Update: Prospects for an Improved Healthspan and Lifespan

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Healthspan and Lifespan Extension: Progress Update, Metabolic Health

Recent research and publications have pointed to a common factor behind much of our deadly chronic illnesses, metabolic stress induced by a diet rich in ultraprocessed foods.

Our 4 major diseases of aging (all noncommunicable!):

1. **cardiovascular disease (CVD), causing stroke and heart attack death and disability,**
2. **cancer,**
3. **neurodegenerative diseases (e.g. dementias), and**
4. **metabolic syndrome, MetS (including T2 diabetes and its complications).**

- , MetS

Peter Attia, MD on MetS, its diagnosis and relationship to risks of acquiring more deadly diseases

- **Peter Attia is a founder and clinician at Early Medical, Austin, TX practicing preventative medicine, 'Medicine 3.0' . He has become an influential voice for individualized healthcare through years of online blogs and YouTube channel discussions/interviews. His recent (2023) book *Outlive: The Science & Art of Longevity, Rethinking Medicine to Live Better Longer* has been a best seller.**
- **Video clip from a discussion of MetS, its definition, diagnosis, and the risks it poses for additional major diseases, 0-12m12s from "Ask Me Anything" session 51: https://peterattiamd.com/ama51/**

Our deadliest diseases of aging originate from the Mismatch of our body, forged slowly by Natural Selection, with our fast-changing Culture

Daniel E. Lieberman, PhD is a paleoanthropologist at Harvard U, where he is a Professor of Biological Sciences and a Professor of Human Evolutionary Biology. He has written several popular books on the evolution of the human body and physical activity, including, most recently, *Exercised: Why Something We Never Evolved to Do Is Healthy and Rewarding,* 2021.

Humans have a long evolutionary background which shaped our body, including our complex metabolism, for surviving in ancestral environments. Recent research has shown our body is a serious mismatch for optimal survival in our rapidly evolving modern social environment.

Steven Bartlett, host of the blog Diary of a CEO, produced long interviews with Prof Lieberman discussing his research journey, myths we cherish about human behavior, and how better knowledge of our evolved capabilities can empower us to make better decisions for our health and longevity. Video excerpt, 2023, 1m30s to 16m12s, of:
https://www.youtube.com/watch?v=ujRwf1HdNjk&t=0s

Mechanisms whereby MetS is promoted by added sugar in highly processed foods

Robert H. Lustig, MD, MSL, Prof Emeritis of Pediatrics, Division of Endocrinology, UCSF. Spurred by finding increasing cases of metabolic disease in children, Dr. Lustig persued the cause and built a case for the disruptive effects of recent increases of the sugar fructose in our diet. He has devoted his Emeritis phase of life to educating others about the adverse health consequences of dietary fructose and other dietary disruptors of metabolic health. He has spoken widely and written several books, most recently *Metabolical: The Lure and Lies of Processed Food, Nutrition, and Modern Medicine*, 2021.

Excerpt from a 2023 video blog interview of Robert Lustig by Dr Rangan Chatterjee, British Physician, *This Is Why Everyone Is Sick & Obese Today!* (17m), 9m16s-14m42s:
https://www.youtube.com/watch?v=Lf8BCK5oWUU

Effects of Fructose and its metabolite, Uric Acid, promoting MetS

Richard Johnson MD is a Professor of Nephrology, Univ of Colorado, Boulder. He has spoken widely and written a popular book about his group's research, *Nature Wants Us to Be Fat: The Surprising Science Behind Why We Gain Weight and How We Can Prevent--and Reverse--It*, 2022.

We share a metabolic survival switch with hibernating bears and other mammals, and it is a contributor to MetS and associated diseases of modern society.

Excerpts from LEVELS blog on YouTube, where Robert Lustig interviews Richard Johnson. They talk about the convergence of their research paths on fructose, MetS, and neurodegenerative diseases, *Is Fructose a driver of Alzheimer's Disease?* (May of 2023), 0-5m, 20m18s-24m25s, 34m48s-35m46s: https://www.youtube.com/watch?v=NbWE-J1JpKs)

In Summary: A Mismatch Disease Epidemic

- **Metabolic Syndrome, MetS, is a major cause of morbidity and death, and a risk factor for the three highest ranking diseases of aging**
- **MetS incidence recently increased dramatically, spurring an examination of our quickly changing environment for clues.**
- **The research trail led to:**
  - **Fructose, a type of sugar, recently massively increased in the US diet by processed food manufacturers. Like alcohol, fructose must be preprocessed in the liver (to fat) before entering the bloodstream**
  - **Fructose turns on a survival mechanism shared with other animals, causing us to store fat, forage for and eat more food, focus brain activity on these two tasks, and reduce our metabolic burn rate.**
  - **This mechanism is sustained by other signals stemming from diet, including salt, high glycemic carbs., and internal signals from metabolic products of fructose, including uric acid.**
  - **These observational and experimental findings underlie the hypothesis that the epidemics of MetS and correlated diseases are promoted by prolonged activation of a survival mechanism no longer relevant to our culture, which has suppressed periodic bouts of famine.**

