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Nutrition smart sports

Bringing cognitive science into sports nutrition

By Bill Giebler

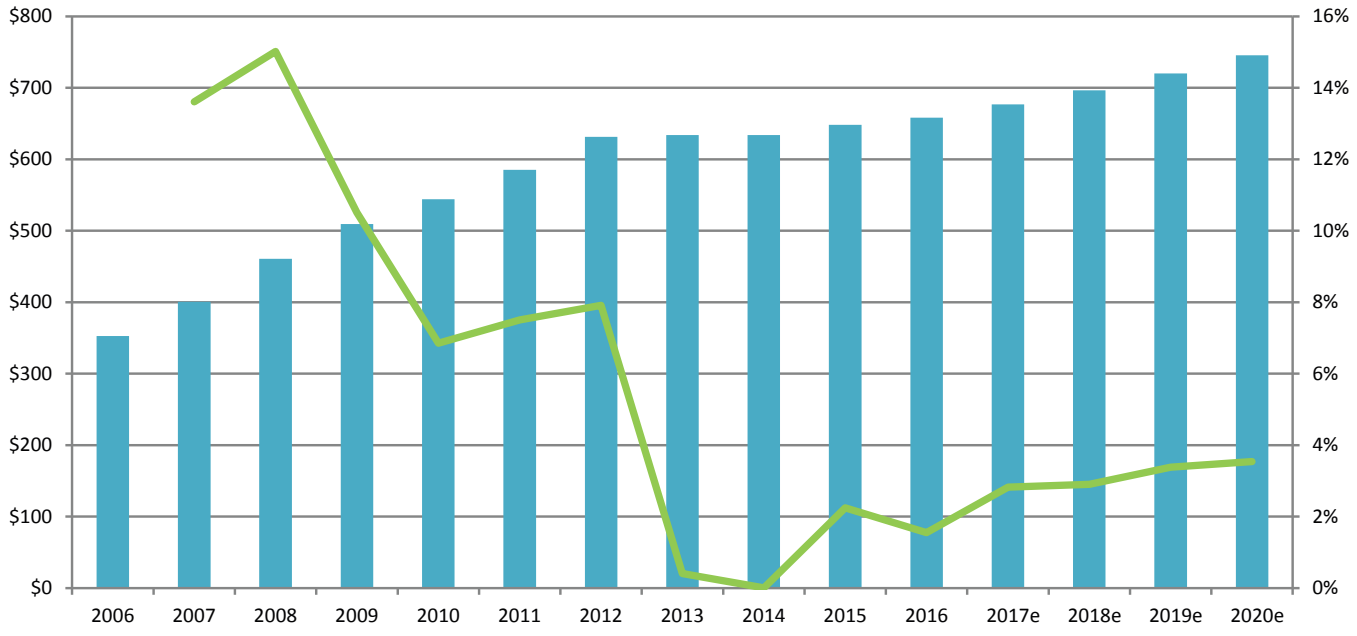
Jacqueline Kelly was on a road trip with her kids when *NBJ* reached her. For many, long stretches of open road call for dietary compromise. Not so for Kelly. The 22-year professional personal trainer with a recent master's degree in sports psychology knows very well the physical, mental and emotional ramifications of nutritional shortcomings—for herself, her clients and her kids.

"Let's say I promise my kids that, if they're really quiet in the car, we can stop and get a donut," she says. "Well, immediately when we get the donut, I would see some sort of sugar high and probably not the behaviors that I want—other than they

NBJ Takeaways

- Cognition and athletic performance are inseparable
- Fueling fitness is no longer about calories—it's about nutritional quality, and that quality impacts cognition
- Plant-based antioxidants are critical in preserving cellular health in the brain
- Exercise is critical for brain health, and the scientific findings are reaching mainstream consumers

BRAIN HEALTH SUPPLEMENT SALES AND GROWTH, 2006-2020E



Source: Nutrition Business Journal ($mil, consumer sales)

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LETTER FROM NBJ: DEFINING CHANGE

It's not as if the sports nutrition and weight loss markets ever stood still. These are fad-driven categories, and the quest for thinner or stronger or faster is never ending. Such desperation and drive seems to require a new set of products and strategies every time we hear the word "swimsuit season." But now the line between sports nutrition, weight loss, or maybe "weight management," and wellness/health/vitality is blurring faster than the fads.

