

# **On Theory**

A selection from:  
**Microcompetition with Foreign DNA  
and the Origin of Chronic Disease**

by  
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## I. Preface

This book presents a theory. The theory identifies the origin of many chronic diseases, such as atherosclerosis, stroke, cancer, obesity, diabetes, multiple sclerosis, lupus, thyroiditis, osteoarthritis, rheumatoid arthritis, and alopecia.

But what is a theory?

Take a set of empirical papers. Present all observations reported in these papers as dots on a plain background. Figure I-1 illustrates a collection of such dots.

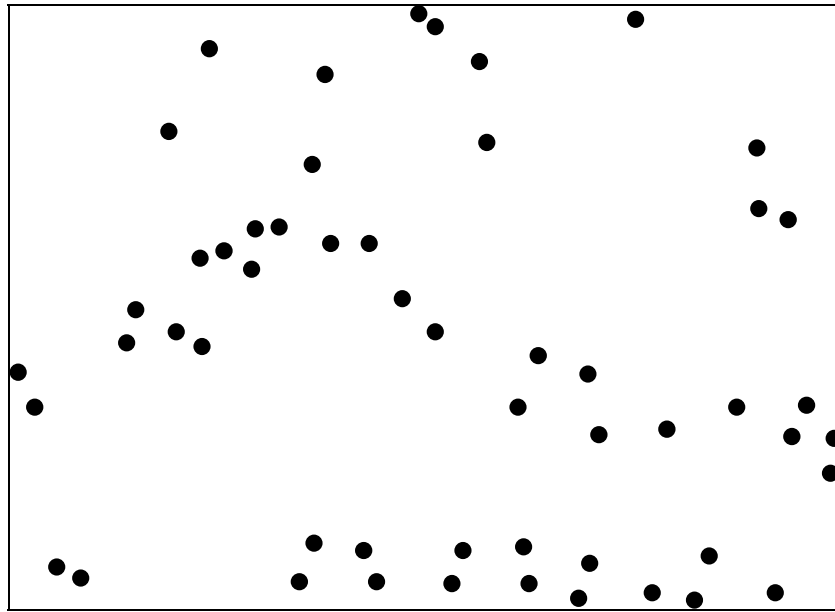


Figure I-1: A collection of observations as dots

Can you connect the dots? Do you see a picture?

Dots represent observations, or facts. A collection of lines, connecting a set of dots, represents a theory. A theory is a picture anchored in a set of dots. Figure I-2 presents a theory anchored in the dots illustrated in Figure I-1.

Theory as a picture is an old idea. In Greek, the root word *thea* means “to see.” *Theoria*, a related word, means spectacle, or viewing from a distance, as a whole. Distance is important. Being too close to any one dot is distracting. Only from a distance, one can grasp the entire picture. Remember the artist’s practice of stepping back from the canvas when examining the painting?

Empirical studies produce dots. Theoretical studies produce lines. A line is a relation between dots. A theory relates seemingly unrelated observations. According to

Webster's dictionary, a theory is "the analysis of a set of facts in their relation to one another." An observation is a fact. The set of lines connecting facts is a theory.

What about predictions?

Every line connects two dots. However, a line by itself is a collection of an infinite number of other dots. Each such new dot is a prediction. The unfilled dot in Figure I-2 illustrates a prediction.

The unfilled dot also clarifies a common confusion between theory and hypothesis. The confusion is so ingrained, that according to Webster's dictionary, theory also means "speculation," or "unproved hypothesis." The picture is a theory. A new dot at a certain spot on a certain line is a hypothesis. No theory, no hypothesis.

Was the theoretical method ever used in biology to produce a major discovery?

Yes, by Watson and Crick. In their single page famous paper, they include one paragraph describing their scientific method.

"The previously published X-ray data on deoxyribose nucleic acid are insufficient for a rigorous test of our structure. So far as we can tell, it is roughly compatible with the experimental data, but it must be regarded as unproved until it has been checked against more exact results. Some of these are given in the following communications. We were not aware of the details of the results presented there when we devised our structure, which rests mainly though not entirely on published experimental data and stereochemical arguments." (Watson 1953<sup>1</sup>, underline added).

Friedman and Friedland, the authors of the book "Medicine's 10 greatest discoveries," provide the following comments on the approach used by Watson and Crick (Friedman 1998<sup>2</sup>, underline added):

"Perhaps never before in the history of science was such a great scientific discovery achieved with so much theoretical conversation and so little experimental activity" (p. 214).

