
Carbs, Fats, and Proteins: How Misappropriation of Biochemistry Distorts Our Relations with Food

Open Access Teaching Case Developed for the Tech for Humanity Pathways Minor

Funded by the Andrew Mellon Foundation

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Background

These days in popular discourse on food, scientific explanation of some sort is employed to show its health benefits or dangers. Often the molecular nature of food is invoked: protein, vitamins, fats, fibers (polymers), etc. Such disproportionate reliance on biochemical explanations as “nutrition or food science” ignores many aspects of food, as well as many discoveries and achievements of contemporary science.

From Vitamins to Nutritionism

It is hard to underestimate the historical role and importance of biochemical analysis of food. That was indeed science for the people, when vitamins were described and synthesized, that brought better nutrition to more people than ever.¹ Despite all the controversy around GMOs, they do make food more accessible for many. But these achievements of biochemistry should not make us believe that it is the only science of food. Some historical roots of cooptation of biochemistry into nutritional guidelines are traced to powerful interests of food lobbies—this is well-documented.² As Michael Pollan puts it in his critique of the ideology of nutritionism: “Notice too how the new language exonerates the foods [beef, chicken, and fish] themselves. Now the culprit is an obscure, invisible, tasteless - and politically unconnected - substance that may or may not lurk in them called saturated fat.”³ This political neutrality of molecules made them reign

¹ See Nobel Prize website for a good summary of research on vitamins.

<https://www.nobelprize.org/prizes/themes/the-nobel-prize-and-the-discovery-of-vitamins/>

² Michael Pollan’s “In Defense of Food”, 2008.

³ Ibid., p. 24

not only in nutritional recommendation policies and popular discourse on food, but in the food science itself.

The rhetorical reduction of food to molecules happens on several levels. It is not just reduction of a food item to molecules, but essentially to **one molecule**. Thus, chicken is no longer a “bird” that has wings, feathers, etc. It is not even a “meat”, made of blood, muscle tissue, cartilage, DNA, proteins, and a long list of other organic and inorganic molecules—but it is a “protein”. Such essentialization is on the one end of the spectrum, and nutritional epidemiology lies at the opposite pole.

1. Notice how you and people around you talk about food. Do you use biochemical terms, like “protein”, “carb”, “gluten”? Do you know their biochemical definitions?
2. Think about the cultural significance of food and shared meals? What are your favorite holiday/festival meals, drinks?
3. What can a food or staple diet say about a given society? Does it reflect values? Economic relations?

Molecular Food Science and Personalized Diets

Although contemporary food science does recognize a certain complexity and diversity regarding food, people, their habits, and even the bacteria in their guts, and although it is cautious of one-size-fits-all recommendations, it still accepts the molecular view as its basis. This is not a purely epistemological commitment, but rather a result of ideologies. For example, to vindicate previous unsuccessful attempts to install biochemistry as “the food science”, it is now posited that the problem was not with science and its methods, but rather with diversity of human physiology and eating habits. Previous conflicting studies, where a “bad” molecule at first would soon be discovered to be a “good” one, are now replaced by a rhetoric of personalization. “What is a good food for you might be a bad food for me.”⁴ Aided with machine learning algorithms, tracking apps, and molecular testing tools, new studies marry biochemistry and big data to produce a personalized (reshuffled and rescheduled) diet that allows us, as consumers, to indulge in desired eating without significantly challenging our diet and

⁴ I specifically refer to a study of personalized nutrition with the use of blood-glucose tracker. Full text can be found here [https://www.cell.com/cell/fulltext/S0092-8674\(15\)01481-6](https://www.cell.com/cell/fulltext/S0092-8674(15)01481-6) and the gist of the study is here:

<https://www.youtube.com/watch?v=Ryc5M3Ciytg>

Authors also produced a popular diet book:

https://www.google.com/books/edition/The_Personalized_Diet/LgmXDgAAOBAJ?hl=en&gbpv=0; also see this platform: <http://personalnutrition.org/Home>

understanding of food. Such engaged science and personalization allow the further commercialization of data derived from our personal eating preferences, and that in turn influences our food choices. A quest for a unified biochemical view of food resulted in claims of relativism, perhaps intellectually lacking, but conducive to profits.

1. Have you used self-tracking technology?
2. Did you use food-related apps or blood-glucose trackers?
3. If yes, share your experiences.