More Information

Preventative Medicine Personalized

- peterattiamd.com

Personalized Optimization of Diet and the Microbiome

- https://zoe.com/

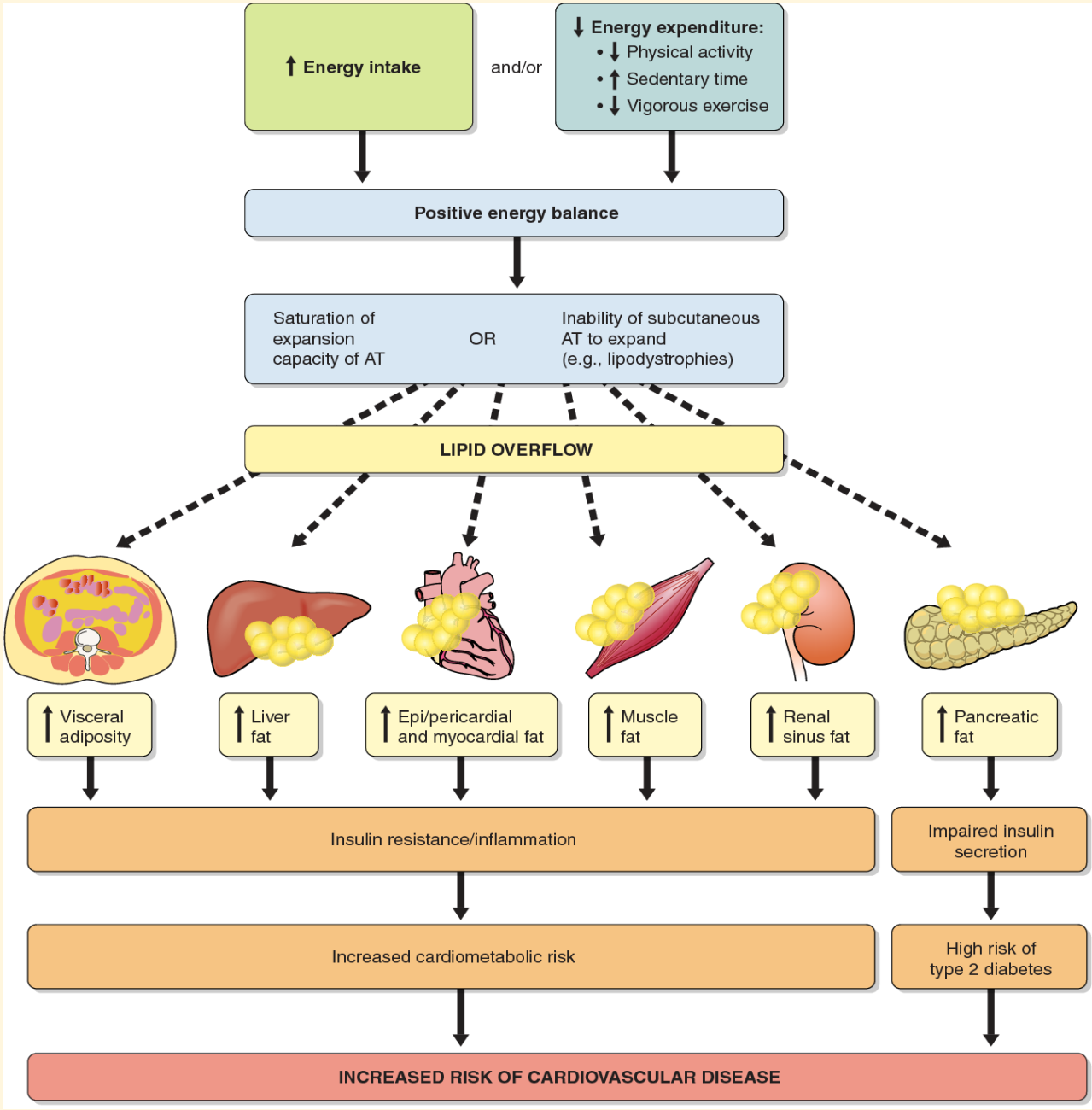
More on Human Behavior, Our Processed Food Rich Diet, Fructose, Uric acid, and Chronic disease

- Drop Acid, book by David Perlmutter MD, 2022
- Robert Lustig interviewed by Prof. Andrew Huberman on his YouTube blog: https://www.youtube.com/watch?v=n28W4AmvMDE
- https://robertlustig.com/
- https://drrichardjohnson.com/
- Richard J Johnson, et al, 2023, Could Alzheimer's disease be a maladaptation of an evolutionary survival pathway mediated by intracerebral fructose and uric acid metabolism?, *The American J of Clinical Nutrition*.