"Never before has such a discovery been made by the simple combination of blackboard scrawling, absorption of the experimental work of others, perusal of other scientist's publications, and manipulation of plastic balls, wires and metal plates. Not once in their several years of working together did either Watson or Crick touch or look directly at a fiber of DNA. They did not have to: Avery, Chargaff, Asbury, Wilkins, and Franklin already had done this part of the process for them" (p. 224).

What is the general attitude towards theories?

The first reaction is suspicion, doubt, disbelief. Richard Feynman is considered by many as one of the greatest theoretical physicists of the second half of the 20<sup>th</sup> century. Mark Kac wrote on Feynman:

“There are two kinds of geniuses: the ‘ordinary’ and the ‘magicians.’ An ordinary genius is a fellow whom you and I would be just as good as, if we were only many times better. There is no mystery as to how his mind works. Once we understand what they’ve done, we feel certain that we, too, could have done it. It is different with the magicians. Even after we understand what they have done, it is completely dark. Richard Feynman is a magician of the highest calibre.”

The same Feynman writes in his book “Surely You’re Joking Mr. Feynman!”:

“I’ve very often made mistakes in my physics by thinking the theory isn’t as good as it really is, thinking that there are lots of complications that are going to spoil it - an attitude that anything can happen, in spite of what you’re pretty sure should happen” (underline added).

Even the great Feynman was suspicious of theories.

Another example is the reaction of the scientific community to atomic theory. According to Albert Einstein (underline added):

“The antipathy of these scholars towards atomic theory can indubitably be traced back to their positivistic philosophical attitude. This is an interesting example of the fact that even scholars of audacious spirit and fine instinct can be obstructed in the interpretation of facts by philosophical prejudices. The prejudice – which has by no means dies out in the meantime – consists in the faith that facts by themselves can and should yield scientific knowledge without free conceptual construction” (Einstein 1951<sup>3</sup>, p. 49).

Avoid the lines. Dots are enough.

Can we really avoid the lines?

According to Henri Poincare, one of the greatest mathematicians of the early 20<sup>th</sup> century:

“Science is built of facts as a house is built of bricks; but an accumulation of facts is no more science than a pile of bricks is a house” (from La Science et L’hypothese).

To conclude: empirical biologists produce dots. Theoretical biologists produce lines. Together, we unravel the mysteries of nature.

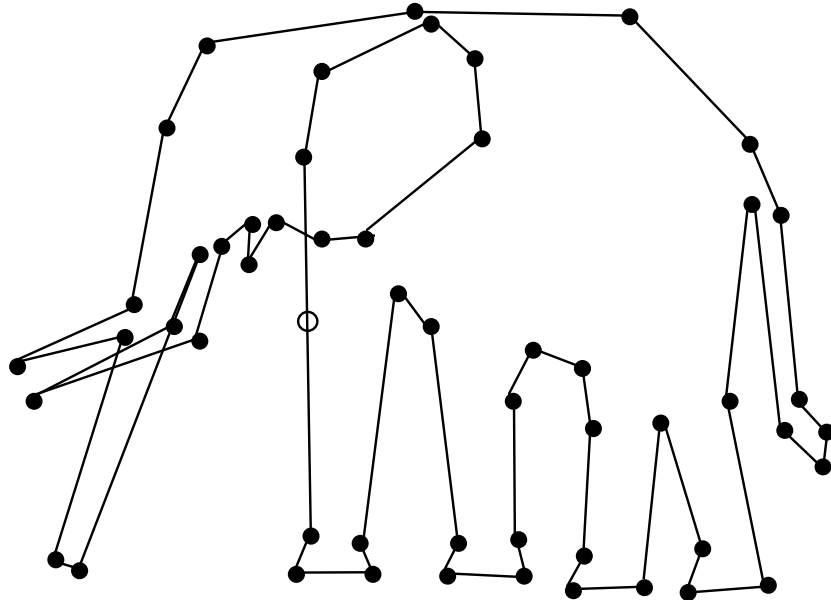


Figure I-2: A theory

(The following section is included in the second edition of the book.)

What about the role of “preliminary data”?

Concentrate on the fragment of the theory that includes points A, B, and C. See Figure I-3.

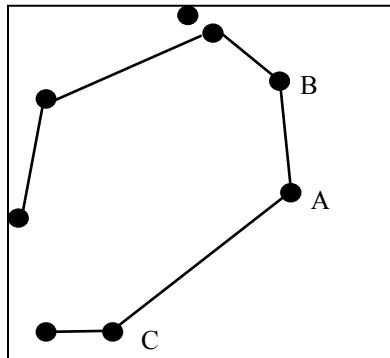


Figure I-3: A fragment of the elephant theory

What is your prediction? What should you attempt to measure next? How would you decide without having the theory to guide you? In Figure I-3, a theory is represented by lines. Therefore, no theory means no lines. Where would you position your prediction without having the lines to guide you? We denoted a prediction, or hypothesis, with an open circle. Figure I-4 presents a few of the possible predictions in this space. The actual number of predictions is of course infinitely larger.

