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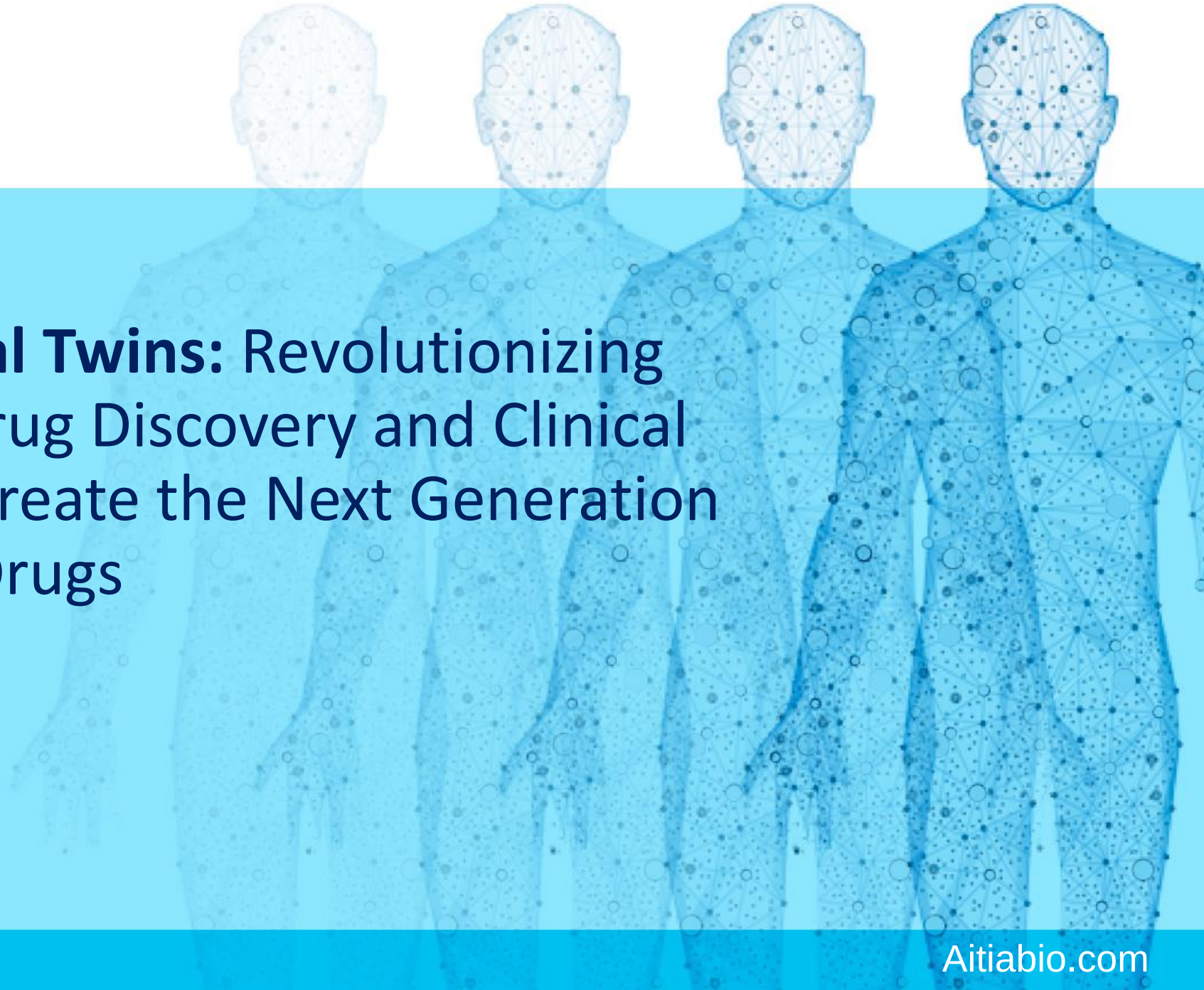


AI-Powered Digital Twins: Revolutionizing Pharmaceutical Drug Discovery and Clinical Development to Create the Next Generation of Breakthrough Drugs

October 6, 2023

Impact of Aitia

AI-driven and **hypothesis-free discoveries** that show dramatic impact on clinical outcomes have emerged from Aitia's **Digital Twins**