Ongoing Sources of Information on Aging Science, Engineering, and Medicine

- https://longevity.technology/ for news of commercial ventures and relevant research
- https://www.lifespan.io/ for "aging research news, crowdfunding and advocacy"

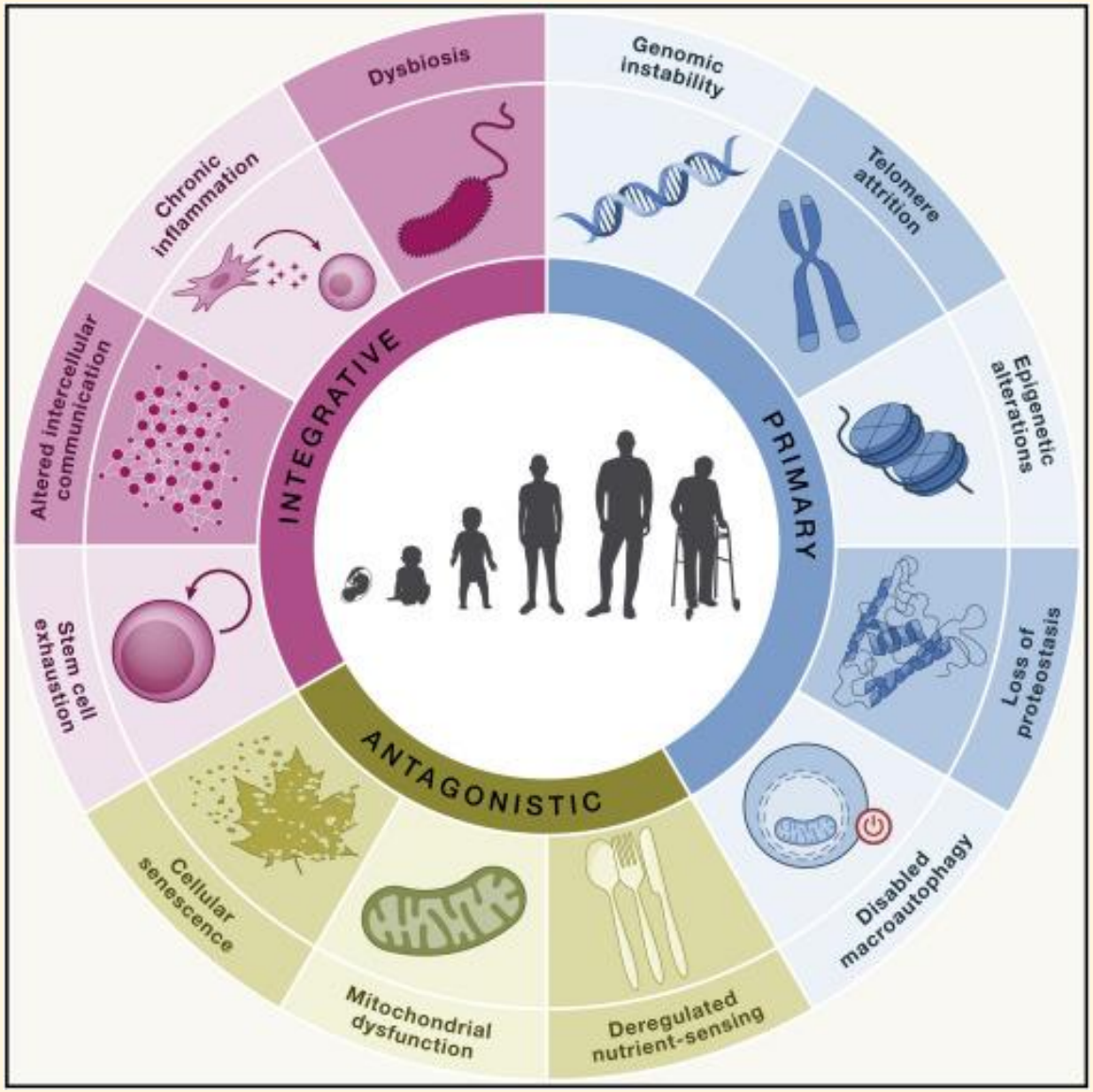
How Excess Fat Increases Cardiometabolic Risk



Source: Tchernof and Despres, 2013, Pathophysiology of human visceral obesity: an update, *Physiol. Rev.*

What is Aging?: Its 12 Hallmarks

Cell-Level changes associated with aging, or "common denominators of aging" in mammals.



The Hallmarks of Aging, Carlos López-Otín, Maria A. Blasco, Linda Partridge, Manuel Serrano, Guido Kroemer, *Cell* , Vol 153, 2013.

Hallmarks of aging: An expanding universe, *same authors, Cell, Vol 186, 2023.*