INNOVATION INSIGHT

Redefining Healthcare by harnessing the power of in silico technology

Luca Emili

Founder & CEO

InSilicoTrials

13-14 September
INTELLIGENT HEALTH 2023
Basel, Switzerland

PRODUCED BY INSPIRED MINDS!

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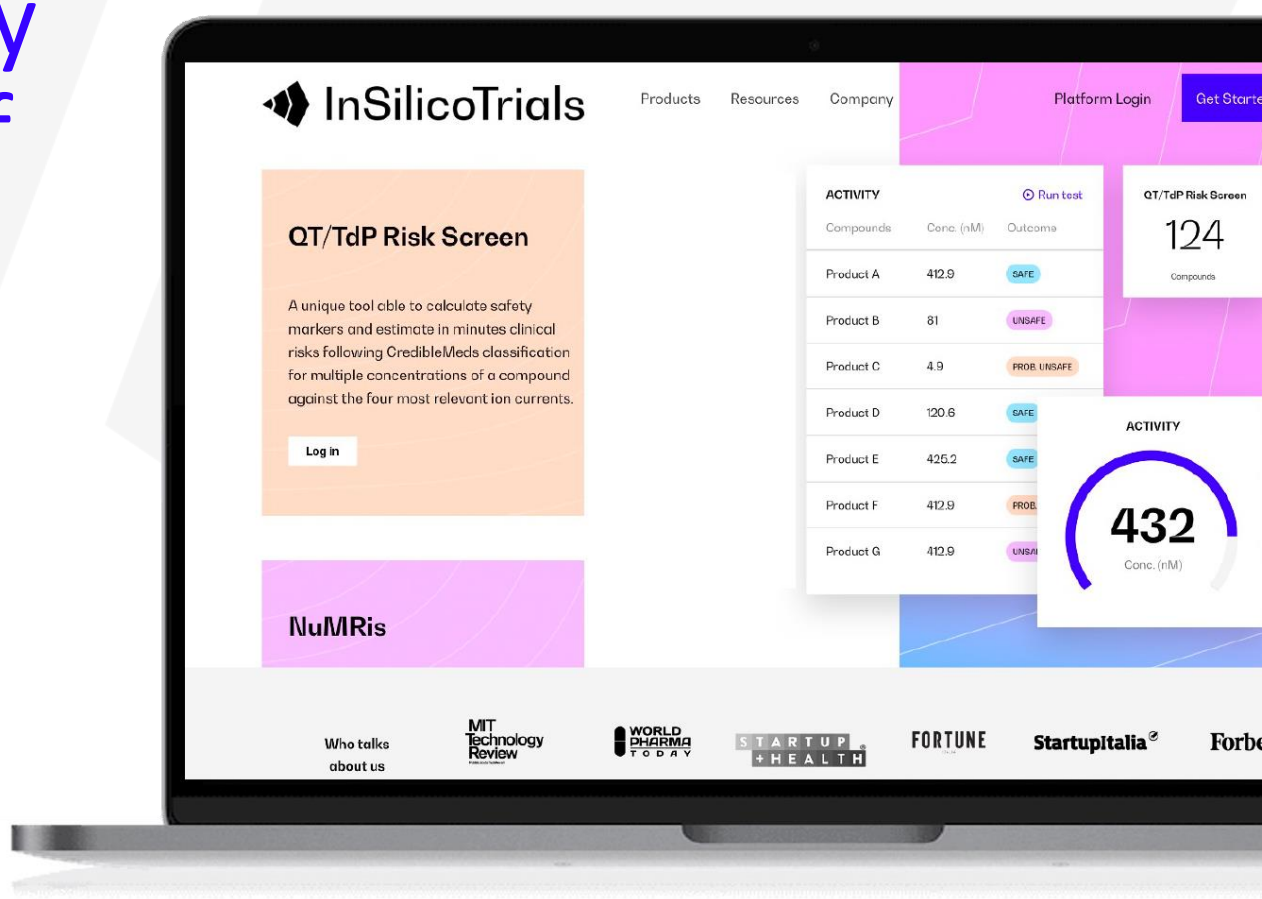
InSilicoTrials

Redefining Healthcare by Harnessing the Power of In Silico Technology



September 14th, 2023, Basel

INTELLIGENT HEALTH 2023

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Our MISSION is to revolutionize drug and medical device development by harnessing the power of in silico technology.

