The role of AI in food quality and security

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Founder and CEO Siftlink

Siftlink: Building AI assisted targeted innovation strategies

(AI-) Discovery

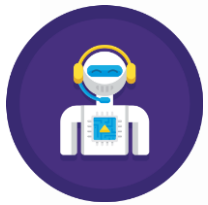
Find drugs, natural compounds, connections between chemicals, genes and applications

Innovation analytics & intelligence

Patent opportunities, Emerging scientific and patent trends, partnership & licensing opportunities

Clinical success indicators

Early assessment of development risks



Sensi - SaaS

Specialized AI research assistant aimed to provide highly specific information, real-time at the right form.

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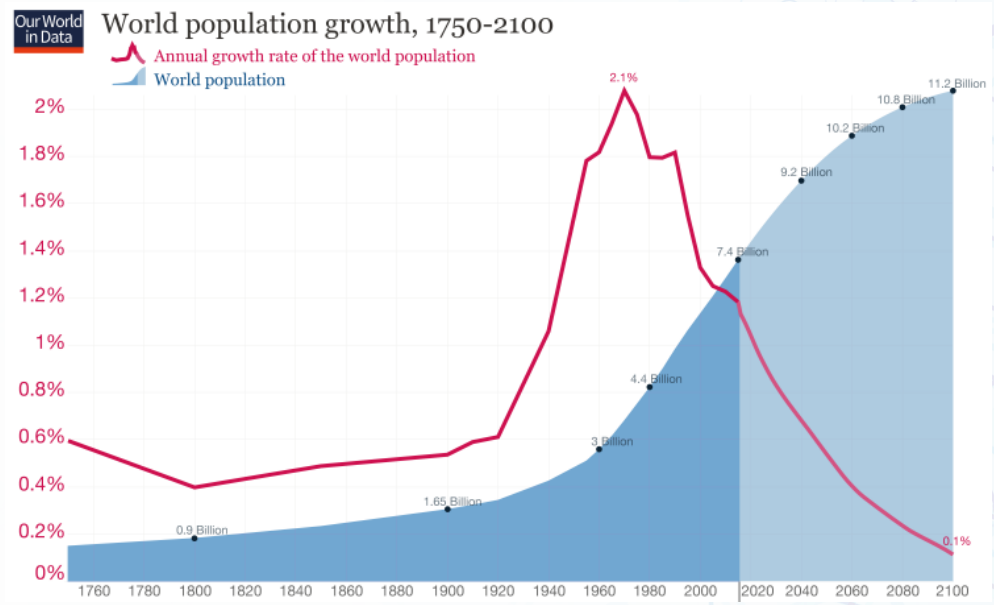
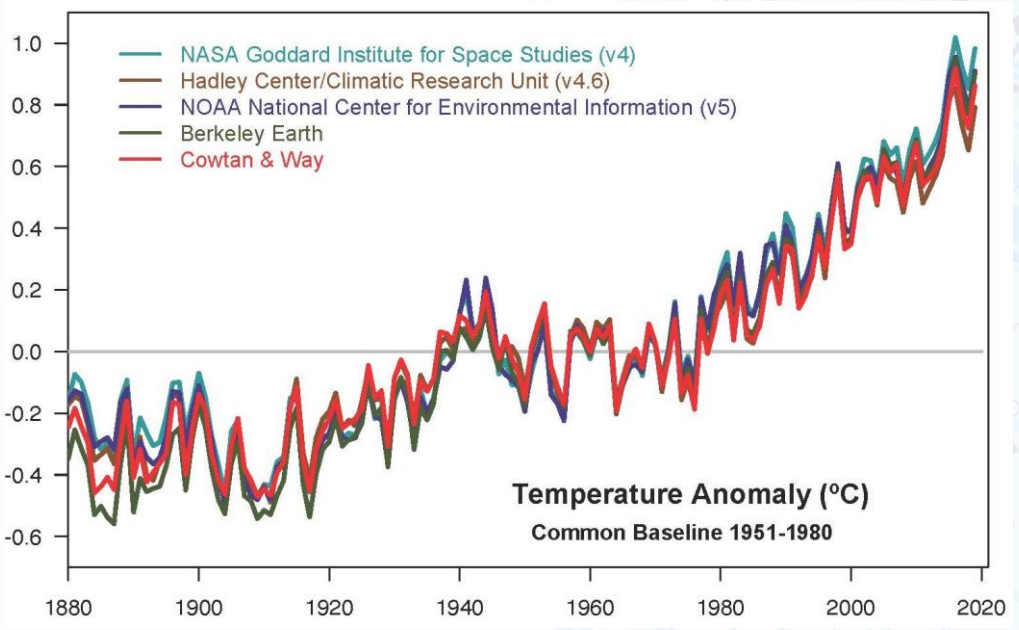
Global food challenges are piling up ...

