

Chapter 2.5

Three laws of physiology

(Please comment if anything is unclear or if there are typos.)

In chapter 2 we encountered three fundamental laws that we will use throughout the book:

1. All cells come from cells
2. Biological processes saturate
3. Cells mutate

Law 1 leads to exponential cell growth and the problem of organ size control. Law 2 limits compensation by organ size and opens a fragility to prediabetes. Law 3 requires mutant resistance strategies such as glucotoxicity, creating a fragility to type-2 diabetes.

To these three laws we can add the force of natural selection. Physiology was selected to maximize transmission of genes to the next generation, not to optimize health or happiness. And since physiology was tuned by natural selection to the prehistoric environment, modern conditions can trigger mismatches that lead to disease.

We will see how these laws apply also to autoimmunity, aging and age-related diseases in the upcoming sections of this book.