Using computer models and simulations, we aim to accelerate the development process and improve outcomes. By building the largest in silico research collaboration network, we are bringing together validated models, simulations, and AI tools, democratizing access and enabling a faster transition to in silico methodologies, while reducing costs and minimizing potential risks when compared with traditional in vivo and in vitro experimentation.

Today’s Problem

Development of new products in the Pharma and MedTech industries is challenging

$2.6BN

Average investment to develop a new drug

12 Years

Average time to get drugs over the finish line

5%

Average percentage of novel drugs approved by regulators

FDA and EU Parliament are endorsing strong innovation in clinical trials

InSilicoTrials is revolutionizing the Pharma and MedTech industries with the power of simulation solutions

Solution

Leveraging validated in silico models and combining them with our cutting-edge simulation platform, we offer accessible and reliable solutions to Pharma and MedTech companies

+70 Scientific partners

FDA

KATHOLIEKE UNIVERSITEIT LEUVEN

EBC European Brain Council

Politecnico di Torino

Universiteit van Amsterdam

AND MORE

Model Acquisition
Co-Development

InSilicoTrials Platform

Easy to Use Interface

Federated Modeling

Cybersecurity Compliant

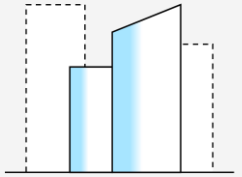
Cross-Data Elaboration

AI and Simulations

Virtual Patients

Simulation Results

Customers

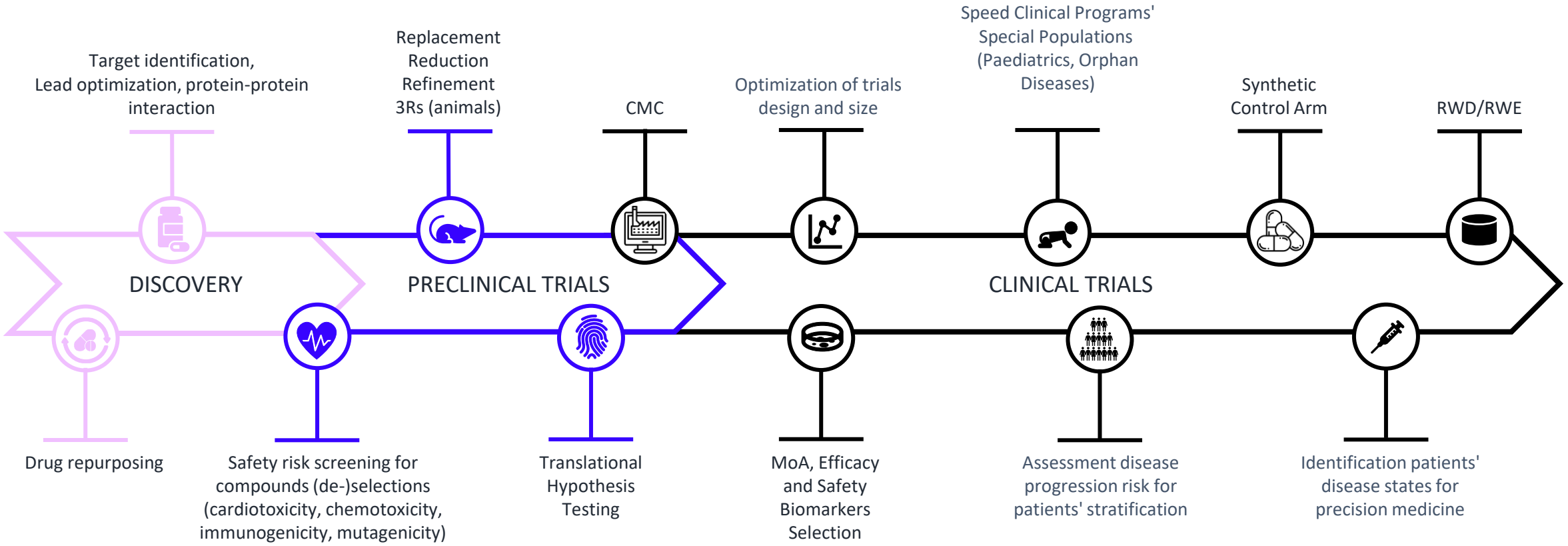


Pharma,
Biotech and MedTech
Companies, CROs

InSilicoTrials Scientific Partners

InSilicoTrials Solutions

InSilicoTrials end-to-end value proposition by covering the whole development Lifecycle



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Benefits

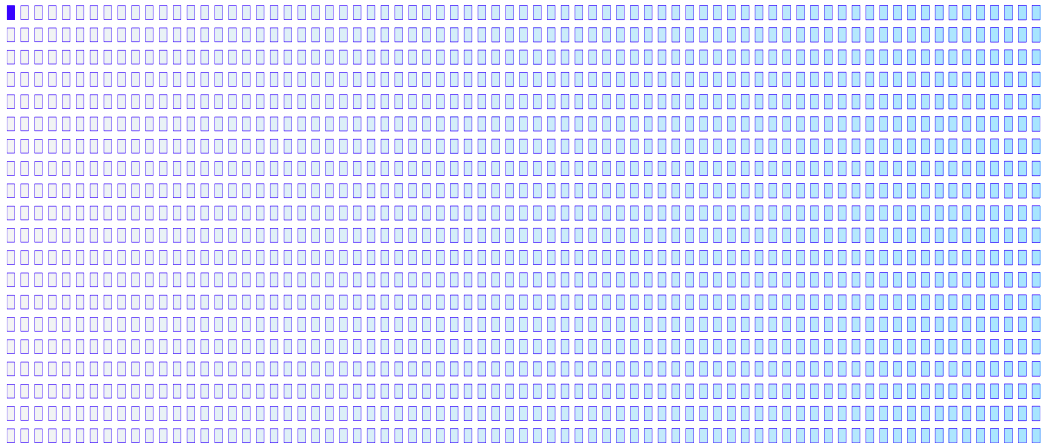
With InSilicoTrials' tools, our Customers saved 99% of time to fasten the Go to Market

