Transcript

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Virgil
How important is nutrition in one's health, and does it become more or less important at a given age?

Dr. Bremer
Well, I have some biases in this space. So, I guess my disclosure is that I think nutrition's important for everything. When asked about nutrition and no pun intended, I think conceptually, nutrition is what connects the food we put in our mouths to our overall health.

All that biology that goes from, again, putting something in, to the output of your health outcomes, is what nutrition science is all about, and that goes throughout the entire lifespan. So, when I give lectures and whatnot, I will say: nutrition is that fundamental link between food and health. It touches every cell and every system in our bodies, at every age of stage throughout the life-course.

Even at conception, even *before* conception, nutrition is important. It is what your mom and dad [consume], their nutritional status is very important on the health of the conceptus. So, all through conception and all throughout the entire lifespan, the biology of what happens between the intake of food and the cell, it matters tremendously.

We're still learning what optimal nutrition means. So when people ask about nutrition, it's definitely not one-size-fits-all. There's certain parts throughout the lifespan [that are critical], whether it be gestation, whether it be early infancy, whether it be pre-puberty, puberty, post-puberty, and in women, whether it be during menstruation, pregnancy, lactation, or in the octogenarians. Every life stage or life event.

We're still learning what optimal nutrition really is and how optimizing the nutrition can then optimize health outcomes for those critical and life stages.

Virgil
I've heard a lot from older friends and coworkers like "oh, you're young, you don't have to worry about what's on the label". But it's interesting to hear that that is not the case, actually.

Dr. Bremer
I would actually say it's quite the converse, because I would say, really, not just from a dietary habit standpoint, but from a cellular programming standpoint, I would say it's actually quite the converse. Your dietary exposures early in life and even in utero during gestation are profoundly important in how they impact your metabolic memory – and certainly in the womb. The exposures that the fetus is receiving, nutrient exposures, does a lot of programming that will impact that child's health throughout their entire life course.

So, I would say it's actually quite the converse. There's certainly ways to make amends [and] to do interventions, but I would say from setting a health trajectory, the earlier one optimizes their nutrition, the better.

Virgil
I want to dive a little bit deeper into a more topical look at nutrition. So as of recently, I feel like in the past 20 years, people have been looking a lot into ultra-processed foods (UPFs) and things of that nature.

Dr. Bremer
Yeah.

Virgil
You mentioned earlier that you guys are discovering a lot about nutrition and different things. What are some interesting things that the Office of Nutritional Research (ONR) has discovered about these UPFs or their effects on the body, from relationships with obesity to endocrine functions or other bodily processes?

Dr. Bremer
I can talk to you for days until you're so bored of me you'd never want to talk to me

again! But I'll start by just taking a half-step back because I think UPFs, particularly in today's environment, have been vilified.

Going back to the 1960s and 70s during the Green Revolution when a lot of these agribusiness[es] and different agricultural processes started to become more prevalent; the goal was really to feed the planet. That's a laudable goal. Industry and the and the private sector, they "modernized" and they develop techniques to grow a lot of food and process it in a way that could be distributed at a global scale. That had a profound impact on diminishing hunger.

In that era, it went from an appreciation of the magnitude of whether it be vitamin deficiencies or hunger to an agribusiness that then developed the resources and the tools to address those problems. Now, in so doing, there was a shift. There were now processes in place where foods could be produced at scale.

Food chemist and food engineers (and food manufacturers) are incredibly smart individuals, and they realized that they could produce products that were super tasty and that people liked. There was there was brand loyalty. There were [products] that were stable on the shelf for prolonged periods of time. Again, that could be mass distributed.

The generation of UPFs, having a generous interpretation of history, was: it was a process put in place to address hunger. Unfortunately, hunger still exists, so I still want to throw that out there. There is a need to have enough food for people on the planet. But now, there's been an appreciation that a lot of products may not be the most healthy.

Then the question is: gosh, why?
Is it because of the nutrient components or not? Is it because of the salts? Is it the sugar? Is it the saturated fats? Is it the lack of fiber? Or is it a lot of these other [new] ingredients that 100 years ago we didn't appreciate? Is it the emulsifiers? Is it the colorants? Is it the dyes, the additives? All those ingredients, either synthetic or natural, that the food chemist and food engineers use to generate food products. Or is it the packaging? Is it the micro plastics?

All of a sudden, now we have all these layers. It's not as clear as just thinking about nutrients and health outcomes. There's a whole lot of other things to consider. I'm super glad that the UPFs are in the news because they do constitute about 70% of the US food supply and 60 to 66% of caloric intake is from UPF products.

So then the question is: are they healthy? The observational data suggests that there are adverse health outcomes that are associated with UPF intake. Okay… so what does that mean? There are different classification systems for foods and the most commonly used one is the NOVA classification developed in Brazil.

But that really wasn't meant to portend health outcomes of any particular food. Nor was it based on nutrient content. It was a classification system that focused on degree of processing. So is it something that you can make it home or is this something that required large-scale industrial, synthetic, or natural additives and whatnot? If it fell on the latter scale, it was ultra-processed.

So, there are a whole slew of foods that fall under that category. It could be the twinkie. It could be the hot dog. It could be those typical junk foods. But it's also yogurts with additives. It's also infant formula. It's also whole grain bread products. So you have this definition that encompasses junk food, if you will, and also foods that are associated with positive health outcomes.

I think the opportunity right in front of us is to really dig deeper beyond just the associative data and really start thinking about what the science and what the biology is.