1. Growing population and hidden hunger.
2. Climate change affecting agricultural production.
3. Geopolitical dynamics, making global food supply volatile.





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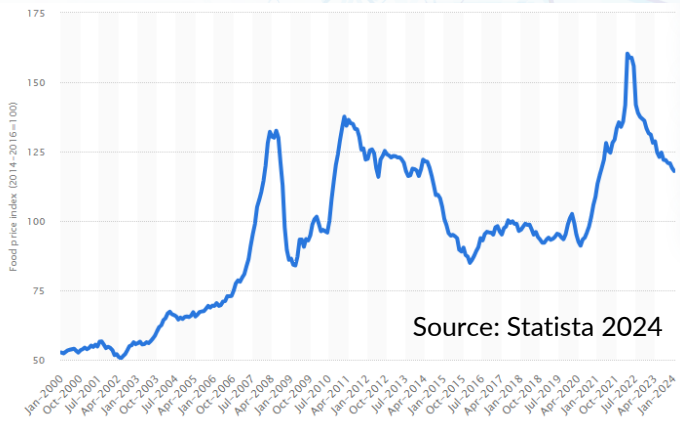
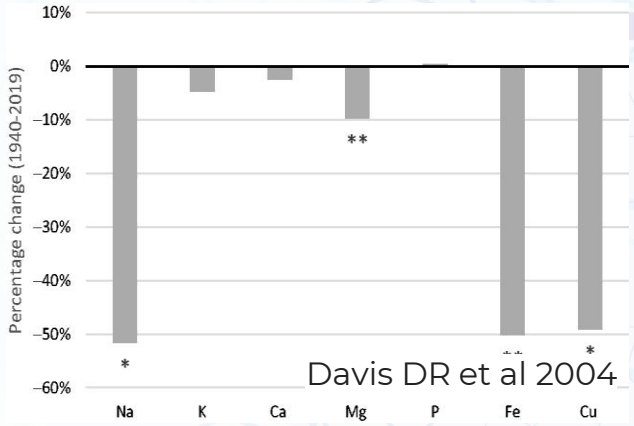
… faster than the technology addressing them is developing

Sustainable foods

Food price inflation



Food nutritional value



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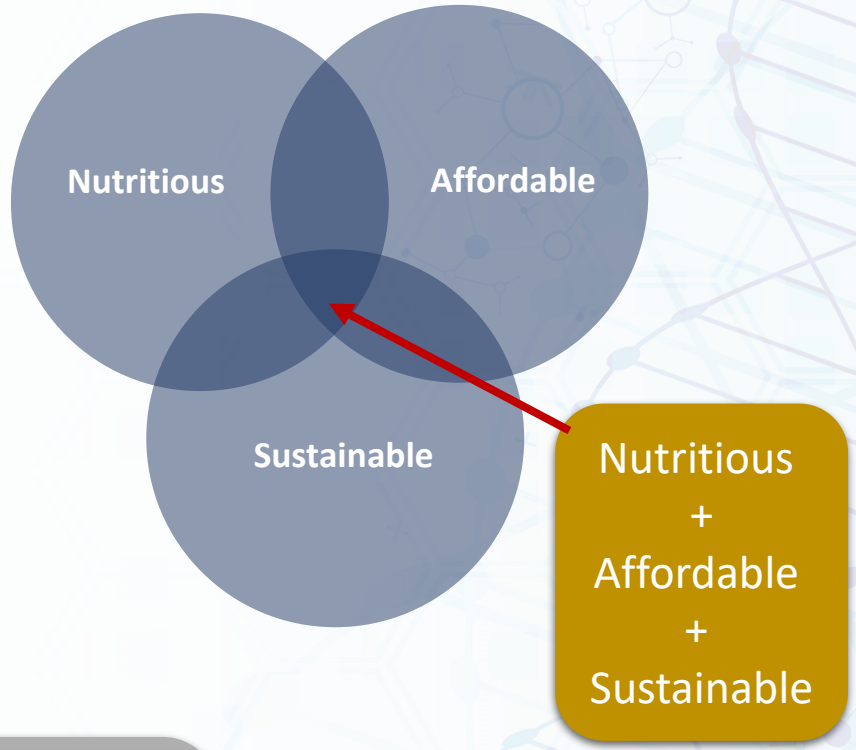
Why?

