

Eating Mistakes That Could Quietly Steal Your Later Years

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STORY AT-A-GLANCE

- › While excess protein can activate mTOR, your protein needs do increase with age, as you need to counteract progressive loss of muscle mass. So, your age really needs to be taken into account
- › Protein requirements range from 0.6 grams per kilo of lean body mass in adulthood, up to 2 grams per kilo of lean body mass for young children. The elderly, bodybuilders and endurance athletes typically have higher than normal protein requirements for their age group
- › It's important to cycle high and low protein intake. Ideally, combine protein restriction with fasting, followed by increased protein intake on strength training days
- › Other nutrients that activate mTOR include branched-chain amino acids, glutamine, methyl folate and vitamin B12; nutrients that inhibit mTOR include curcumin, fisetin and polyphenols such as quercetin, resveratrol and epigallocatechin gallate
- › Fasting 16 to 18 hours each day is ideal, as this allows your body to deplete the glycogen stores in your liver to a greater degree and suppress mTOR and activate autophagy better

This article was previously published February 24, 2019, and has been updated with new information.

Dr. Jason Fung, is a nephrologist and author of three books, "The Obesity Code," "The Complete Guide to Fasting," and "[The Longevity Solution](#)," which is the topic of this

interview. This book was also co-written with James DiNicolantonio, Pharm. D, who also happens to be the co-author of my book, "Superfuel."

The motivation for "The Longevity Solution" came from a discussion with DiNicolantonio. "He'd already talked about salt in his book, 'The Salt Fix,'" Fung says. "In 'Superfuel,' he talked about good fats, bad fats and super fuel. We thought it would be great to tie everything together in terms of the real dietary determinants of longevity." Fung added:

"I spend a good section of the book talking about protein – the different types of protein, animal versus plant protein, for example, and how much protein [you need]. These are really important questions because there's so much [information] out there, and you don't know who to believe."

From my review of the book, I think that is probably one of the most valuable pieces, because there's so much confusion about protein. There's good reason for this confusion, because it's a complex topic. An important part of the equation is the mammalian target of rapamycin (mTOR), also known as the mechanistic target of rapamycin, a very important pathway responsible for controlling autophagy.

If you inhibit mTOR – which you can do by restricting protein – you activate autophagy, which is a good thing. However, I've personally made the mistake of not eating enough. While excess protein can activate mTOR, your protein needs do increase with age, as you need to counteract progressive loss of muscle mass. So, your age really needs to be taken into account as well.

Understanding the Role of mTOR

As noted by Fung, mTOR is basically a nutrient sensor. While insulin primarily senses your intake of carbohydrates, mTOR primarily senses protein. Different proteins will stimulate mTOR more than others. Fung explains:

"The reason is that mTOR senses the availability of protein and increases these growth pathways. If you're trying to increase muscle, like bodybuilders will, for

example, then this might be a very good thing. On the other hand, it impacts aging. One of the real interesting theories of aging is that there's a sort of trade-off between the growth program and the longevity program.

That is, if you grow, it's actually the same pathway as aging. Whether it's good or bad depends on your age. When you're young, you want to grow, so you activate all these growth pathways. But as you get older, if you keep revving that growth engine, it's just going to burn out.

Just like your car engine, revving it is great if you want to go fast. But if, on the other hand, you want to keep that car for a long time, you don't want to rev it that much. Things change as you go along.

During childhood and early adulthood, you want that growth program to go forward, but that growth program is intrinsically at odds with the longevity program. After a certain point, you may want to cut things back. That's the understanding of mTOR; mTOR drives all this growth. But then as you get older, you wind up with diseases of too much growth ...

There are all these chronic metabolic diseases where increasing the growth pathway, which is the same as the longevity-aging pathway, is not good. At some point, you want to slow it down. But as you get older, your body actually becomes resistant to some of these growth pathways.

Therefore, you actually need to take a little bit more. If you're elderly and you're at risk of falls, for example, then taking more protein might be a good thing. This is one of the reasons that protein is so hard to understand because everybody's so different ... You just have to look at your own situation."

What Are Your Real Protein Needs?

All of that said, there are some general guidelines you can use to estimate your protein needs. Children, for example, generally need higher amounts of protein since they're in growth mode.