NBJ's challenge has become not just tracking the sales data but also getting that data to meet definitions that shift with the markets and the marketing. One of my undertakings since I stepped into the senior analyst job in February has been to take a fresh look at how we define these categories and make sure the data definitions are dynamic enough to follow changing consumer patterns.

The biggest catalyst for refreshing how NBJ defines categories is clearly protein.

Protein, as we all know, has moved out of the gym and into the pantry for athletes, non-athletes and biohackers alike. In past issues and reports, protein powders and drinks had been grouped under Sports Nutrition, but given its many new roles, we are renaming that category "Sports Nutrition and Protein Supplements."

This focus on protein takes us into what we've historically called the Hardcore Drink category. It used to be about pre-workout and post-workout formulations, but now a product like Muscle Milk might be as much a snack as a strength-building strategy. Hardcore Drinks will now be known as "Ready to Drink Protein."

We also talk about changing our mindset on what we've called "Weight Loss" and transitioning to a healthier, and more accurate, term "Weight Management." This category would still include products targeted at weight loss but also capture the consumers using these products to manage a current weight and lifestyle. Driven by current weight management strategies and use of protein, we expand the definition of Meal Supplements to include some powders. The line between nutrition-needs meal supplements and "weight loss meal supplements" is pretty hard to determine these days. Blame a fixation on protein or a quickened pace of life, but a drinkable meal could be as much about fitting nutrition into a lifestyle as fitting into a swimsuit.

These steps show how NBJ is taking a closer look at the impact of consumer behavior on category definitions and how we best model the data to let brands find and serve those consumers.

Expect a deeper discussion of definitions in our upcoming Sports Nutrition and Weight Management report. Until then, I am eager to hear from subscribers about how we can make sure we are putting the right products in the right places to make the data more actionable for brands following this rapid and ever-changing market.

Claire Morton
Senior Industry Analyst

COVER STORY CONTINUED

would love me to death because I'm the best mom ever." The high fat and low quality refined carbohydrates, however, would have effects on the kids through the day and sometimes as much as three days later, Kelly says—and up to three weeks for anyone who's gluten intolerant, "making them less efficient for those full 21 days, if we're talking about an athlete."

Athletes are exactly who we're talking about—and the broadening view of sports nutrition among consumers. As that breadth moves the category beyond muscle mass, will it include brain health? The "dumb jock" myth was busted after high school, after all, and we've long seen the connection between mental focus and athletic performance. ("Baseball is 90 percent mental," Yogi Berra famously clarified. "The other half is physical.")

The foundation is already in place, as cognitive nutrition grows in the marketplace—a category NBJ has tracked from $353 million in 2006 to $658 million in 2016. Thus, we may be just a couple of synaptic connections away from stimulating consumer's hunger for cognitive science in sports nutrition.

Kelly, whose book *It's All in the Mind: Think Differently, Get Fit, Change Your Life*, focuses on focus. "When we talk about mental skills training, let's say with a golfer wanting to stay focused during his putt, we always talk about preparation, effort and attitude," Kelly says. "And I think that is such an amazing way to talk about how you would prepare yourself for the day or the week with your nutrition."

Pro athletes must prepare way ahead, with periodization of workouts for in-season, out-of-season, pre-season and post-season, says Kelly. "And you pretty much know what your body needs nutritionally, also, but not as many people put in as much preparation and effort and mind their attitude when it comes to their nutrition."

Focusing on diet and nutrition, says Kelly, brings consistency of overall health, wellbeing and focus. Gone are the pack-in-

the-calories-as-long-as-you-burn-them-off days. Athletes are beginning to recognize the importance of what is fueling their performance. It's not just about muscles; it's about finding the right nutrition for mental performance.

This is not a new conversation for Olympic and professional athletes, says Kelly. "But when I read more general articles in *Shape Magazine*, *Men's Health* or those types of things, I think this is a really new conversation." People know the importance of nutrition, she says, "but this link between where you are in your head and your nutrition is a new conversation for the general population."