BIG PHARMA

Multiple sclerosis disease progression and treatment effect bio-simulation

InSilicoTrials | Simulation Time

1 DAY



4 YEARS

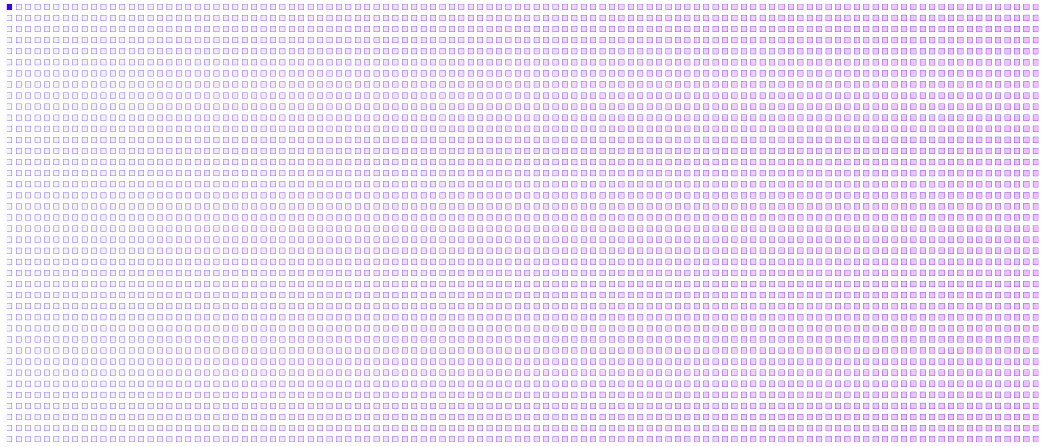
BIG PHARMA | Traditional Approach

Eisai

Early in silico assessment of drug-induced cardiac risk

InSilicoTrials | Simulation Time

1 MINUTE



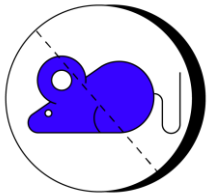
3 DAYS

EISAI | Traditional Approach

FDA Modernization ACT 2.0

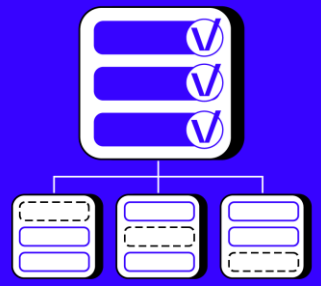
The act authorizes alternative methods to animal testing, including computer models

Aim: to modernize and streamline the regulatory processes of drug development



Radical shift in how new drugs and treatments will be created, as animal testing for every new drug development protocol is no longer mandatory

https://www.congress.gov/bill/117th-congress/senate-bill/5002
https://pubmed.ncbi.nlm.nih.gov/36762462/



Implications:
Recognition and use of computer models and in silico technology to support the drug development process

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Engagement in Regulatory Science

We are leading the task force for the Good Simulation Practice creation.

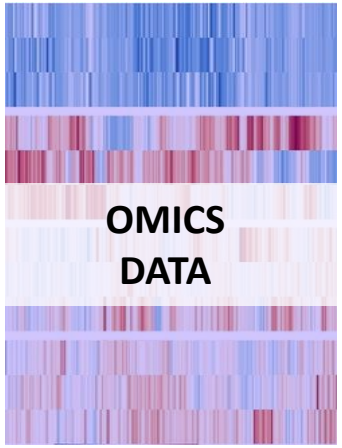
Reviewed and addressed by the FDA, this will become a publication by Springer in 2023 as the first milestone toward the standard creation by regulators

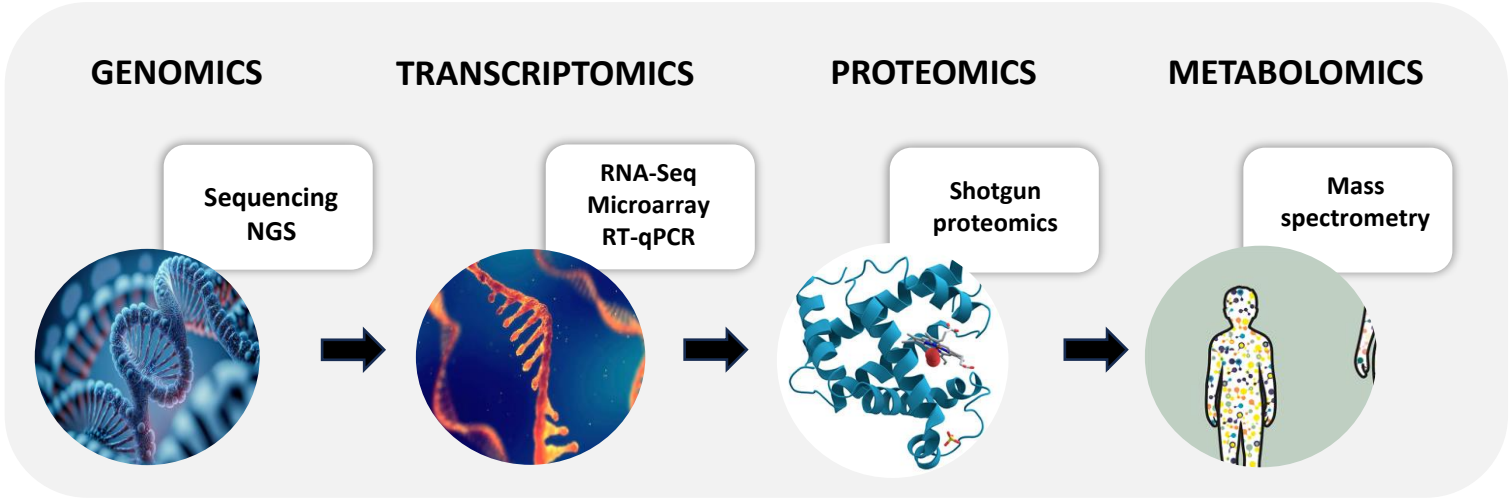
+130 researchers from university and industry

