JAMA: When do you expect your company’s products to be widely available in grocery stores?

DR VALETI: I see this as a phased introduction into the market. We might have to pick a region first, supply the region, and get very early feedback. Maybe we’ll go to a few restaurants with chefs who would serve this in dishes that people love. What is important for us is that we also get feedback from people who handle meat. We see that process improving our products as we scale up. I think it’s in the 5- to 10-year horizon for large scale availability. But in the next 2 to 5 years, premium meat should be available on the market.

JAMA: Do you ever miss seeing patients?

DR VALETI: Yes, that is one of the things I miss a lot about cardiology. I had a number of very close patients who, when they were having a heart attack or a cardiac arrest, I led the team to treat or resuscitate them. So I miss seeing them and their families come back to the office. I also had a number of patients who required advanced techniques to figure out their cardiac diagnosis. Solving those diagnostic dilemmas gave me intense satisfaction and happiness. These were life or death decisions. So while I miss cardiology, I don’t think for a moment that starting Memphis Meats hasn’t been a natural progression of my training in cardiology. Somehow all these dots connect.

Note: Source references are available online through hyperlinks embedded in the article text.
as *nootropics*, drugs that are supposed to advance cognitive function, are gaining in popularity, too.

Even the nutritional product use is of questionable benefit for many individuals. Do we really believe that the vast majority of children in the United States are deficient in vitamins and minerals? I’m not talking about children with diagnosed deficiencies, which are rare, and then absolutely need to be treated. Most cases of deficiencies involve vitamin D deficiency in kids younger than 1 year or iron deficiency in children aged 1 to 5 years. The vast majority of children who take a multivitamin are healthy children who—if anything—are likely getting more than enough.

**Drug-Drug Interactions and Other Concerns**

Concerns about supplement use are not limited to children. A study published in *JAMA Internal Medicine* in 2016 looked at how the prevalence of dietary supplements and over-the-counter medication use changed among the elderly from 2005 to 2011. More than 2000 people, on average older than 70 years, were interviewed twice. Between 2005 and 2011, over-the-counter medications decreased from 44% to 38%. The use of supplements, however, increased from 52% to 64%.

Researchers were especially concerned about how these products might potentially be the cause of major drug-drug interactions, a concern also raised by the *JAMA Pediatrics* study. Although clinicians spend a large amount of time checking for potential problems in the pharmaceuticals they prescribe, relatively little is spent on potential problems from supplements. The electronic health record often doesn’t ask or know about them—let alone flag them for problems, and neither do pharmacists.

That’s a real problem. The study of elderly adults found that the potential for major drug–drug interactions from supplements increased significantly from 2005 to 2011, increasing from 8% to more than 15%.

It’s bad enough that so many US consumers are taking supplements, which can be expensive, often provide no proven benefit, and may not even have what the bottle labels say they contain. What’s worse is that many of these supplements may also be increasing the potential for adverse outcomes because of other medications that they’re already taking. About 23,000 visits to emergency departments each year can be attributed to adverse events from dietary supplements.

Supplement producers do not need to prove that their products work before selling them to people. There’s little regulation, so these products can often wind up containing very little of what patients think they do. Many of them contain ingredients that have been banned for use in people or have never been studied. In 2016, when a researcher pointed this out, he was sued by a supplement maker.

Given that spending on supplements now approaches 10% of our overall spending on pharmaceuticals, it may be time to question their regulation or lack thereof. Even if we’re not going to require them to be held to the same standards as prescription drugs with respect to efficacy, it seems reasonable to at least increase our focus on them with respect to safety.

Anything we do for health has to be considered in the context of benefits and harms. When the former outweighs the latter, it’s reasonable to proceed. But in the case of supplements, for many if not most people, the benefits appear to be minimal at nonexistent. The potential harms on the other hand are real and documented. Given this, it’s hard to understand why patients are using them in such increasing numbers. Physicians may need to push back harder than we have in the past.

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**Published Online:** August 15, 2018, at https://newsatjama.jama.com/category/the-jama-forum/.

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**Bench to Bedside**

**Gut Microbes May Account for the Anti-Seizure Effects of the Ketogenic Diet**

Tracy Hampton, PhD

The low-carbohydrate, high-fat ketogenic diet is an effective treatment for many patients who have epilepsy that fails to respond to existing anticonvulsant medications, but the detailed mechanisms behind the diet’s beneficial effects on brain activity and behavior remains to be fully elucidated. New research published in *Cell* points to a pivotal role for the gut microbiome in mediating the effects of the diet.

“The ketogenic diet has been utilized in the treatment of epilepsy for almost 100 years. There has been much research as to the likely mechanisms of action, and there appear to be a multitude of metabolic effects,” said Helen Cross, MD, PhD, who is The Prince of Wales’s Chair of Childhood Epilepsy at University College London Institute of Child Health and was not involved with this work. “It is perhaps not surprising that the change in diet leads to a change in gut microbiota—what this study elegantly shows is that this may contribute to the diet’s antiseizure effect.”

For the study, investigators examined the efficacy of the ketogenic diet using 2 types of mice: mice reared as germ-free in a sterile laboratory environment and mice treated with antibiotics to deplete gut microbes.

The researchers used these mice, as well as conventional mice, to model refractory...