

The Importance of Exercise and Biological Youth for Longevity

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December 22, 2024

STORY AT-A-GLANCE

- › Maintaining "biological youth" is crucial for longevity. Exercise, particularly moderate activity and 150 to 180 minutes of weekly resistance training, is the most powerful intervention for slowing biological aging
- › Optimal protein intake is about 0.8 grams per pound of ideal body weight. Protein quality matters, with collagen and glycine being especially important but often overlooked nutrients
- › Moderate carbohydrate intake (40% to 55% of calories) is associated with lowest mortality risk. Long-term low-carb diets may impair metabolic flexibility and mitochondrial function
- › Up to 99% of the U.S. population may have some degree of insulin resistance. The HOMA-IR test is a simple way to assess metabolic health
- › Regular sun exposure is critical for health and longevity. Other key factors include adequate sleep, stress management, minimizing environmental toxins, and maintaining gut health

Editor's Note: This article is a reprint. It was originally published July 21, 2024.

I spoke with Siim Land, author of the new book "[The Longevity Leap](#)," discussing key factors for optimizing health and lifespan. Maintaining "biological youth" is the single

most important factor for longevity, but the question is how to achieve this as you get older.

Land's book is 500 pages, with 8,000 references, so it's a good resource to take a deep dive into the strategies that will help keep you biologically young. He's a leader in the longevity field and walks the walk – he implements the programs he talks about and is a stellar example of taking good care of your biology. Chronologically, Land, who lives in Estonia, is 29, but he claims the biological ages of his organs are much lower – 17 years overall, with a 9-year-old liver.

These estimates are based on relatively new epigenetic and biological age tests, which are intriguing, but we don't yet know if the results translate to longer lifespans. I personally do not put much trust in them and believe they are flawed. Land explains:¹

"What does it mean if you have a liver of a 9-year-old? Does it mean that you're going to live exponentially longer than someone else? We don't have that data yet ... I wouldn't put a lot of emphasis on the tests themselves, much rather I would look at the traditional biomarkers, like glucose, inflammation ... and those other things."

Historically, many mistakes have been made in longevity research, particularly the focus on extreme calorie, carbohydrate and protein restriction:²

"The practical outcome would be that you're eating very small amounts of food and you are becoming very frail and skinny. But in the actual world, we're starting to see right now that frailty is a huge risk factor for early death and mortality. And malnutrition itself also increases the risk of a lot of different diseases, all-cause mortality and neurodegeneration and heart disease events.

Right now, I think the field has started to appreciate a lot more of these tangible, practical, functional outcomes, like muscle strength and body composition ... other biomarkers that move more from the theoretical side of biological aging."

Optimal Protein and Carbohydrate Intake for Longevity

Land and I agree that most adults need about 0.8 grams of protein per pound of ideal body weight (the weight you would ideally be, not necessarily the weight you are now), or for Europeans, approximately 1.76 grams of protein per kilogram, for appropriate muscle maintenance and growth.

"If you eat too much, then that could be problematic from the perspective of kidney health and homocysteine levels. If you're eating too little, then that's the risk of the sarcopenia and frailty," Land notes. Regarding carbohydrates, we're also in agreement that low-carb diets are not typically optimal for longevity.

Land cites research showing that moderate carbohydrate intake is associated with the lowest mortality risk. "With carbohydrates as well, it's very commonly thought that eating too many carbs is going to be bad for your health. At least in observational studies, it's the opposite — 40% to 55% of calories as carbohydrates is linked to the lowest risk, usually," he says.³

Land argues that while low-carb diets can be beneficial in the short-term for certain individuals, long-term carbohydrate restriction may impair metabolic flexibility:⁴

"In the short-term, someone might have pre-diabetes or insulin resistance, then in the short-term, it makes sense for them to maybe control the carbohydrate intake slightly to regain some of that insulin sensitivity. But chronic ketosis, chronic low-carb does impair long-term insulin sensitivity as well."

Indeed, adequate carbohydrate intake is crucial for optimal mitochondrial function and overall health. It's the optimal fuel for your mitochondria, but most people don't consume enough healthy carbohydrates. If you're metabolically healthy, most adults need 200 to 250 grams of carbohydrates daily as a minimum, while active individuals need closer to 400 grams. Chronically restricting carbohydrates can lead to increased stress hormone production and muscle breakdown.

Many people experience initial health improvements on low-carb diets, but these benefits are typically not sustainable long-term. The short-term benefits occur because you're no longer feeding harmful bacteria in your gut, which decreases the production of

endotoxins that can damage your overall health. In the long term, however, if you don't consume enough healthy carbohydrates, your mitochondrial health will suffer.

While low-carb diets temporarily alleviate symptoms by starving harmful bacteria, they don't resolve the underlying mitochondrial and gut health issues. A more sustainable approach involves addressing the root causes: improving mitochondrial function, reducing exposure to environmental toxins, including **seed oils**, endocrine-disrupting chemicals in plastics and electromagnetic fields (EMFs), and supporting a healthy gut microbiome balance.

The Most Powerful Intervention to Maintain Biological Youth

When asked how to maintain biological youth, Land states that exercise is likely the most powerful intervention:⁵

"Probably the single most powerful thing for biological aging is moderate exercise. Just maintaining physical activity, it just targets all the hallmarks of aging in a positive way. It improves all the organ function and it also improves the risk of all these chronic diseases as well. It targets everything that you need to do when it comes to slowing down biological aging."