Personal is Political

This view of food would not carry so much ideological force if it were only the food corporations and their scientists promoting it. However, we as consumers also buy into it, because it makes our lives easier, freeing us from guilt and thoughtful social action. By abstracting food into molecules, we forget its other qualities. Not all bell peppers are created equal. They may be fresh, organic, GMO, local, imported, ethically sourced, fair trade etc. Besides these categories and framings there are plenty more, perhaps more important ones, that we don't think to ask about. Who are the people who planted our food? Who are those who collected it and brought it to us? Where are they? What were their labor conditions like there? Where are seeds coming from? Water? Soil? But by abstracting a bell pepper into a "carb" we make it into a uniform object across these differences. This hides so many layers of reality between a molecule and the actual juicy, shiny, vividly colored vegetable we hold in our hands, and it reinforces blind consumerism.

1. How do you understand the meaning of "Personal is Political"?
2. Do you think it is possible to bring a change to important issues (e.g., overconsumption or climate change) through personal, individual choice and action? Or would it be more effective to organize into groups/coalitions?
3. Do you investigate your food, especially produce labels? Where does it come from? Why is that important?

Rational Nutrition

The impulse to categorize and quantify molecular and caloric intake of food is a modern phenomenon. Through much of human history, one's daily ration was dictated by necessity. The relatively recent, modern abundance and variety brought about by industrial production, along

with the valorization of scientism, led societies to devise a system of “rational” nutrition. However, it is worth remembering that the numbers and percentages in these calculations are subject to the influence of many interests.⁵ This empiricist theory of food should not mislead us into believing that we eat for enjoyment any less than before. Although knowing the basic composition of what you consume is appealing to a modern mind, it only creates an illusion of control and completeness of understanding. This view of food is limited and self-absorbed, and still based in consumerism.

The modern, biochemical view of food enabled further molecularization of enjoyment. For example, molecular gastronomy uses laboratory techniques in a kitchen to produce a “modern sensory experience”.⁶ This trend found prominence in fancy restaurants rather than in the tubes of food slurries seen in futuristic visions. Concomitantly, molecularization enabled reduction of the science of food to the science of taste buds.

1. How do you portion your daily meal intake? Do you follow any diet or have any nutritional restrictions?
2. Do you cook? What recipes do you prefer, why?
3. Have you tried viral recipes/snacks, such as frozen fruit roll-ups? What can the virality of food content tell you about how recipes spread? Why were young people so excited about that DIY processed food snack?
4. Do you watch/follow food content creators? Has it affected how you eat?

What's next?

The prestige of biochemistry in food science is waning. Groundbreaking research on dietary deficiencies and vitamins is a matter of the past. Politicization of GMOs made any clear-cut conclusions impossible. Vitamins became less medicalized and migrated from the world of essential nutrition to the fashionable world of supplements and superfoods. As it turned out, it is much harder to make sense of the molecular dynamics in food (or any other matter), when each molecule is only looked at in isolation. Contemporary attempts to support molecular reductionism with studies on gut microbiomes, circadian rhythms, eating habits, modeling, machine learning, physics of complexity, etc., barely start to fill in blanks, and I would argue

⁵ Food lobbies' fights over food pyramid and “my plate” system are documented in M. Pollan's “In defense of food”.

⁶ I couldn't resist quoting this phrase by Vsause2 <https://www.youtube.com/watch?v=vbvQIKzSmkO>

those methods are not sufficient to evaluate how we eat and why. The biochemical view of food is in need of major rethinking.

Reducing our concept of food to simple molecules not only reflects categories of modern science, in particular biochemistry, but also reflects consumerist selfishness in an unsustainable paradigm of indulgence. Food is idealized and devalued at the same time. We idealize “protein” in chicken, but at the same time that oversimplifies chicken into just another “protein”--- a mere product. Simplistic molecular framing of food is unsustainable. It ignores the richness and complexity not only of the living matter of food or the inorganic matter of soil, but also the people and human-made infrastructures that bring the food to us. To value food we should recognize its complexity, not simplify it to essential molecules.

1. Some cultures categorize food into “hot” and “cold”, not based on its temperature at the time of consumption, but based on the effect they feel it has on the body. Can you think of other ways of thinking about food without invoking biochemical vocabulary?
2. Food biochemistry is an important part of food science, no questions about that. But its simplified use in everyday discourse is displacing something else that might be as important. Where do you think the balance is? Would education of the public about food science change that?
3. What else can help make food systems more sustainable?
4. Why are details about agriculture almost absent in the mainstream news? Do we take it for granted? Unlike Big Tech, which receives a lot of public attention and admiration. What are other “invisible” but important infrastructures that should be discussed more?