1. Difficult to bring together affordability, quality, sustainability, consumer preference in food.
2. Inherently inter-connected problem.
3. Developing innovative products can take too long and with lot of trial-and-error.



> *"We are drowning in information, but we are starving for knowledge"*
>
> Rutherford D. Roger

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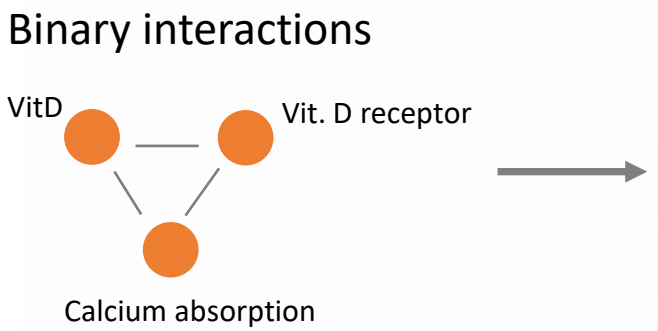
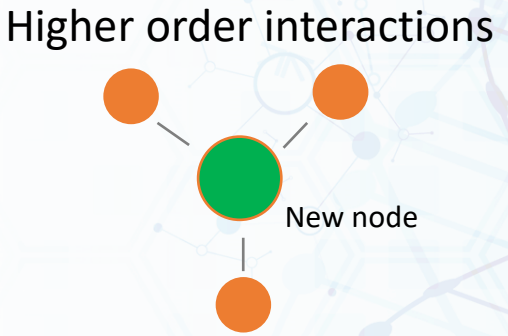
Recent emerging properties of AI can fundamentally change how we innovate

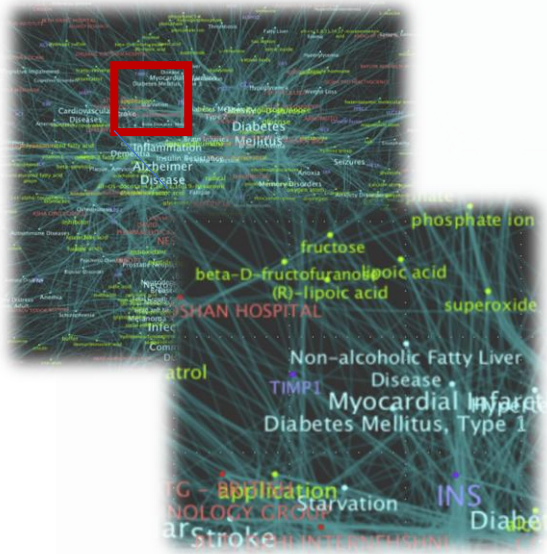
A breakthrough on what knowledge means for systems

- AI fundamentally changes the way we capture, represent and use knowledge.
- The way we (and our systems) understand the world around us.