That was a long-winded intro. But your question as to where I think ONR and how science can be engaged in this process is to critically ask the question[s]. Based on the epidemiological data, we see a signal. That's super important. That raises a flag, and I'm glad that the flag's been raised.

Now, it's time to get deeper into the weeds and understand the mechanism and causation. Is there a cause? And if and if so, what is the cause? Get nitty gritty, and then let science lead the way. With the estimated 10 billion people on this planet come 2050, we need to have ways to feed everyone.

Can science help un-tease this associative data and uncover mechanisms? So as food manufacturers reformulate their products, they're making products that are healthier. I don't think the goal should be to eliminate UPFs, because I think:
A. that's not practical and
B. there are several ultra processed foods that are in the supermarket right now that are associated with positive health outcomes

Where science can lead the way is [in] understand[ing] the mechanism and understanding the biology. The food scientists and the food engineers can then reformulate products that are still tasty, that people still want to buy. Being practical, if you take everything off the shelf, the US is ill-equipped to go back to home cooking every meal.

I mean, just thinking realistically; there is a place for these products, but how can they be generated in a way that they're healthy and not unhealthy? Being generous in assumptions, one often vilifies the food companies – that they're intentionally making products to get people to buy that are unhealthy.

I think we're learning that some products aren't the healthiest. I don't think that was necessarily the intent at the outset. These are businesses. But I think if we let science provide the information and then go back to the private sector with this information, the private sector will have incentive to reformulate their products to be healthier.

Virgil
From a nutritional expert standpoint, you're at a pretty interesting crossroads, right? You have all this different background information on why UPFs were made, why they're so prevalent, and their prevalence in society, like 60 to 66% of caloric intake is from that. And you have the: well, some of them are considered junk food, some of them are considered health products. All of these different factors.

How do you feel? Is it an exciting challenge to take on, [are you] curious, is it intimidating? How do you feel?

Dr. Bremer

No, I think it’s super exciting and quite frankly it's necessary. Where science can lead the way is to really provide the evidence base to make informed decisions that will impact policies and practices. Right now, there's more questions than answers, and when there's no data, it's very easy to make stories.

We’re, right now, in a space where there's no data to help inform choices. Doing the hard science and then doing it in a way that's rigorous and reproducible and robust will help tease out some of these unknowns. I think the science that's done today is going to be instrumental for the foods that we eat tomorrow.

I think there's a huge opportunity here for science to inform food systems in a way that is focused on health. Historically, food manufacturers, their goal was to provide food for their consumers. That’s okay – that's their business! What science could do now is: inform food manufacturers and policy makers and decision makers how to generate and produce food that not only their consumers like, but that are healthy. Instead of having deleterious health outcomes, which, in the long term, is not good for the food company.

How can they generate food that people still like that but are associated with positive health outcomes? That would be a win.

Virgil
We've got a lot of science and research going about and intersecting with policymakers as well. In the grand scheme of things, where do you think NIH falls in impacting the future of UPFs in society?

Dr. Bremer
NIH is front and center, and I think people are looking to the NIH to support that science, to provide the evidence base. Without the science, without the evidence base, it's super challenging for policymakers to make decisions. But with a robust and a very rigorous scientific program and evidence base, then the regulators and policymakers can make decisions based on science.

NIH is integral to that whole process. That's our job; to support the science, to provide the evidence base, to inform programs, practices and policies.

It's daunting to some extent because of the complexity. But I would also dare say that when people started talking about the about the microbiome ten [or] fifteen years ago, they thought, “gosh, this is too complex of an issue to address”. No! And now, it's being adequately addressed every day.

So, I think there's a lot of challenges in doing research in this space because of all the competing variables in nutrition science. People are living systems. This is hard work, but without doing it, and doing it in a way that's rigorous, we're not going to move the needle.

Because of the prevalence of diet-related diseases, I think it's more critical than ever to do the right science, to generate that evidence base that informed decisions can be made [upon]. That are being made on what's healthiest for individuals consuming these food products.

Why should industry care about this? If they're selling products and making a profit, what's in it for them? Being generous in my assumptions, I would offer the supposition that if they reformulate their products to maintain their taste and everything else, but that they could claim to be healthy, I think there would be all of a sudden a large interest in the private sector to make healthier foods to keep their [consumer] base.

I'm not an economist nor am I in the private sector, but I do think as companies reformulate foods and appeal to what the American public wants, I think there could be a profit gain there too. I don't think it's an issue of the health nuts versus food industry. I think we're all in the same boat here.

Nutrition science is... it's complicated. If you want to find a study to support anything you want to do and you go online, you'll probably find some study done somewhere that's going to say “coffee's good” or “coffee's bad”, or “we don't know”. So doing the right kind of science and doing it rigorously is important [because] then people believe the science, and then that can be actionable.

This is political, it's timely. There's lots of opinions in this space, and there's lots of uncertainty because there's lack of a common definition. There's so many questions

that [are] not addressed in a rigorous way. We're going to have the same conversation 10 years from now and I'll still say, “yeah, we don't know”.

But if we do the science now, the science we do today will change the food systems of tomorrow. Given the prevalence in the US and other parts of Europe on UPFs, that's huge. Even in Brazil, where the NOVA classification was made, the percentage of UPFs in their mainstream diet is much, much, much lower than here in the US.

It's not a one-size-fits-all type of approach. Understanding what in these foods can potentially be causing harm helps educate the consumer, but it also educates the food manufacturers on how to reformulate products in a way that they could be healthier.

There's lots of moving parts here.

Virgil
I appreciate your time and your expertise on it!

- **Dr. Bremer**
  Not a problem!