Sports smarts

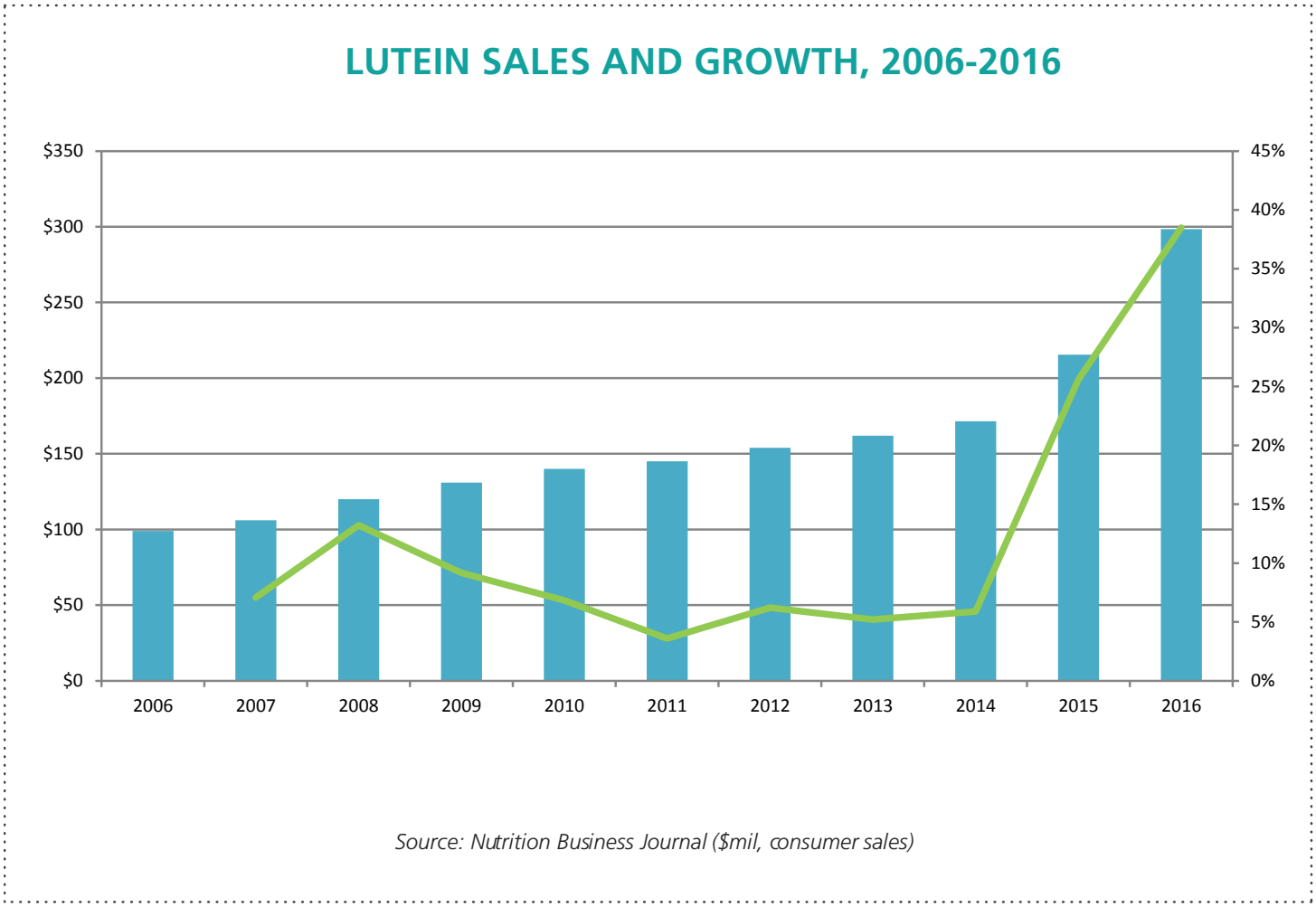
"In the past, there's been a belief among athletes that as long as I'm burning the calories, I can eat anything I want," echoes Robert Rountree, M.D. "I can eat all the sugar I want because I'm going to burn it off."

Rountree has seen a big shift in attitudes over his more than 30 years in practice. Today, he says, there's growing awareness that carbohydrates, especially refined ones, create free radicals that damage mitochondria, the power producers of cells—not just in the heart and blood vessels, but also in the brain.