Now, when calculating your protein needs, it's important to make the calculation based on grams per kilograms (kg) of lean mass, not total body weight. The reason for this is because you do not need protein to maintain your fat mass. You need it to maintain your lean muscle mass. The following amounts can be used as a general guideline:

Children – 2 grams of protein per kg of lean body mass

Young adults – 0.8 grams of protein per kg of lean body mass

Adults – 0.6 to 0.8 grams of protein per kg of lean body mass

Bodybuilders – 1 to 1.2 grams of protein per kg of lean body mass

Endurance athletes – 1 to 1.5 grams of protein per kg of lean body mass

Seniors – 0.8 grams of protein per kg of lean body mass; possibly more if muscle wasting is a problem

The Importance of Cycling High and Low Protein Intake

The challenge here is find the balance so that the whole system is optimized. Muscle loss is a more or less inevitable consequence of age. But with age you also have more damaged cells that need to be removed by autophagy. My solution has been to devise a program in which I combine protein restriction with fasting, followed by increased protein intake on strength training days.

"I think that makes a lot of sense," Fung says. "If you look at the literature on longevity, the only really well-established thing that makes people live longer is calorie restriction, but it's very hard to do. One of the things is to cycle it back and forth, so that ... some days, you're taking very little; some days you're taking a lot. I think that's actually how people were actually meant to live ..."

I think it makes a lot of sense because it's this sort of growth-versus-longevity paradigm. If you're always eating the same thing, then you're not going to be able to get that balance right. Because [when] you're in a pro-growth [pathway], that's also a pro-aging pathway.

You really want to go in between the two. Some days, you're going to take a lot. That will stimulate your mTOR, as well as insulin, for example, and put you in this growth pattern. Then you'll have days where your mTOR is going to be driven down very low. Those are the days your body's going to go into more of a survival mode, if you will. That's going to activate autophagy.

When you eat protein, for example, mTOR, which is a nutrient sensor, goes up. It basically just shuts off autophagy. Autophagy is this sort of cellular recycling process. It's very important for aging because it's a rejuvenating cycle for your cells ...

When mTOR is very low, then your body will start to break down some of the subcellular parts. Those that are going to be broken down first are those older damaged parts. You're going to get rid of them all. Everybody thinks breaking down protein is bad. But it's not, because that's the first step in renewing yourself. You've got to get rid of all the old stuff and you've got to rebuild the new things. That's why it's important to cycle it ...

I think you should, one day, maybe take 100 [grams of protein], and the next day zero. I think that's much better [than eating a specific amount of protein each day], because on the day you're taking zero, you get rid of all your old cells. Then on the day you're taking 100 grams, you're going to rebuild."

In addition to protein, other nutrients can also activate or inhibit mTOR:

- Nutrients that activate mTOR include branched-chain amino acids, glutamine, methyl folate and vitamin B12
- Nutrients that inhibit mTOR include polyphenols like curcumin, fisetin, quercetin, resveratrol (found in wine) and epigallocatechin gallate (EGCG, found in green tea).

Organic coffee and dark chocolate also contain high amounts of mTOR inhibiting polyphenols

The Importance of Fasting for Longevity

In his book "Circadian Code: Lose Weight, Supercharge Your Energy and Sleep Well Every Night," Satchidananda Panda, Ph.D., cites research showing that 90% of people eat across 12 hours a day or more, and compressing this eating window may in fact be one of the most important things you can do for your health.

Fung recently published a case series paper¹ detailing how fasting can be used as a therapeutic alternative for Type 2 diabetes. Three diabetic patients between the ages of 40 and 67 participated in a supervised fasting regimen to evaluate the effects on their insulin requirements. The patients had been diagnosed with Type 2 diabetes for 10, 20 and 25 years respectively, and were taking high doses of insulin daily.

Of the three patients, two did alternating-day 24-hour fasts, while one fasted for 24 hours three times a week over a period of several months. On fasting days, they were allowed to drink unlimited amounts of low-calorie fluids such as water, coffee, tea and bone broth, and to eat a low-calorie, low-carb dinner.

On nonfasting days, they were allowed both lunch and dinner, but all meals were low in sugar and refined carbohydrates throughout. (The complete manual of the fasting regimen used is described in Fung's book, "The Complete Guide to Fasting."²) Two of the patients were able to discontinue all of their diabetes medications while the third was able to discontinue three of his four drugs. All three also lost between 10 and 18% of their body weight.