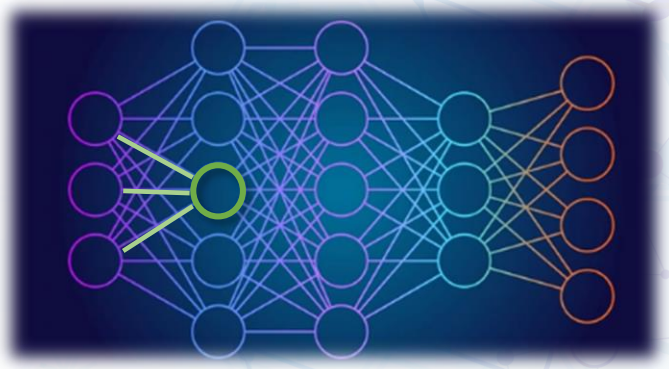




GPT3: 50’000 nodes



GPT3: 175Bn nodes



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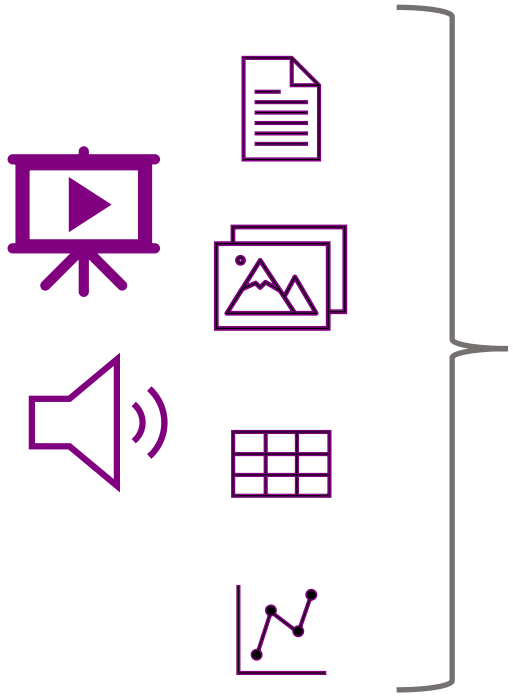
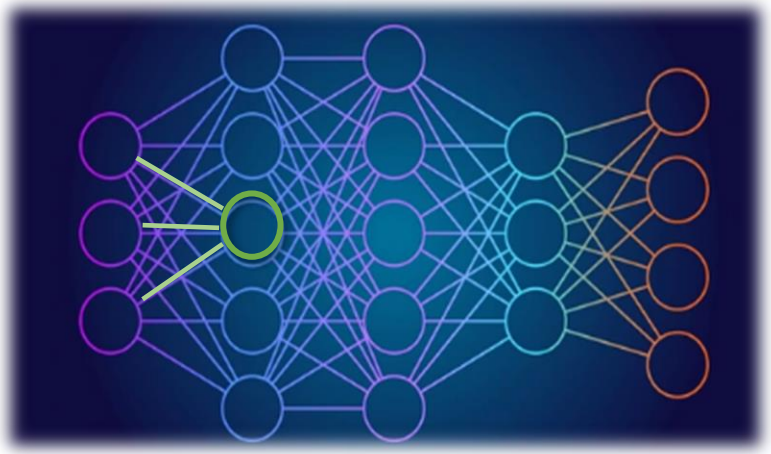
1. Foundation models: Multi-scale, multi-purpose modelling

1. Trained on massive, heterogeneous data.
2. Can predict diverse things (text, chemical structures, properties).
3. Foundation models in Biology and Medicine being developed.





- *"Explain the role of Vitamin D in calcium absorption"*
- *"What would be the effect of mutation Arg274Leu in Vitamin D receptor?"*
- *"How can I increase the bioavailability of astaxanthin?"*

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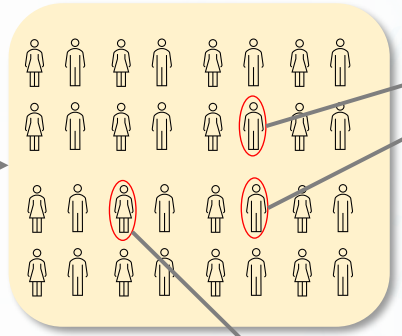
2. Model customization with limited data & generative properties

Few – shot learning

Generative AI

AI driven design hypothesis generation

Automated Targeted interactions (Real World Data)



“Check your blood”

“Do you feel tired right now?”