Digital Twins

Digital Twins are **data-driven computer replicas of human disease** that connect genetic variation to molecular circuitry and clinical outcomes that allow "experiments" to be conducted computationally -

orders of magnitude faster and cheaper than in wet labs

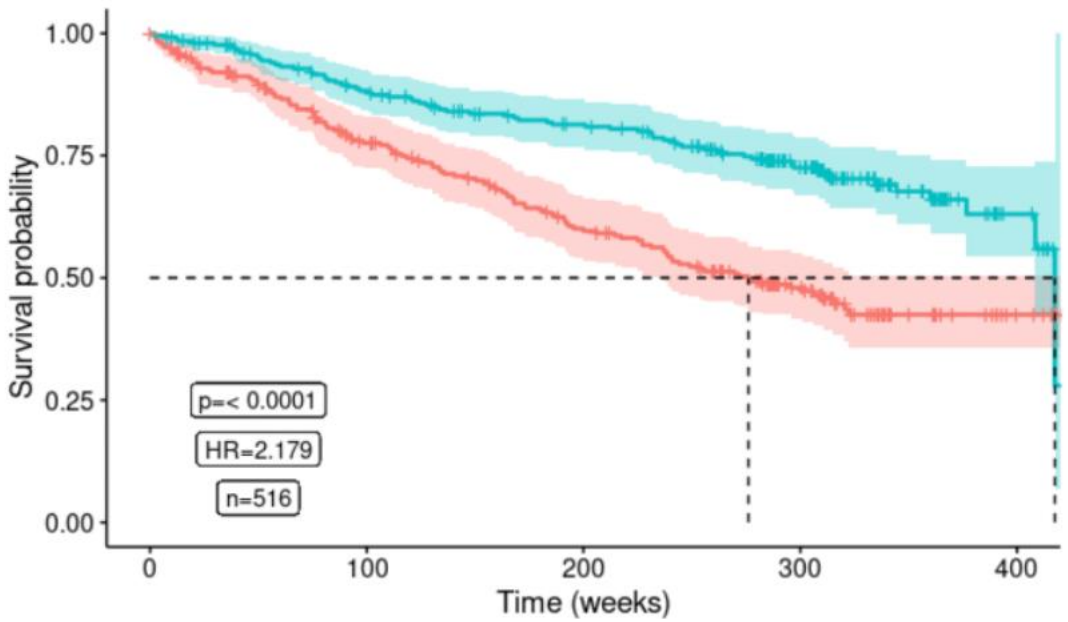
in a "model system" of human disease that is much more accurate than animal models or cells in a petri dish

These discoveries are being rapidly translated into breakthrough drug candidates that could transform the treatment of neurodegenerative diseases including Alzheimer's, Parkinson's, Huntington's, ALS and cancers including multiple myeloma, prostate cancer, and pancreatic cancer

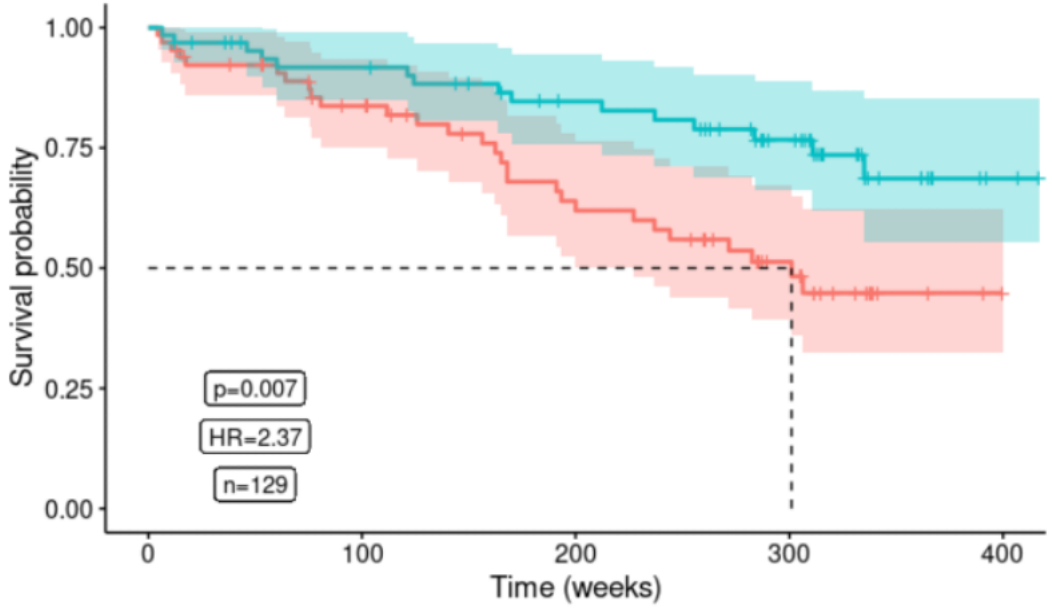
Aitia has Discovered Novel Drug Targets Driving Significant Benefit in Overall Survival

One promising target discovered through Aitia's Multiple Myeloma Digital Twins improves overall survival by over 3 years!