"It was stunning because the time it took to get them off the insulin was between five and 18 days. The longest it took was 18 days ... He had been told he'd be on it for the rest of his life ... We got him off everything in 18 days," Fung says.

"We still follow those three ... They're still off of all their medications. They manage it with their diet. The point is that if you have a disease that causes so much disability – Type 2 diabetes – you can allow your body to simply use up that excess sugar. It's like the body has too much sugar. That's the whole disease. Don't eat, and allow your body to burn it off. Now you have a completely free solution, a completely natural solution ...

I don't know of anything that could be better for the treatment of Type 2 diabetes. It turns out there are all kinds of other benefits [as well] ... Some of the research shows the average person is actually eating for 14 hours and 45 minutes per day. If you start eating breakfast at 8 a.m., you don't stop until 10:45 p.m. on average. This is the average American. That is unbelievable.

The point is [you need to] cycle. You have to put your body in a fed state. That is, you eat and your insulin goes up. Your mTOR goes up. But then you have to fast. There's a daily cycle that we're not respecting. There's a fed state. There's a fasted state ... If you don't ever use that energy that you're putting into your body, you're just going to store it, and then it makes you sick."

Finding the Sweet Spot for Time-Restricted Feeding

Opinions about how long one should fast each day when intermittently fasting varies. Clearly, if your eating window is less than 12 hours, you're doing better than most. As a general rule, the recommended range is between 12 and 18 hours of fasting each day.

I'm of the opinion that 16 to 18 hours of fasting might be the sweet spot, as this allows your body to deplete the glycogen stores in your liver more and suppress mTOR and activate autophagy better. Fung agrees, saying:

"I think that somewhere around 12 to 14 hours is a sort of a baseline ... The next step up is somewhere around 16 to 18 hours. That's so easy to do. Once you get used to it, it's so easy. You can build that right into your day without any

problems at all. I think that's where you're exactly right. Your glycogen stores last about 24 hours.

But if you're following a lower carbohydrate diet, you're not going to build up those glycogen reserves. Therefore, in 16 to 18 hours, you're going to get down to that point.

Remember, when you've gotten rid of a lot of those glycogen reserves, then your body's going to go into this mode where you're going into gluconeogenesis, which is starting to break some of the proteins down, which everybody thinks is bad, but I actually think is a highly beneficial thing, because you will rebuild that.

Then you start to get into burning fat. That's really where you want to be on a daily basis, 16 to 18 [hours of fasting]. It allows you to just jump into the 20- to 24-hour [fasting] range without any difficulty if you're at that baseline already."

How Growth Hormone Is Affected by Fasting

Many hormonal shifts occur during fasting. Paradoxically, growth hormone, which would appear to stimulate mTOR, does increase when you fast – increasing two to three times its baseline level within 24 hours of fasting – yet mTOR is suppressed during fasting.

Fung explains:

"The growth hormone question is really interesting, because it does seem paradoxical. Why would your body make all this growth hormone if you've got nothing to eat? It's because the growth hormone acts through the liver to produce insulin-like growth factor 1 (IGF-1) ... which mediates all the effects of growth hormone. If you knock out IGF-1 and give growth hormone, it has no effect.

During fasting and calorie restriction as well, your liver downregulates the growth hormone receptor in the liver. So [while] the growth hormone level goes way up, your body's not that receptive to it. Therefore, there's not a lot of IGF-1 going on. That's very interesting.

Because then when you eat again, this is when that big surge of growth hormone can start to hit you, and then you can start to rebuild all your muscle and so on ... That's, again, is [part of] this rejuvenation process and this antiaging process."

Since your growth hormone level will remain elevated for up to 48 hours, you can further optimize your fitness by doing strength training on the day you break your fast, as then you will enter your workout with a very high growth hormone level, allowing for maximum muscle growth.

"That's what people do [when] training in the fasted state. They fast for 18 to 24 hours, get the high growth hormone levels, train and then they eat. That's when you got the big growth hormone surge. What they found also was that when you exercise, your body becomes more responsive to this growth, of course, because it wants to rebuild. But it'll last for like 48 hours," Fung says.

"You don't have to eat before you exercise. You can exercise, then anytime within the next 24 to 48 hours, if you eat a lot of protein or whatever, you're going to have that rebuilding, because the growth hormone is there. The body is in that state where it's trying to rebuild."

