycans in the joints. Additionally, glucosamine trials have resulted in patients with reduced levels of inflammation, improved joint pain and stiffness, restored mobility and narrowed joint spacing in the knee.

Barry W. Ritz, Ph.D., vice president of scientific affairs, Atrium Innovations, speaking during SupplySide MarketPlace in May 2012, offered two reasons for the continued interest in glucosamine and chondroitin: Consumers perceive of a lack of safety among OTC pharmaceutical options and/or the "placebo effect," where consumers want to feel improvement therefore they achieve their end result even if they haven't taken an actual dose.

Ritz went on to highlight that while several meta-analyses have proved more favorable to glucosamine use, testing results remain mixed because glucosamine may be less effective for more severe OA patients, patients that weigh more or the mixed results may simply be a matter of trial design.

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Ingredient Advances

While glucosamine and chondroitin have been the biggest names in the category, newer ingredients may have faster effects and similar efficacy. Frost & Sullivan reported well-established ingredients such as chondroitin sulfate and glucosamine remain a serious challenge to collagen peptide, an up-and-coming ingredient that has been shown to support healthy cartilage structure.

“Manufacturers, however, are combating this situation by conducting numerous studies in order to prove the efficacy of collagen peptides and show the benefits of combining peptides with other ingredients,” according to the group’s report, “Increasing Incidence of Osteoarthritis and Osteoporosis Driving Collagen Peptide Market.”

New analysis from the firm, “Strategic Analysis of the Collagen Peptide Market in the United States,” finds the collagen peptide market earned revenues of US\$224.6 million in 2011 with anticipated increases up to US\$344.5 million by 2017.

Frost & Sullivan predicts the ever-increasing demand for youthful vigor will require combining collagen peptides within functional foods and beverages, as well as in dietary supplements. The concept of blending collagen peptides with first-generation ingredients, such as chondroitin, has caused a boom in the market for cartilage builders.

“Manufacturers must look at blending collagen peptides with other well-known, complimentary ingredients in the market like chondroitin and glucosamine in order to gain a significant market share,” said Frost & Sullivan’s research analyst, Ashwin Raj Ravinder. “Increasing marketing activities and creating awareness amongst consumers is always essential.”

Euromonitor International’s global head of consumer health research, Monica Feldman, attributed the low consumer awareness of peptides to changes in consumer habits. “Another very old way of taking care of joint health is with chicken soup, believe it or not,” she said. “When our grandmothers cooked chicken soup they cooked it with bones. If you cook chicken with bones, it becomes gelatin-like when it cools down and that’s when the chicken releases its natural collagen.”

Commercially Significant Collagen Peptides

	Highlights
Type I Collagen	<ul style="list-style-type: none"> • Mainly sourced from bovine, porcine and fish • Contains 19 different amino acids • Glycine, proline and hydroxyproline are the most prominent amino acids present • Constitutes 90.0 percent of protein in the human body • Mainly present in bones, skin, tendons and teeth • Mainly positioned for sports and fitness nutrition, and beauty segments
Type II Collagen	<ul style="list-style-type: none"> • Chicken cartilage and sternum is the main source • Contains 18 different amino acids • Minor variation in the composition of amino acid profile seen in type I • Mainly present in cartilage and the vitreous humor of the eye • Mainly positioned for bone and joint health

Source: Frost & Sullivan

Different types
of collagen-
based ingredients
are available
for dietary
supplements and
functional foods.

Different types of collagen-based ingredients are available for dietary supplements and functional foods. UC-II®, a patented undenatured type-2 collagen ingredient from InterHealth Nutraceuticals, has been tested clinically in a randomized, double blind trial, which showed 40 mg/d of UC-II increased joint comfort, flexibility and mobility. UC-II was more effective than 1,500 mg/d of glucosamine combined with 1,200 mg/d of chondroitin; a 40-mg daily dose of UC-II was more than two-times as effective as 2,700 mg/d of glucosamine combined with chondroitin in promoting complete joint health. The findings confirmed those from an earlier pilot study that found 10 mg/d of UC-II for 42 days significantly reduced pain including morning stiffness, stiffness following periods of rest, pain that worsened with use of the affected joint, and loss of joint range of motion and function in five female subjects (58 to 78 years old) suffering from significant joint pain.

Another combination offering, BioCell Collagen®, features three major constituents, collagen type-2, chondroitin sulfate and hyaluronic acid (HA), that are reduced to highly bioavailable, low-molecular weight forms using a patented hydrolysis process. In 2010, a multi-center, double blind, placebo-controlled, unpublished trial demonstrated the safety and efficacy of BioCell Collagen in addressing OA symptoms and in improving various physical activities, as measured by VAS and WOMAC scores. A previous unpublished 16-patient study of BioCell Collagen demonstrated a safety profile and statistically significant efficacy in supporting chronic degenerative joint conditions in patients with OA.