Full Cohort



Identified Subpopulation



Target High Expression

Target Low Expression

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AI Has the Potential to Disrupt the Three Foundational Areas in Drug Discovery & Development

AI-Driven Target Discovery

"What is the **right target** in the right stratified patient population?"

AI-Driven Drug Design

"What is the **right drug** against the right target?"

AI-Driven Clinical Trial Design

"Who are the **right patients** for the right drug and what are their **biomarkers** to design better clinical trials?"

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AI has Made Significant Strides in Drug Design, Including the Optimization of Protein and Small Molecule Design, but…

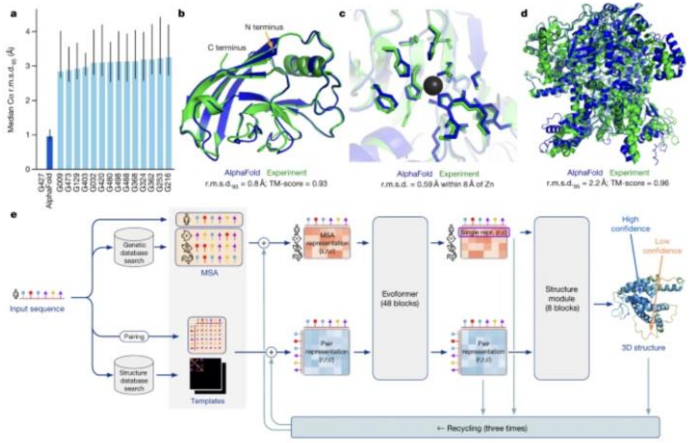
AI-Driven Drug Design

nature

Article | Open Access | Published: 15 July 2021

Highly accurate protein structure prediction with AlphaFold

Fig. 1: AlphaFold produces highly accurate structures.



"DALL-E 2 of biology" designs proteins for new drugs

"Now that we have this ability, the possibilities of what we can produce are endless."

Insilico Gains FDA's First Orphan Drug Designation for AI Candidate

Agency grants status to INS018_055, a small molecule inhibitor treatment for IPF

Biotech labs are using AI inspired by DALL-E to invent new drugs

Two groups have announced powerful new generative models that can design new proteins on demand not seen in nature.

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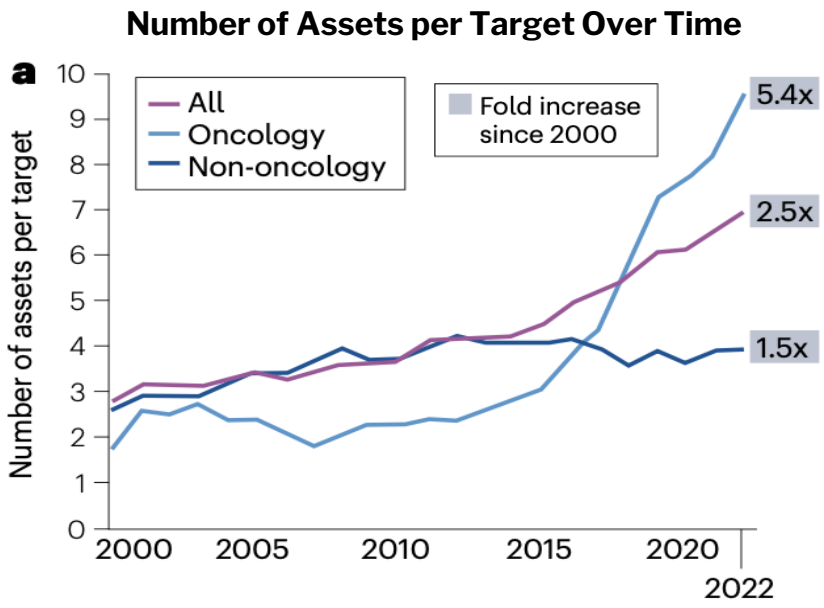
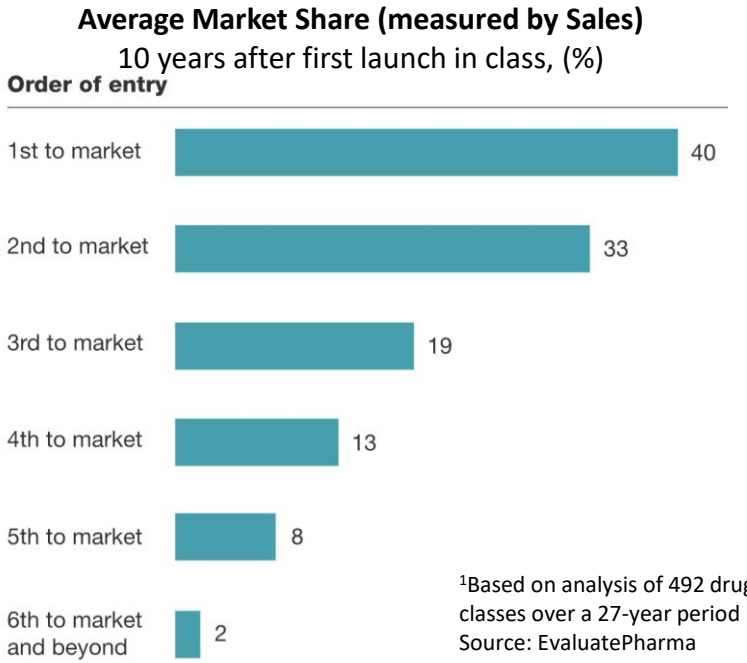
...has Struggled to Make Progress in Target Discovery, Preventing Breakthroughs from Occurring...