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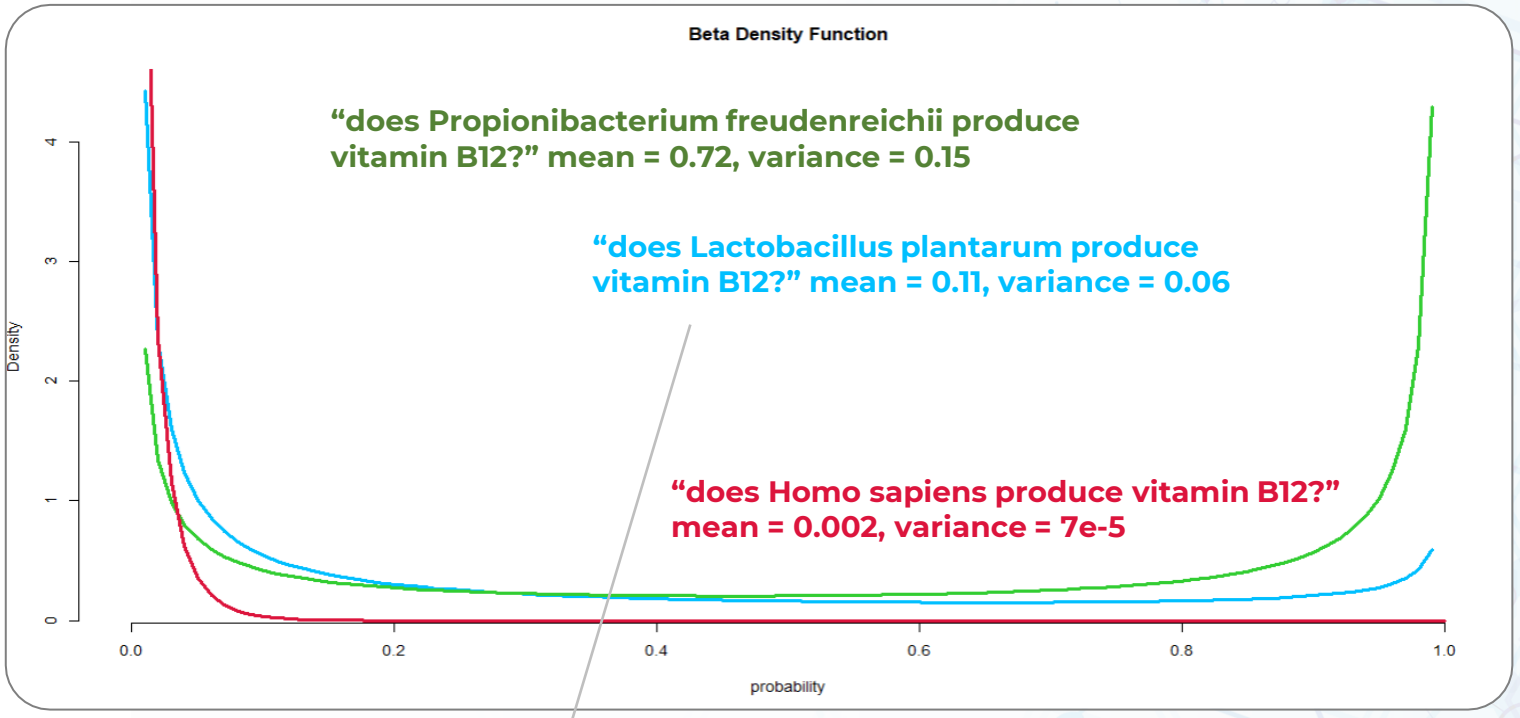
3. Exploration of “what-if” scenarios through reasoning

Chain-of-Thought: A "chain of thought" is a step-by-step reasoning process used to solve problems or make decisions by logically connecting ideas or pieces of information.

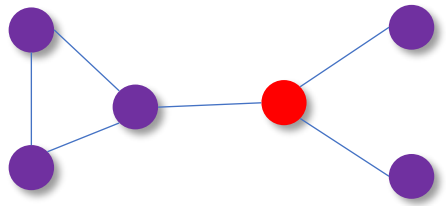
Probabilistic reasoning: is the process of making decisions or drawing conclusions based on the likelihood or probability of various outcomes. Taking decisions under uncertainty.



