Bio Agri Zero
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Scientific paper - summary and reasons of interest

Title
The Unmapped complexity of our diet

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REASONS OF INTEREST

As I deal with and do research on patterns of networks and connections in cities, I became really interested when we started studying about metabolism. I started doing a small research on the topic and really soon started reading about metabolism architecture, a post-war Japanese architectural movement which is based on the the mechanism and structure of our organisms' metabolism. To know more about the topic, I started reading the Metabolism in architecture a book by Kisho Kurokawa.

So I started reading scientific papers about network theories in our cities and the biomimicry of metabolism in our cities during the week of Bio zero about. Most of the papers I read were from Barabási Albert László, a Hungarian Network scientist, known for research of network theory the concept of scale-free networks. While studying about metabolism in our organisms, and how our bodies are working in really similar structures as our cities, I developed my assignment topic, which is based on the importance of our intestinal tract's health and operation, how it effects our whole body system and health.

When I was developing my assignment about gene modification I found I scientific paper from Barabási Albert László about the Unmapped complexity of our diet. I am really curious about the how modern medicine treats our dietary questions and examine our health conditions based on our guts' health. Such an example as, having issues with headaches and migraines can be traced back to histamine intolerance… "*Food affects our health through multiple molecular mechanisms:some chemicals serve as a direct source of intermediates for human metabolism, while others, such as polyphenols, play a regulatory role. Yet many food molecules also feed*

the microbiome in our gut, which metabolizes these compounds into other species that can be further transformed by mammalian metabolism."[1]

SUMMARY

The reason of the study
The reason of the study is to expand our understanding about the nutritions and their complex system we have in our diets under the aegis of a newly developed AI system. The study questions the trend of being more and more aware of our diets and how it affects our health and disease.

The hypothesis
The study states that most of our understanding about our diets rely on 150 key nutritional components that are tracked and catalogued by the United States Department of Agriculture and other national databases. In the study we can read about new ways of collecting data, such as machine learning that can create a high-resolution library of these biochemicals. The library could enable a more systematic study of the full biochemical spectrum of our diets and by that better understanding of our health condition and diseases and not just rely on trends created by the above mentioned databases.

Introduction
In the study we can read about the fact that, the notable chemical diversity in living organisms, is due to their survival instinct, they contain way much more nutritional components than we need in our diets. For example, to be able to survive in their living environments, they use the so called chemical defence and when doing so.. they produce a wide range of flavonoids, terpenoids and alkaloids. The group of plants have roughly 2,000 chemicals detected. Yet, 85% of these chemicals remain unquantified due to FOODB-an open-source database that collects data on the chemical composition of unprocessed foods, meaning that while their presence has been detected or inferred, their absorption in specific food ingredients remained unknown. The study examined garlic as an example, to show how much 'unquantified' chemical components are not informing the databases.

The method and findings
To be able and create a systematic in-depth research to identify and document the distributed data across multiple scientific communities and literature sources, the researchers came up with a pilot project called FoodMine, which uses the language that is able to process and to mine the full scientific literature. As an example of the findings of the AI

[1] The Unmapped complexity of our diet - Ibert-László Barabási, Joseph Loscalzo, Giulia Menichetti

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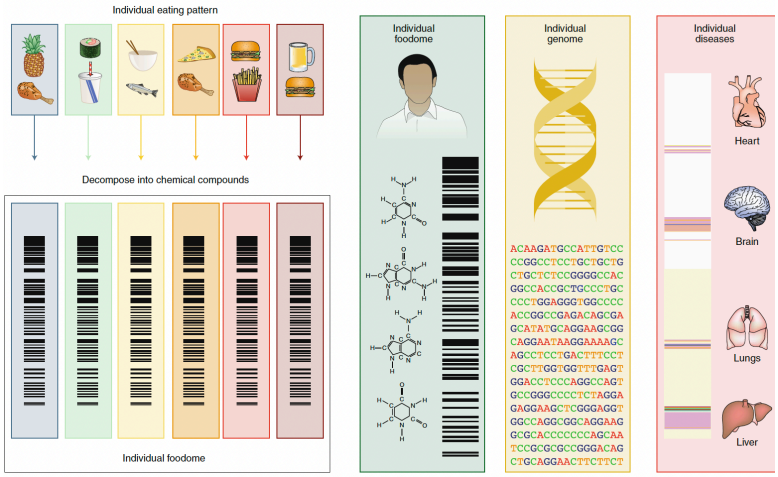
system: *“there are at least six distinct biochemicals in our diet involved in the TMAO pathway: L-carnitine, choline, TMA, TMAO, allicin and 3,3-dimethylbutan- 1-ol (DMB). Yet, only one of them, choline, is tracked and quantified in nutritional databases. The remaining five, despite the key roles they play in health, are effectively nutritional dark matter.”*[2] TMAO was known before as a key player in the development of heart problems.



Discussion and conclusion

There are challenging parts of the experiment, such as and low-output methods of examining and scanning chemical resolutions that are catalogued by the pilot project. Also, the impact of food processing on the thousands of chemicals found in the nutritional dark matter.

Being aware of our own circumstances, such as our eating patterns, our individual “foodome” (food supply, personal choices, modulated by geography, culture and socio-economic status), and our genome… so the affect of these chemicals on our sub-cellular networks can lead our modern medicine and our own understanding to required actions about our diet to improve health.

[2] The Unmapped complexity of our diet - Albert-László Barabási, Joseph Loscalzo, Giulia Menichetti