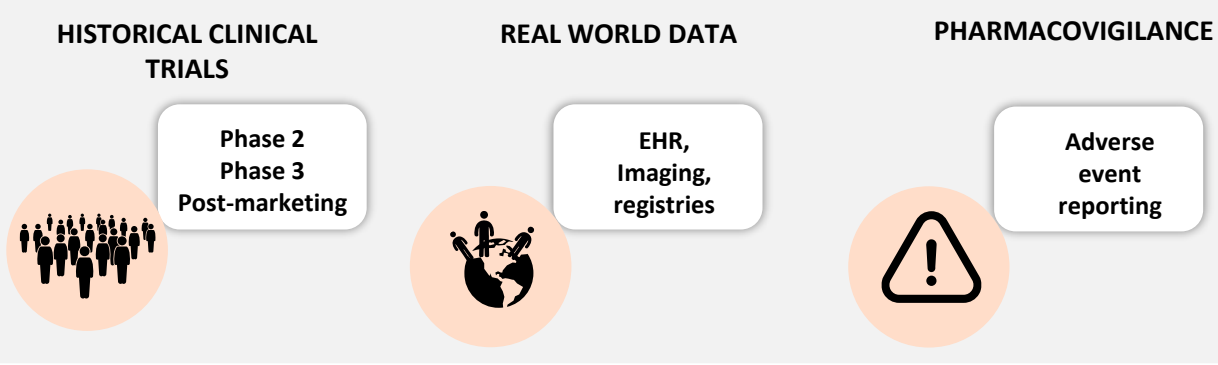
From Big Data to Virtual Patients

Big Data for Building Virtual Patient Models

Human datasets: -omics and clinical data







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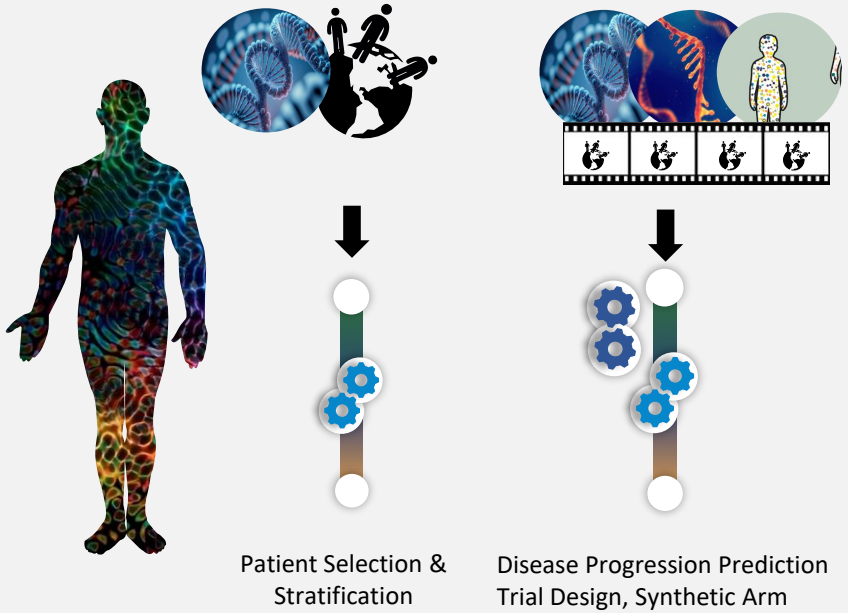
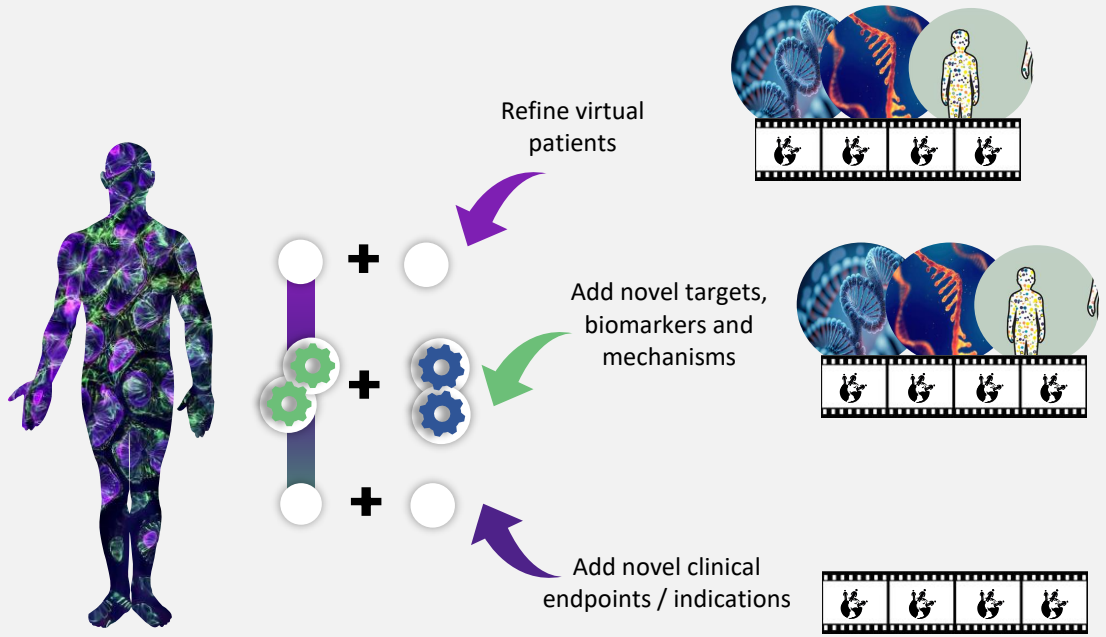
Leveraging Omics and Clinical Data for Therapeutic Innovation and Enhancement

New models



Enhancement and refinement of existing in silico solutions



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InSilico Microbiome

The Interest in Gut Microbiome

Host

Genes

Lifestyle

Gut microbiome

Nutrients, vitamins

Drugs

Endocrine system

Immune system

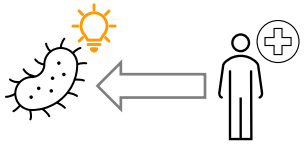
Nervous system

Clinical implications

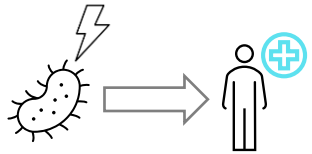
Pathological conditions

- Cancer
- Obesity
- Autoimmune
  e.g. Type 1 diabetes
- Inflammatory
  e.g. Inflammatory bowel disease (IBD)
- Neuropsychiatric
  e.g. major depression