"So, I think that's why a lot of people are moving to a carbohydrate restricted diet," Rountree says. "If not paleo or ketogenic, at least moving away from the idea that I can eat all of the carbs I want just because a calorie is a calorie is a calorie. It's simply not true."

In fact, says Rountree, "one of the ways people are thinking about Alzheimer's is they're calling it diabetes of the brain. And we're realizing that sugar, in particular, rapidly worsens Alzheimer's. So, think about it. If it's worsening Alzheimer's, what is it doing to normal cognition?"

Instead, he says, it's important to ensure the brain is getting all the nutrients it needs. "The brain is just a collection of cells like any other collection of cells. The same nutrients that help other cells in the body—trace elements, B vitamins,



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"We think about the brain like a muscle. And if you treat it just like your muscles, you'll get a recovery and regrowth and make your brain tougher."

– John Ratey, M.D.

essential fatty acids like omega 3 fats from fish, magnesium, antioxidants; all those very same nutrients are going to help your brain."

Paradoxically, restriction of calories overall is also worth watching. This will initially stress the body, but seems to have a leveling effect over time. Many athletes report mental clarity as a result of fasting, as well as improved endurance. Intermittent fasting, basically restricting calorie consumption to a small window in the day or going without food altogether for day or more every week, has shown additional benefits including weight loss. "If you get adapted to intermittent fasting, your body will be able to control the precise amount of glucose that's released from your liver so that there is always enough," says Rountree.

A lot of athletes, he says, are discovering that calorie restriction "will actually turn on protective mechanisms in your cells that will help you perform better, and in particular help your brain perform better."

But everyone's metabolism is different, Rountree warns. Not all athletes will benefit from the same diet.

"You ask me what the trend is, though," Rountree says. "The trend is for people to try to figure this out for themselves: Is it more carbs or more fats? And if carbs, at least less refined carbs."

Ingredient opportunity

It's not just about nutrients. Botanicals play a big role, too, and plant-based antioxidants make the best antioxidants, says Rountree. "In the past, we've always thought of antioxidants as things like vitamin C, vitamin E, zinc, selenium. All those things are fine up to a point. We need them. But where you get the most beneficial effects is from antioxidants derived from plants."

Resveratrol is a great example, Rountree says. "You wouldn't really say that people are deficient in resveratrol, but there are studies showing that it improves cellular health and in particular mitochondrial health."

Green tea, too, and herbs like ginkgo and curcumin and the sulforaphane found in broccoli sprouts and seeds are useful, too, as what Rountree calls "calorie restriction mimics." "They turn on the same pathways that calorie restriction turns on," he says. "And when you turn on those pathways, the mitochondria get healthier. And when the mitochondria get healthier, your brain gets clearer, more focused."

Rountree also recommends nicotinamide riboside, a combination of nicotinic acid or niacinamide and ribose, as seen in products like NIACEL-250 from **Thorne Research**, where Rountree serves as chief medical officer. "When you put them together they make this really unique molecule that's converted into a substance in the mitochondria called NAD," a nutrient that "provides the brake or the accelerator for the mitochondria. If you don't have enough NAD the mitochondria don't move forward, and if you do, the mitochondria get much more efficient."

A sports cognition category could, therefore, be richly populated with a wide variety of cognitive boosters and antioxidants.

Seeing the prize

Macular carotenoids could rise as an important piece of the cognitive sports puzzle. These building blocks of eye health are gaining interest and awareness, not just for their role in vision—where they've been shown to reverse the damaging effects of blue light—but for their role in cognitive function. A 2012 study in the *American Journal of Clinical Nutrition* suggests that not only are lutein and zeaxanthin the only two carotenoids that cross the blood-retina barrier to form macular pigment in the eye, "they also preferentially accumulate in the human brain." The study correlates both nutrients with cognitive function.

Cognition and vision both elevate sports performance, says Lynda Doyle, VP of global marketing for ingredient supplier **OmniActive Health Technologies**. Their Lutemax 2020 provides macular carotenoids in the same ratio found in the diet. The fundamental purpose of these ingredients is to filter high-energy blue light and support visual function. "New research shows that supplementing with Lutemax 2020 can improve visual function, including visual processing speed, which may be the most pertinent for athletic performance," says Doyle. "Faster visual processing means quicker reaction times and better performance."