Nonetheless, there is a lower awareness among consumers about collagen peptide-enriched products because there is a lack of health claims that support the benefits of the ingredient. Manufacturers should invest in more research and development, marketing and human clinical studies to prove the efficacy of collagen peptides, according to Frost & Sullivan's report.

Now that we've moved away from chicken soup, Feldman said she's seeing interest in HA, where one double blind, placebo-controlled study found a beneficial effect and safe oral use in the management of hip OA. All 42 patients experienced marked pain relief in as little as three months.

"Hyaluronic acid is another form of collagen and, ironically, it's derived from rooster cock and it's very good for joint health," Feldman said. "So we've had a long history of deriving our supplements from animals, but we either don't do that anymore, or we call it something else depending on the extraction process or the blend."

She added the U.S. market has moved away from shark cartilage for joint support. "I know there's a little bit of controversy because the product is derived from sharks, and people want to protect the shark population," she said. "We don't see shark cartilage very much in the United States anymore, but if you go to places in Latin America and Asia, they still have shark cartilage supplements. They've been taking them for decades."

S-adenosyl-methionine (S-AMe), methylsulfonylmethane (MSM) and HA have been shown to improve cartilage structure. Combinations of glucosamine with chondroitin or MSM appear to reduce pain and swelling, while S-AMe attacks pain.

Boswellia, an Ayurvedic herb, has a long history of traditional use in anti-inflammation and joint support. Conventional trials have found the mechanism of action to be boswellic acids

(KBA, AKBA), which reportedly inhibit 5-lipoxygenase (5-LOX) enzyme activity. According to Ritz, a series of studies demonstrated a reduction in pain in OA of the knee in as few as five days and a decrease in cartilage degradation.

Curcumin, the active compound in the Ayurvedic botanical turmeric, also has ties to traditional medicine. One trial completed with Meriva curcumin (from Indena) improved function in knee OA in as few as seven days. Similar to curcumin and boswellia, the Amazonian vine known as cat's claw has been shown in both traditional and conventional medical trials to be effective in reducing inflammation in arthritis and OA subjects. Further studies show its role as a strong inhibitor of nitric oxide (NO), which is believed to break down joint cartilage.

An abundance of research exists for the benefits to joint health of the branded French maritime pink bark extract Pycnogenol (from Horphag). As recent as 2008, study results showed Pycnogenol benefitted patients with mild to moderate OA as it improved symptoms and was able to spare use of non-steroidal anti-inflammatory drugs (NSAIDs).

The last few years have seen greater interest in marine oils that are rich in long-chain polyunsaturated omega-3 fatty acids. One recent trial, performed on guinea pigs, demonstrated diets rich in omega-3s reduced OA symptoms by 50 percent compared to a standard diet.

Cetylated fatty acids (CFAs) are also being sought after for joint support. In a 2002 study, patients with OA in a trial taking CFA (as Celadrin, from Proprietary Nutritionals) experienced noticeable improvement in knee range of motion and overall flexibility after 68 days of use.

Keratin, from sheep, can be used for reduction of joint inflammation. Recently introduced to the U.S. market, this blend of animal and plant proteolytic (protein digesting) enzymes is said to balance inflammation response.

Getting a huge profile boost from Dr. Oz for its weight-loss attributes, brown seaweed also helps to maintain optimal levels of the protective synovial fluid between joints, supporting healthy cartilage through the synthesis of glycosaminoglycans and reducing levels of inflammation.

The dietary compound ergothioneine (ET) has come to light as mildly active cases of RA are believed associated with an unexplained high level of ET in red blood cells. ET concentrations in patients with mildly active RA were compared to ET levels in patients with coronary heart disease and osteoarthritis, serving as non-RA chronic inflammatory disease controls. By the end, high ET levels were found in 10 individuals.

The next big wave for joint product development will focus on the dairy market, Euromonitor predicts. While typically reserved for discussion around bone health, vitamin D and calcium play a critical role in the prevention of OA and thus in maintaining joint health.

According to Euromonitor, global sales of foods and beverages positioned for bone and joint health in the 32 markets it covers totaled US\$13.8 billion in 2010. And although the average product growth in those 32 markets from 2005 to 2010 was fairly static, a few countries "registered outstanding dynamism," the firm said. In India, for instance, sales increased five-

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fold and the Czech Republic recorded growth of 171 percent, while in Austria, China and the Netherlands, sales doubled.