One slight caution here is that fasting, being a stressor just like exercise, will also increase the stress hormone cortisol. While for most people, exposure to this mild stress every day will make them stronger and healthier, for some it may be problematic, and may require you to tweak your fasting schedule. You may find your body responds better to a once-a-week 24-hour fast, for example, opposed to daily intermittent fasting.

More Information

Fung also discusses the benefits of tea, known for their longevity-boosting effects. Green tea is rich in catechins such as ECGC. Fung likes Pique Tea Crystals, which contain far higher amounts of catechins than regular green tea. Just remember, for tea to be beneficial, you need to drink it "straight," without sweeteners and milk.

Whole leaf teas will also typically be of higher quality than bagged teas. Black tea contains thioflavins, which also appear highly beneficial. "Tea, I think, is one of the underappreciated sorts of things. I think it's just a part of a healthy lifestyle," Fung says, adding:

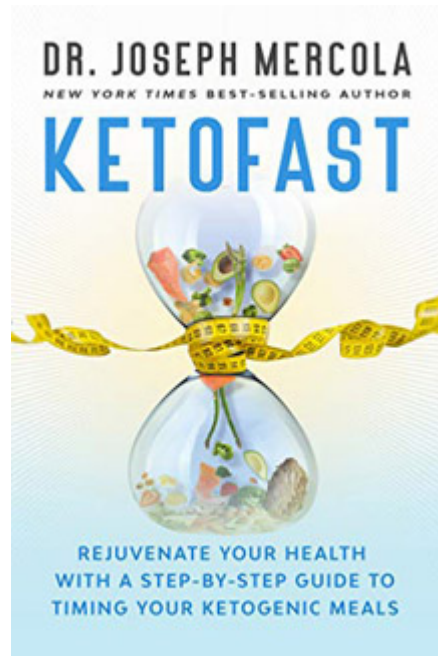
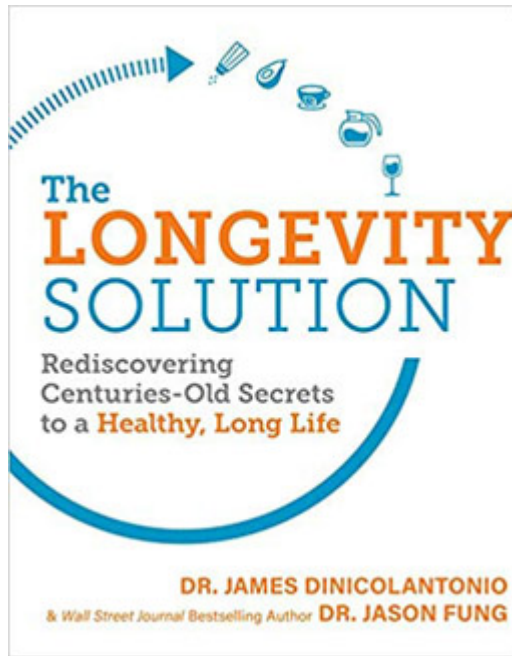
"The book itself, I think, is fantastic. It goes through everything sort of in a shorter form. If you want to get more information on fasting, you can go to 'The Complete Guide to Fasting.' If you want to get more information on salt, you can go to James' book, 'The Salt Fix.' If you want to get more information about healthy fats, you can go to 'Superfuel' or 'Fat for Fuel' ... [[The Longevity Solution](#)'] is sort of a synthesis of all that.

Then what we do is we look at the blue zones, which is these long-lived populations, and ... see how they stack up [against] these simple ideas that we put out there for healthy living.

We also looked at this very interesting study called the 'Ramucirumab monotherapy for previously treated advanced gastric or gastro-oesophageal junction adenocarcinoma' (REGARD), which looked at the Southern diet, which is of the southern United States.

Turns out that fad diet is highly, highly detrimental. Why? It's a lot of processed foods, a lot of processed meats, processed fats, high in salt but not good because it's all processed ..."

If you're intrigued by what you've heard so far and want to learn more, be sure to pick up a copy of "[The Longevity Solution](#)." In addition, my book, "Ketofast" is also available.



Sources and References

- ¹ BMJ Case Reports 2018; doi:10.1136/bcr-2017-221854
- ² The Complete Guide to Fasting, Jason Fung