Which prediction would you bet on? Without a theory to guide your selection, you will most likely bet on a prediction which is “near” an existing observation. This strategy is supposed to increase your chances for success. This is the famous “preliminary data” strategy frequently adopted by grant reviewers.

“A grant proposal must contain preliminary data from work already done, a hypothesis or set of hypotheses, and a description of work to be done in the future. Usually in the “goals and specific aims” section, the author can point out that the work in the proposal is directed at the next logical and reasonable, if not obvious, extension of the preliminary studies.”<sup>4</sup> (underline added)

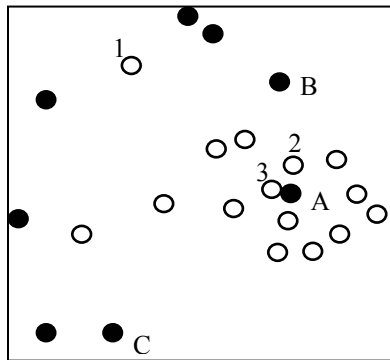


Figure I-4: Predictions, predictions, predictions.

In terms of Figure I-4, you will, most likely, bet on prediction 3. Consider the same set of predictions when the theory is known (Figure I-5). The study testing prediction 3 will fail. Instead of prediction 3, you should have chosen prediction 2, or even 1! Although prediction 1 is “far away” from any known observation, or is considered “high risk” or a “wild guess” according to the “preliminary data” strategy, the study testing it will, most likely, succeed. How do you know that “it will most likely succeed?” Because the theory said so.

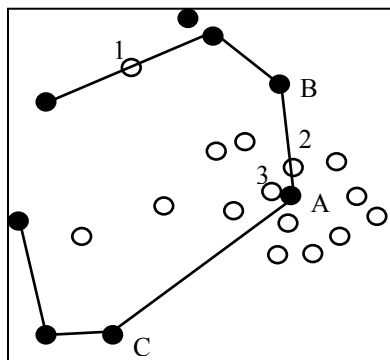


Figure I-5: Theory and predictions, predictions, predictions.

## XVIII. Concluding remarks

This book presents a theory that identifies the origin of many chronic diseases.

But, is it a good theory?

According to Albert Einstein:

“A theory is more impressive the greater the simplicity of its premises, the more different kinds of things it relates, and the more extended its area of applicability” (Einstein 1951, *ibid*, p. 33).

The theory presented in this book is based on one basic premise: microcompetition with foreign DNA causes chronic disease. The derived conclusions (the subsequent events in the different sequences of quantitative events) relate numerous seemingly unrelated observations reported in studies with animals, humans, *in vitro*, *in vivo*, on a molecular level, cellular level, clinical level, on atherosclerosis, cancer, obesity, osteoarthritis, type II diabetes, alopecia, type I diabetes, multiple sclerosis, asthma, lupus, thyroiditis, inflammatory bowel disease, rheumatoid arthritis, psoriasis, atopic dermatitis, graft versus host disease, and other chronic diseases. To use Einstein’s criteria, a theory based on a single premise, which relates so many seemingly unrelated observations, from such a diversity of topics, is a good theory.

Last question: why should we study this theory?

Because,

“The truly great advances in our understanding of nature originated in a way almost diametrically opposed to induction. The intuitive grasp of the essentials of a large complex of facts leads the scientist to the postulation of a hypothetical basic law, or several laws. From these laws, he derives his conclusions, ... which can then be compared to experience. Basic laws (or axioms) and conclusions together form what is called a “theory.” Every expert knows that the greatest advances in natural science ... originated in this manner” (Einstein 1919<sup>1</sup>).

When we understand nature, chaos turns into order, fear into confidence, and disease into health.

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<sup>1</sup> Watson JD, Crick FHC. Molecular Structure of Nucleic Acid. *Nature*, 1953, 737-738.

<sup>2</sup> Friedman M, Friedland GW. *Medicine’s 10 greatest discoveries*. Yale University Press. 1998.

<sup>3</sup> Einstein A. Autobiographical notes. In, Schilpp PA (ed). *Albert Einstein: Philosopher-Scientist*. Tudor Publishing Company, NY. 1951.

<sup>4</sup> Sowers AE. How NIH evaluates proposals. *Scientist*. Oct16, 1995. 9[20].