*GPT-4 responds “No”, But there is some sparse literature around it

The riboflavin and folate content of the mixture increased significantly after fermentation. Relative to control samples, riboflavin increased by 76–113%, to 91.6 ± 0.6 μg/100 g fresh weight, and folate increased by 32–60%, to 58.8 ± 2.0 μg/100 g fresh weight. For one bacterial strain, *L. plantarum* 299, a significant 66% increase in vitamin B_{12} was observed, although the final amount (0.048 ± 0.013 μg/100 g fresh weight) was only a small fraction of recommended daily intake. Measurements of amino acid composition in the mixture revealed small increases in alanine, glycine, histidine, isoleucine, leucine, and valine in the

Question Data



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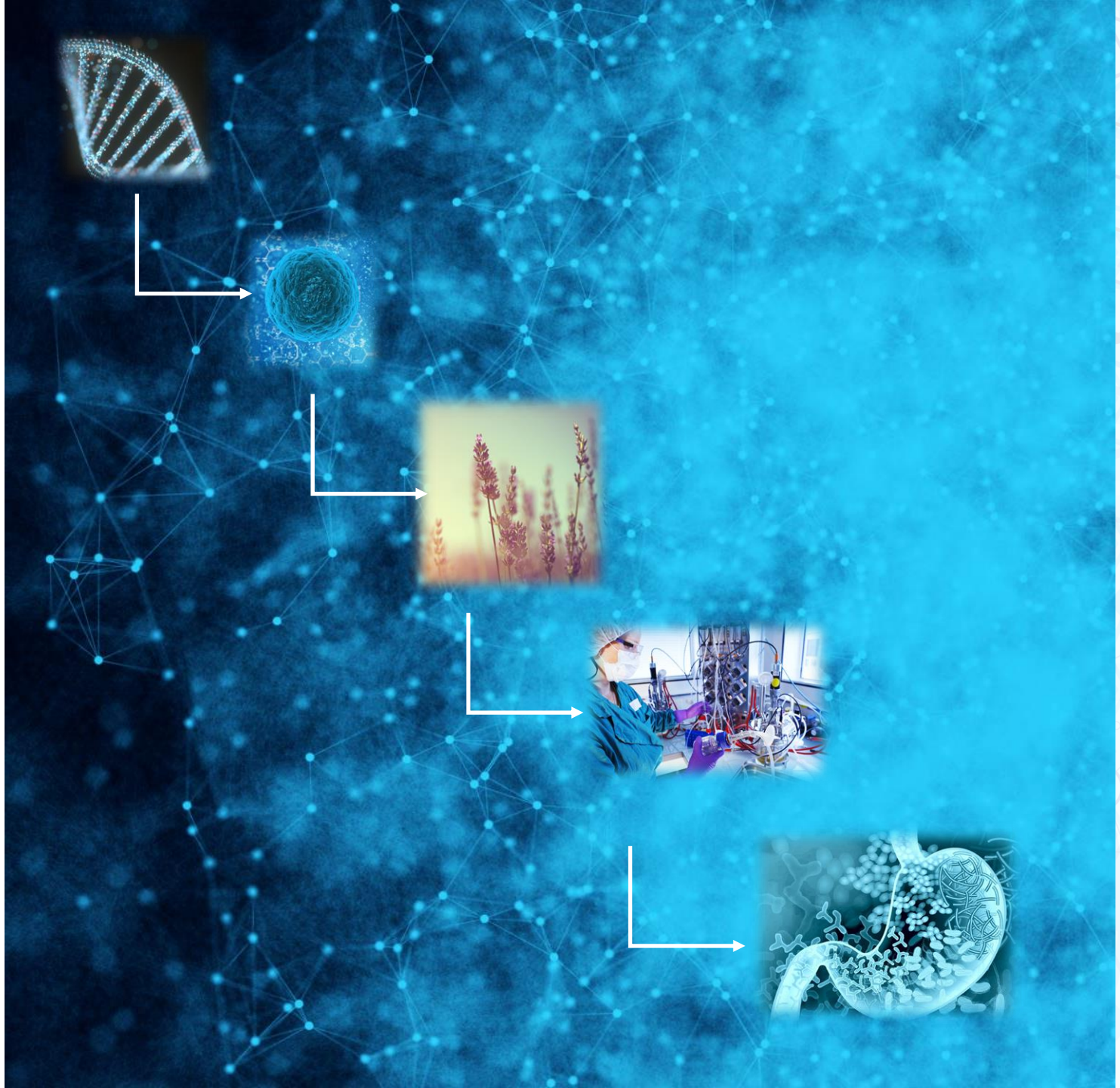
Building a Food, Health & Sustainability AI model

1. Train on (all) biology, nutrition, food production & processing data.
2. Our way to connect the molecular world with ecosystems and health.
3. Use in various tasks. Accelerate scientific discovery and product/process innovation, addressing multi-level challenges.
4. Following ongoing effort on developing similar models in biology and medicine.