Doyle reiterates the awareness of supplementation to support cognition, marked, she says, "by the popularity of ingredients such as ginkgo biloba, phosphatidylserine, Co-Q10 and curcumin, to name a few." The link between cognition and sports performance is within reach, too. Especially in a diversifying sports category.

Doyle believes the sports nutrition mar-

"Clean nutrition is important to wellness consumers and affords new product entries which use differentiated, scientifically substantiated, 'clean' ingredients to drive market growth."

– Lynda Doyle, OmniActive

ket is thriving today because long-term health and wellness are increasingly relevant to consumers. It's no longer a category just about muscle mass. New sports wellness customers seek to enhance their workouts and maintain a healthy body weight. They do this with proper nutrition, from healthy food and from supplements. "Clean nutrition is important to this group and affords new product entries which use differentiated, scientifically substantiated, 'clean' ingredients to drive market growth," Doyle says.

Macular carotenoids might be one such new entry.

The muscle upstairs

John Ratey, M.D., tends to approach the topic from the other angle. The Harvard Medical School neuropsychiatry expert is also the bestselling author of *Spark: The Revolutionary New Science of Exercise and the Brain*.

"Exercise is a bolus of stress for your brain," Ratey told *NBJ*. Like Rountree, Ratey credits certain stressors, like calorie restriction, mild phyto-toxins and exercise, with healthy brain function. During exercise, Ratey says, "your brain is working really hard. That's great because we think about the brain like a muscle. And if you treat it just like your muscles, you'll get a recovery and regrowth and make your brain tougher."

Research about exercise in school-aged kids demonstrates this very clearly. "You improve, almost immediately, a kid's ability to behave," Ratey says. "And not just from tiring them out. The fitter they are, the better students they are in every way: they're not acting out in class, they're more motivated, they're less anxious, their courage is more." This extends to adults and to athletes.

Proper brain nutrition is critical, too. Ratey lists the usual suspects of nutrients and botanicals: reduce glucose and refined carbohydrates, increase resveratrol, CoQ10, the catechins in green tea, curcumin, vitamin D, allicin-rich garlic, onions, broccoli—even cinnamon and dark chocolate. Each of these contains very potent nerve-healthy substances, he says, by virtue, ironically, of their inherent phytochemical pesticides. "The reason is that they are slightly neurotoxic, [and] when the cell is stressed, we make neuroprotective factors as well as the antioxidant enzymes and things called protein chaperones." It's in our brain cells' response to the stress of the toxin that the good stuff starts to happen. Ratey calls this the "janitorial service" of our nerve cells, a response, he says, "to deal with the reactive oxygen species that we use when we're thinking, moving, living, that can lead to erosion, cancer and all that."

Ratey suggests that it's reasonable, then, to consider many of these nutrients and botanicals "brain foods." And, he adds, the cellular response will "always overshoot the mark, so you're left with more antioxidant enzymes, more janitorial services." All of this "helps to promote resilience and resistance to stressors in the future." The outcome, he says, is an increase in neuroprotection, synaptic plasticity and resistance to future stresses on the cell. In the real world, Ratey says, thought speed will increase and a more flexible brain will be better able to evaluate situations. And not just short term. "What happens is that you preserve your brain cells longer, so you don't fall into cognitive decline so quickly."

The resulting mental focus—from proper diet and exercise—is crucial to athletic performance, Ratey says emphatically. "Focus is amazingly important. Think about our athletes, they're in such great shape," he says, waxing about "last night's" NBA game. "It's amazing that they can run like gazelles and keep doing it for 48 minutes. They're extraordinarily focused."

The brain, then, becomes the centerpiece of a physiological circular reference: nutrition feeds the brain, exercise strengthens the brain. Cognitive clarity and athletic performance are, therefore, inseparable. And always have been. The "dumb jock" might be an issue of perception, a dumb spectator incapable of seeing beyond the gross physical. But such physical fitness inevitably results in a sharper mind.

"I like to say," Ratey concludes, "exercise is really to tune up your brain, and the effect on the body is just a welcome side effect."