As highlighted in Dr. James O'Keefe's landmark study,⁶ **too much vigorous exercise** can be detrimental, so finding the right balance is key. Land suggests that for vigorous exercise like resistance training, the sweet spot appears to be around 140 to 200 minutes per week.

Land has adjusted his own routine based on this data. "I'm doing about 180, maybe 150 to 180 minutes, of resistance training, and I'm training three times a week ... cycling between upper body, lower body or push-pull leg split," he says.⁷

I've also reduced my resistance training to three days per week based on potential risks of excessive training, but most people need to exercise more, not less. Moderate-intensity exercise like **walking** is an ideal form of physical activity, as it's very hard to overdo it.

The Importance of Protein Quality and Collagen

It's not only protein quantity that's important but also its quality and amino acid balance. Glycine and collagen, which are often overlooked, are among the most important. Land explains:⁸

"Glycine is conditionally essential, not essential, but that's because your body makes 3 grams of glycine per day. But those 3 grams would be used for things, like creatine synthesis. But then you have 12 grams of glycine for collagen turnover, like optimal collagen turnover."

Most people are deficient, as they're likely only consuming 0 to 1 gram of collagen protein daily. About one-third of total body protein is collagen, so it's crucial to consume adequate collagen, from foods like bone broth or grass fed ground beef, which contains connective tissue, or glycine to support connective tissue health.

The Prevalence of Insulin Resistance and Metabolic Dysfunction

The homeostasis model assessment of insulin resistance (HOMA-IR) is a test discovered in 1985, which is the gold standard for measuring insulin resistance. If you use HOMA-IR data, up to 99% of the U.S. population may have some degree of insulin resistance. Using this test is a simple way to assess your metabolic health.

You can figure out your HOMA-IR using two simple tests – your fasting blood glucose, which you can do at home, and then a fasting insulin level, which is an inexpensive test. Multiply those two numbers, and if you're in the U.S., you divide by 405, and if you're in Europe you have different units than the US and need to divide by 22. If the result is below one, you're not insulin resistant. The lucky less than 1% of the population does not have insulin resistance.

Land agrees this is a useful marker, while also emphasizing the importance of looking at multiple biomarkers to assess metabolic health.

The Importance of Sunlight and Vitamin D

We also discussed the critical importance of sunlight exposure and maintaining optimal vitamin D levels. Land, who lives in Estonia at a high latitude, maintains his vitamin D levels through a combination of sun exposure when possible, diet and supplementation when needed.

Sun is one of the most important factors for longevity, probably comparable to exercise. I think it's almost biologically impossible to be healthy if you don't have enough sun exposure. One way to help compensate, if you live in an area where year-round sunlight exposure isn't practical, is using topical lanolin.

If you put lanolin on your skin before going in the sun, it will enhance vitamin D production from sunlight and helps reduce skin drying, cracks, wrinkles and fissures, so it's especially useful if you're concerned about photoaging.

However, if your diet is rich in vegetable oils, you should exercise extra caution with sun exposure. These oils contain high levels of linoleic acid (LA), an omega-6 fatty acid that easily oxidizes when exposed to ultraviolet (UV) light. When sunlight interacts with skin laden with these oils, it triggers their breakdown, resulting in inflammation and DNA damage.

Therefore, it's advisable to limit sun exposure to earlier in the AM or later in the PM if you've been consuming these oils, ideally abstaining until you've eliminated seed oils for four to six months.

Practical Recommendations for Longevity

By focusing on foundational aspects of health – from mitochondrial function and gut health to exercise and nutrient balance – you may be able to significantly improve your long-term health outcomes. Several key strategies to optimize your health and longevity covered in the interview include:

Exercise regularly, including moderate-intensity activity like walking and about 150 to 180 minutes of resistance training per week

Consume adequate carbohydrates (200 to 400 g daily for most adults) from whole food sources to support metabolic health

Prioritize protein quality, aiming for about 0.8 g per pound of lean body mass, with roughly one-third coming from collagen sources

Get regular sun exposure and maintain optimal vitamin D levels

Focus on gut health through diet, lifestyle and possibly targeted interventions

Minimize exposure to environmental toxins, including seed oils, endocrine disruptors and EMFs

Use simple tests like HOMA-IR to assess metabolic health regularly

Prioritize sleep, stress management and overall lifestyle balance

You can find more details in Land's book, "[The Longevity Leap](#)," which provides a comprehensive overview of these topics and more, backed by extensive scientific references. As he describes:⁹

"I covered a lot of specific chronic diseases. I have a full chapter on kidney disease, metabolic syndrome, heart disease, three chapters on heart disease, actually, neurodegeneration and inflammation. I'm going into a lot of deep dives with a lot of these conditions."

As research in longevity science continues to evolve, it's clear that a proactive, comprehensive approach to health is crucial. Rather than seeking a single magic bullet, the path to longevity appears to lie in the consistent application of evidence-based health practices, regular self-monitoring and a willingness to adapt as new information emerges.

Sources and References

- 1, 2, 3, 4, 5, 7, 8, 9 [Youtube, Dr. Mercola Interviews Siim Land](#)
- ⁶ [Missouri Medicine March-April 2023; 120\(2\): 155–162](#)