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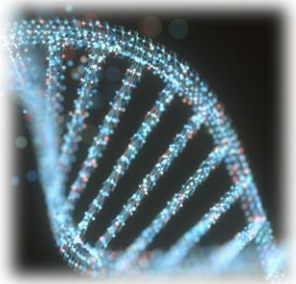
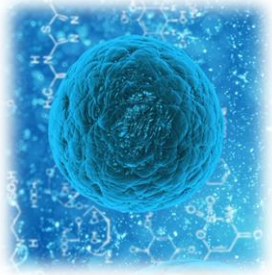
Use cases for FHS AI

- On nutritional value, affordability and sustainability.

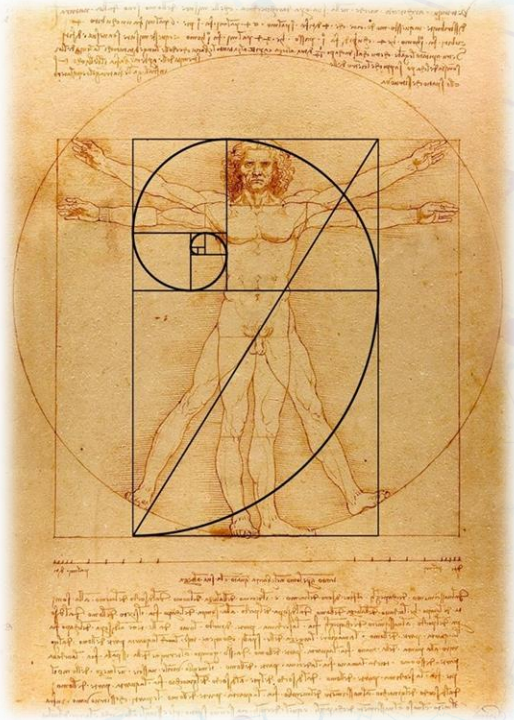
- Nutrient-directed plant varieties
- By-product adapted varieties

- Rationalize experiments, reduce trial-and-error.
- Derive processes that maintain nutrients and improve food properties
- Develop protocols for by-product upcycling

- Decipher the link between food, nutrition and health





- Sustainable, local production
- Reduce supply chains, local products

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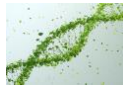
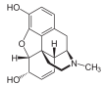
Siftlink: Towards building a food & health model

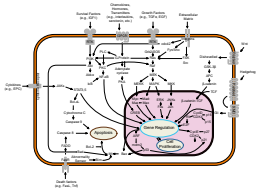
Knowledge modelling + AI-driven discovery = product/process innovation



Plant/microbe genome data



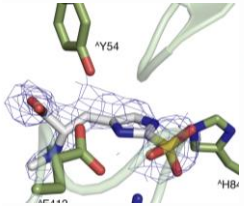
1.1M natural compounds



23’000 metabolic/biosynthetic pathways

Research, clinical and patent data

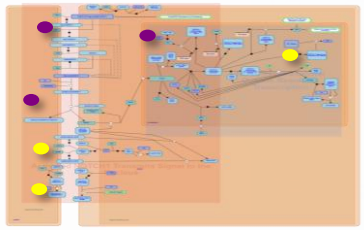
1) Molecular modelling



2) System/Fermentation modelling

Ingredient 1

Ingredient 2



3) Clinical/Consumer success indicators

“Suggest a synergistic composition that reduces the side-effects of compound X or boosts its effect”

“Suggest a fermentation protocol to produce my compound together with the synergistic one, starting from the following possible resources, by products”

Key messages

AI can:

1. Be more about enhancing our knowledge, rather than building more technology.
2. Accelerate science, helping us design more targeted experiments, reducing trial and error.
3. Reduce food product/process innovation cycles.
4. Become an accessible resource for the local economy, enabling innovation and business translation.