Not surprisingly, dairy products accounted for virtually 99 percent of bone and joint health-related food and beverage sales in 2010, as they are an excellent source of calcium and contain at least some vitamin D.

The “dynamic” sales volume, the company said, can be attributed to dairy companies that have become “remarkably adept” at utilizing health and wellness claims, especially the joint and bone health benefits, to promote their products.

“As always, the trickiest part of any health and wellness-oriented marketing strategy is to motivate the younger age groups which are not yet affected by health problems to take preventive measures,” wrote Ewa Hudson, head of health and wellness research at Euromonitor.

Jumping on the functional dairy trend, four years ago, French firm BioSerae introduced a milk protein ingredient called Oseol to the joint health market. When combined with glucosamine and chondroitin, the company said test results showed improved pain relief and a reduction in inflammation and cartilage degeneration.



Schiff's Move Free Ultra is among the supplements offering a combination of ingredients and comparing the efficacy to the well-known combo of glucosamine and chondroitin.

Market Outlook

Sales of joint health supplements in the United States have dipped slightly in the last year while the number of retail SKUs have flip-flopped between high and low, ultimately resting at a five-year low. In the United States alone, overall category sales across all markets have declined. According to SPINS, for the 52 weeks ending July 7, 2012, overall sales of dietary supplements labeled for joint health dipped nearly 2 percent for the same period one year ago.

Globally, as per Innova Market Insights, the new product market for supplements showed a similar decline. Product introductions dropped from 469 in 2010 to 399 in 2011.

According to Frost & Sullivan, the U.S. and European joint health market is expected to net about US\$200 million in sales this year, about half of the total bone and joint market in those regions. Experts predict moderate gains upon market expansion into developing countries, wider target demographics, new ingredients and/or combination introductions.

Market expansion is on the rise, “albeit, it is growing more slowly than it did earlier,” said Tom Vierhile, Datamonitor’s innovation insights director. In the United States, he said, the market for bone and joint health foods accounted for more than US\$2 billion in sales in 2010, and is expected to reach some US\$3 billion by 2015. Datamonitor projects the market will have a compound annual growth rate (CAGR) of 5 percent from 2010 to 2015—a decline from the 6.1 percent CAGR this market had from 2005 to 2010. In its report, “The Future of Functional Food & Beverages: Bone & Joint Health,” Datamonitor noted global growth is trending upward, with the growth expected to be strongest in Brazil and India, each with a projected 8.2-percent CAGR through 2015.

Vierhile also pointed to an expanding demographic for joint health products, saying, “The numbers on aging would suggest the market for joint care products should expand in the future,

but lack of product innovation and skeptical consumers seem to be depressing growth.”

About 14 percent of the U.S. population is expected to be in the 65+ age bracket by 2015, up from 12 percent in 2000, Vierhile pointed out, adding that some markets are already well beyond this number. In Japan, he said, it’s estimated that 26 percent of the population will be age 65 and older by 2015, up from 17 percent in 2000.

“You would think these numbers would translate into lots of new product activity in foods and beverages, as well as OTC health care products. But new product launch activity has been depressed of late, if the U.S. market is any guide,” Vierhile commented.

The number of new joint health food, beverage and OTC health care products launched in the United States, per Datamonitor’s Product Launch Analytics, see-sawed in the last five years. Stores carried an average of 66 SKUs in 2008, with a dip to 56 SKUs in 2009. The number of new launches in 2010 reached a peak of 108 SKUs, and then steadily declined in 2011 (34 SKUs) and then again in 2012 (14 SKUs to date).

But the outlook is not as dire as the present market figures might suggest. Speaking at SupplySide MarketPlace, A. Elizabeth Sloan, Ph.D., president, Sloan Trends & Solutions, said she, too, sees the joint product market opportunity—for boomers.

She said the category needs an infusion of change: “A new shot in the arm and maybe combinations of ingredients.”

That “shot in the arm” could already be under the noses of U.S. product developers. Outside of the United States, functional food development around joint health is widely accepted.

Ravinder observed: “Europeans are aging faster than Americans. The aging populations in China and Japan are further driving the bone and joint health market as people older than the age of 50 are more likely to face issues related to bone and joint health. Functional food, beverages and dietary supplements are considered to be the best carriers of bone and joint health ingredients in this market.”

Ready-to-mix powders, functional yogurts and fortified juices are some of the end applications where bone and joint health ingredients are performing well overseas and offer potential to the U.S. market. “Europe generally consumes more functional foods and beverages, while the United States consumes more dietary supplements to maintain healthy joints,” added Ravinder.