Current research interests



- Diagnosis
- Biomarkers
- Patient stratification

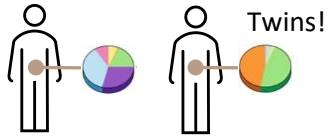


Treatment

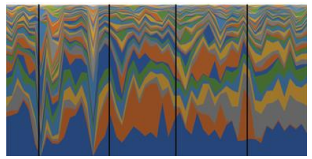
- Prebiotics
- Probiotics
- Antibiotics
- Fecal transplant

Main challenges

Inter-individual differences
⇒ personalized treatments



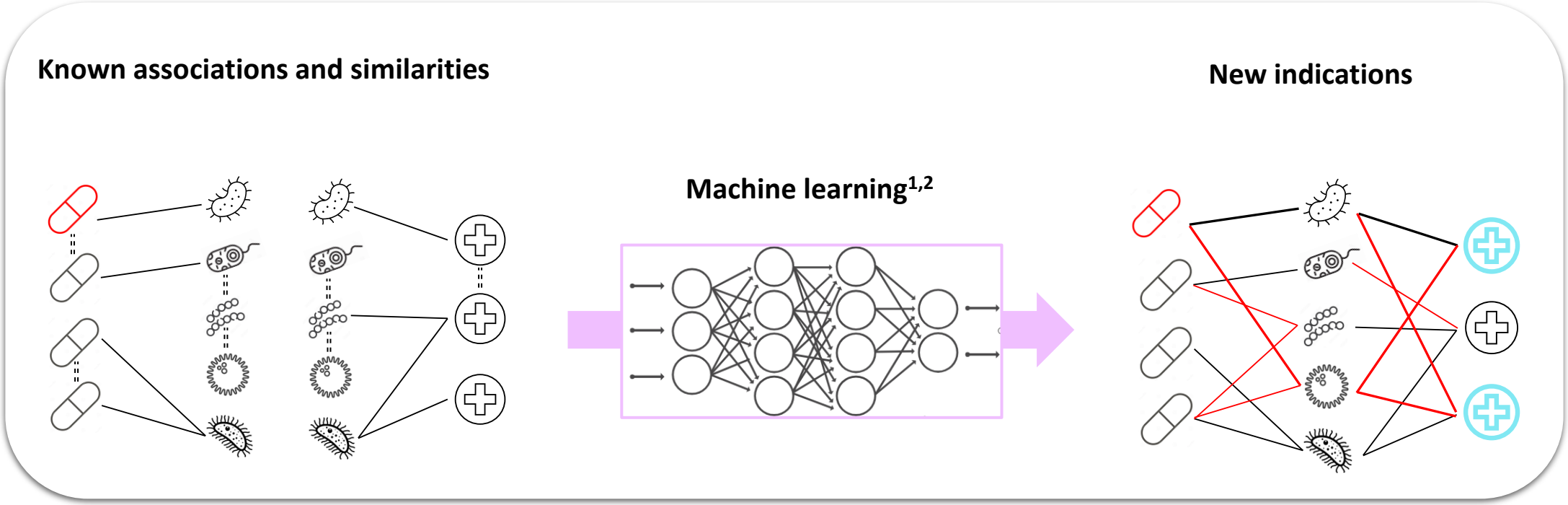
Highly variable composition



Generation and analysis of big datasets (“-omics”)