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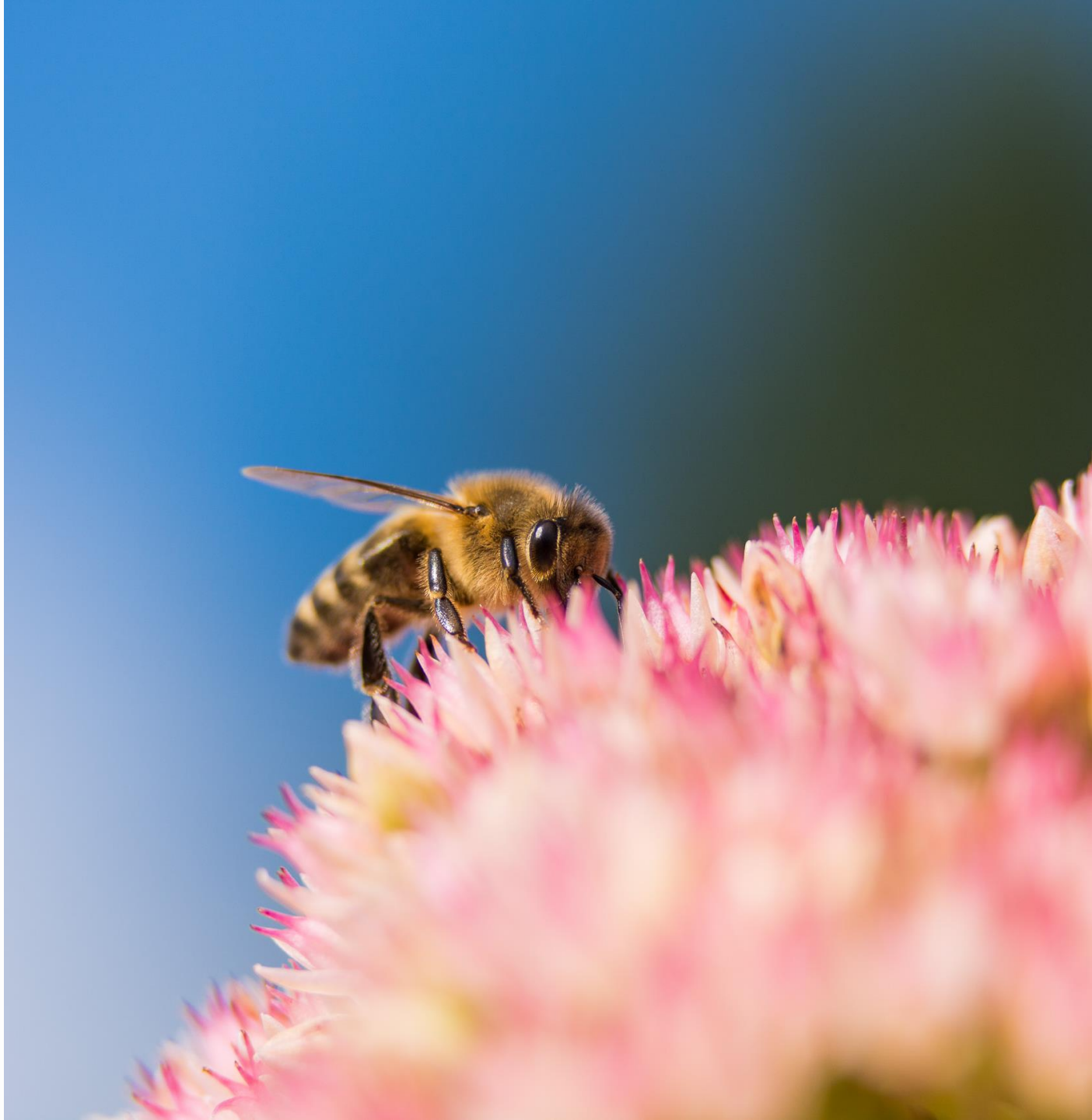

Thank you!

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Contact

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