Another problem in the U.S. market, according to Vierhile, is a high percentage of consumers say they are interested in these food/beverage products, but a much smaller number is actually



Beverages and liquid dietary supplements can incorporate a range of active ingredients, from botanicals to collagen, in a more convenient and easy-to-consume delivery format.

buying. In its “2011 Consumer Survey,” Datamonitor asked U.S. consumers, “How interested are you in food and beverages that can improve your bone and joint health (e.g., strengthens bones)?”

“The percentage of U.S. consumers that said they are ‘interested and actively buying’ these products was 15.5 percent, compared to 49.6 percent that said they are ‘interested but not actively buying’ these products. For the record, 34.9 percent of consumers said they are ‘not interested and not actively buying,’” Vierhile explained.

He does offer a glimmer of hope for the market, saying women are somewhat more inclined to be interested in these products than men. Globally, he said the percentage of women saying they are interested in food and beverage products for bone and joint health benefits is about four percentage points higher than for men.

The numbers of regulatory claims introduced are down, but do not appear to hurt market growth.

The Regulatory Effect

In today’s political climate, even the mention of government regulation invokes a strong reaction from the business community. However, for the joint health market, the numbers of regulatory claims introduced are down, but do not appear to hurt market growth.

Joint health claims in the United States dropped from 162 in 2010 to a mere 95 in 2011; worldwide joint health claims from that same period dropped to 161 in 2011 from 238 the year before, according to Innova Market Insights.

In the United States, for example, ingredient suppliers and manufacturers of supplements are regulated by the U.S. FDA, and are only allowed to make structure/function claims around dietary supplement use. As a result, most products contain generalized label claims like “supports healthy joint function.”

New label claims may be down, but not entirely out. The National Advertising Division (NAD) of the Council of Better Business Bureaus recently approved a supplement claim highlighting a correlation between glucosamine and joint comfort, flexibility, movement and mobility. In 2008, the Canadian Natural Health Product Monograph approved claims stating glucosamine helps to relieve joint pain associated with OA.

Another plus for the market is that Japan now allows for a Foods for Specialized Health Use claim (similar to a structure/function claim in the United States) for some forms of glucosamine.

Getting approval to go beyond structure/function claims to full-fledged health claims, which mention disease states like arthritis, has proven difficult in the United States. In 2004, FDA rejected health claims linking glucosamine and chondroitin sulfate to a reduced risk of OA and joint pain, tenderness, swelling, and joint degeneration and joint cartilage breakdown. According to Ritz, FDA has rejected 45 of 47 studies submitted to date for review for possible health claims because they were conducted in individuals who already had osteoarthritis.

FDA basically concluded, Ritz said, “Results from patients with OA/JD and CD cannot be extrapolated to predicting reduced risk of OA in the general healthy population.”

Development opportunities exist, but finding those gems will require suppliers and manufacturers to bring to market innovative functional foods and beverages, novel ingredients and wider target demographics.

The regulatory environment for new health claims appears to be just as stringent abroad as it is in the United States. Last year, the European Food Standards Agency (EFSA) turned down a request from Gelita, a German company, that wanted to link collagen consumption with joint health.

In the past, EFSA has also rejected claims involving glucosamine and its purported benefit for joint health. Rejected claims included “glucosamine contributes to maintenance of joint function,” “glucosamine helps maintain joint cartilage” and “glucosamine helps to maintain joint mobility.”

Future Thoughts

The U.S. joint supplement market in the United States now finds itself in a period of little growth. Development opportunities exist, but finding those gems will require suppliers and manufacturers to bring to market innovative functional foods and beverages, novel ingredients and wider target demographics.

Added NMI's French: “The leading edge of heavy supplement users are seeing that there are other supplements out there that offer multiple benefits often in a shorter amount of time than, say, glucosamine and chondroitin. So competition from other vitamins and nutrients to glucosamine is certainly one way the market will grow.”

According to Sloan, nearly a quarter of the senior population (aged 65+) are the primary purchasers of joint health products in the United States. The next big swing, she said, could come from the Hispanic population, with 16 percent of grocery shoppers making purchases as a result of sports activity or as a result of weight issues.

Finishing Sloan's thread, Ritz said there is potential to capture a younger generation and sports enthusiasts focused on preventive care. “You can get ‘em now or get ‘em later,” said Ritz.

Euromonitor's Feldman said she's noticed major health facilities taking a greater interest in integrative medicine: “You'll see places like U.C. Berkley, Tufts University, Cornell and the University of Chicago sending wellness updates to the 40-somethings preparing them for what's to come (e.g., knee replacements) and at the same time, educating their future patients about supplements and healthy diets.” □

Brenda Porter-Rockwell has been writing and editing content for print and online publications for both business and consumer publications for more than a decade.

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