In Silico Microbiome: Predicting Indications for Microbiome-based Therapies

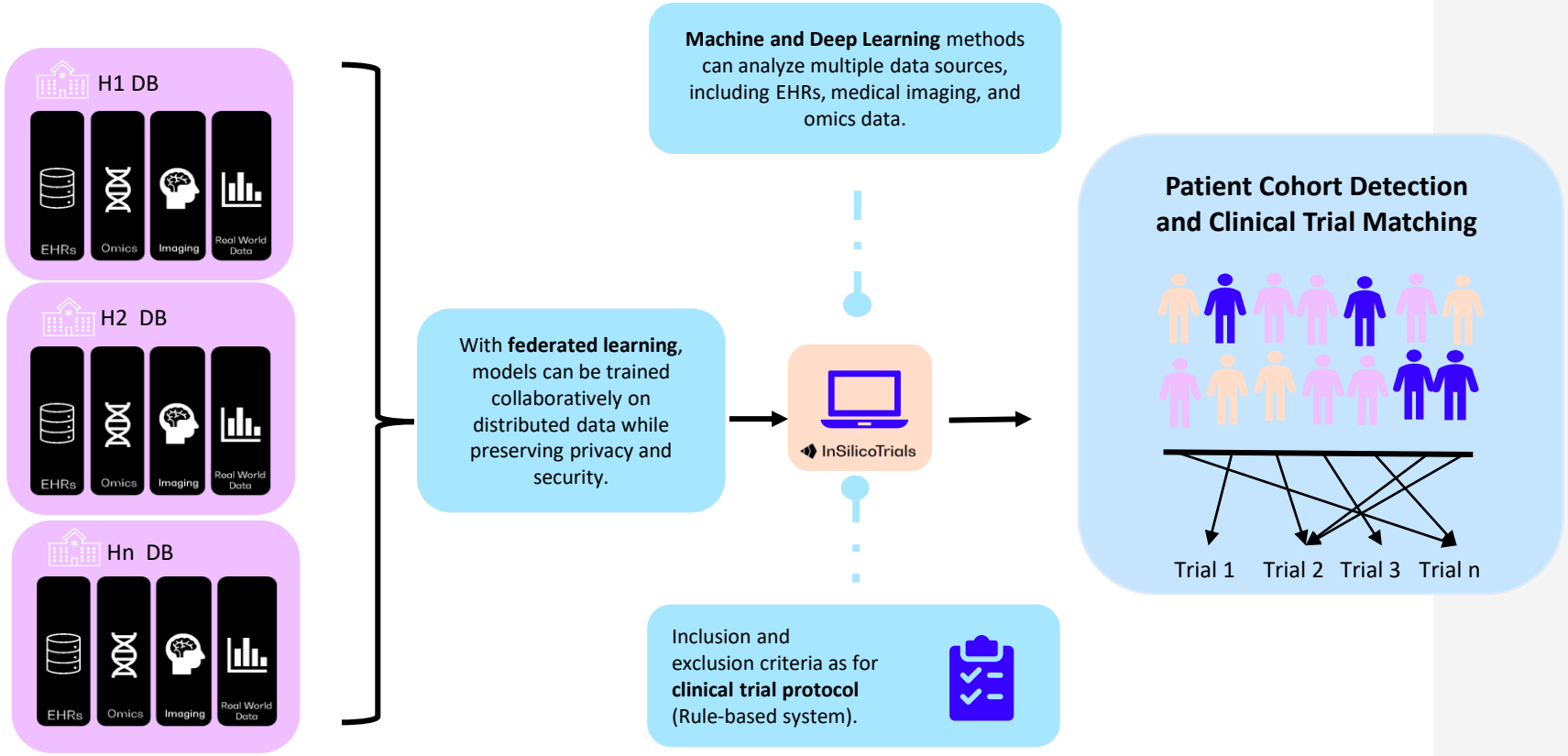
Machine learning approaches unravel new drug-disease-microbe associations



1. Algavi and Borenstein, Nature Communications, 2023.
2. McCoubrey et al., Biotechnology advances, 2022.

AI Solutions for Patients' Cohort Detection and Clinical Trial Matching

Proposed Solution and Architecture



Federated AI Architecture

We use **federated machine learning** models to train algorithms on data at the source, avoiding the need to move data from one location to another, ensuring **privacy and security of the data.**

Machine Learning Model

The machine learning model uses **natural language processing** techniques to extract meaningful information about patients and their clinical history to increase the accuracy of **patient cohort** detection.

Efficient Clinical Trial Matching

We match patient cohorts with **clinical trials** inclusion and exclusion criteria to increase **patient recruitment**, reduce the cost of screening for eligibility, and enhance the time-to-market for new products.

Thank you

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