AI-Driven Target Discovery



The **number of assets** in clinical development is **outpacing** the number of **biological approaches**



[1]Based on analysis of 492 drug launches in 131 classes over a 27-year period (1986-2012)
Source: EvaluatePharma

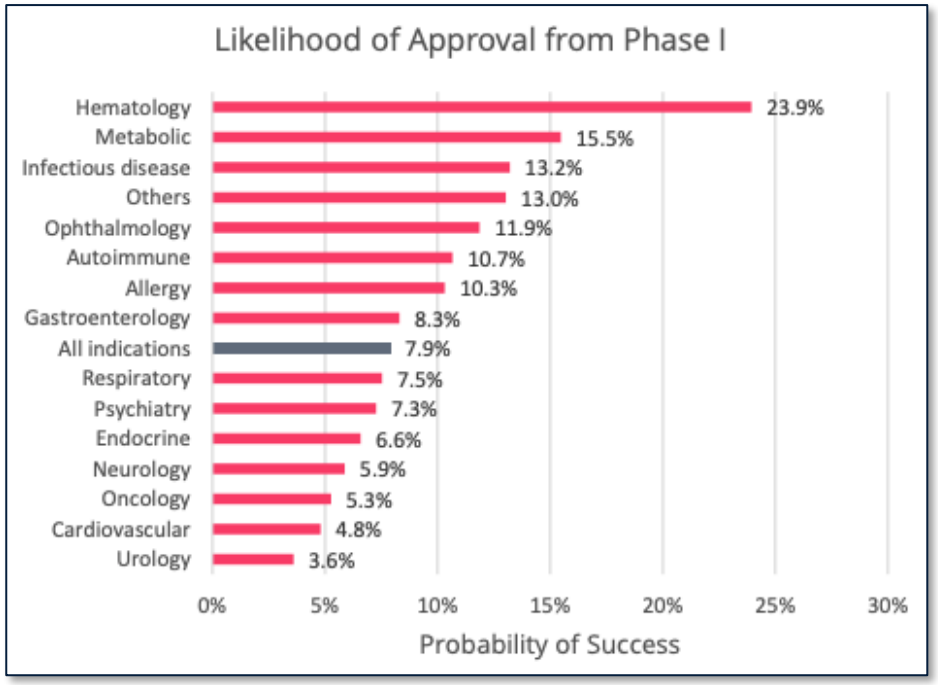
Weak ROI **after the first 2 drugs** to market

Source: Nature

...and to Make Progress in Patient Selection, Preventing Innovative Drugs from Getting to Patients

AI-Driven Clinical Trial Design

Clinical trials still **struggle** to find the **right patient population** for a given drug candidate, resulting in a clinical trial success rate of ~8% across all indications



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Source: PharmaIntelligence

Why?

Why has so Little Progress Been Made in Using AI to Discover and Validate Novel Targets and Better Select Patients for Clinical Trials?

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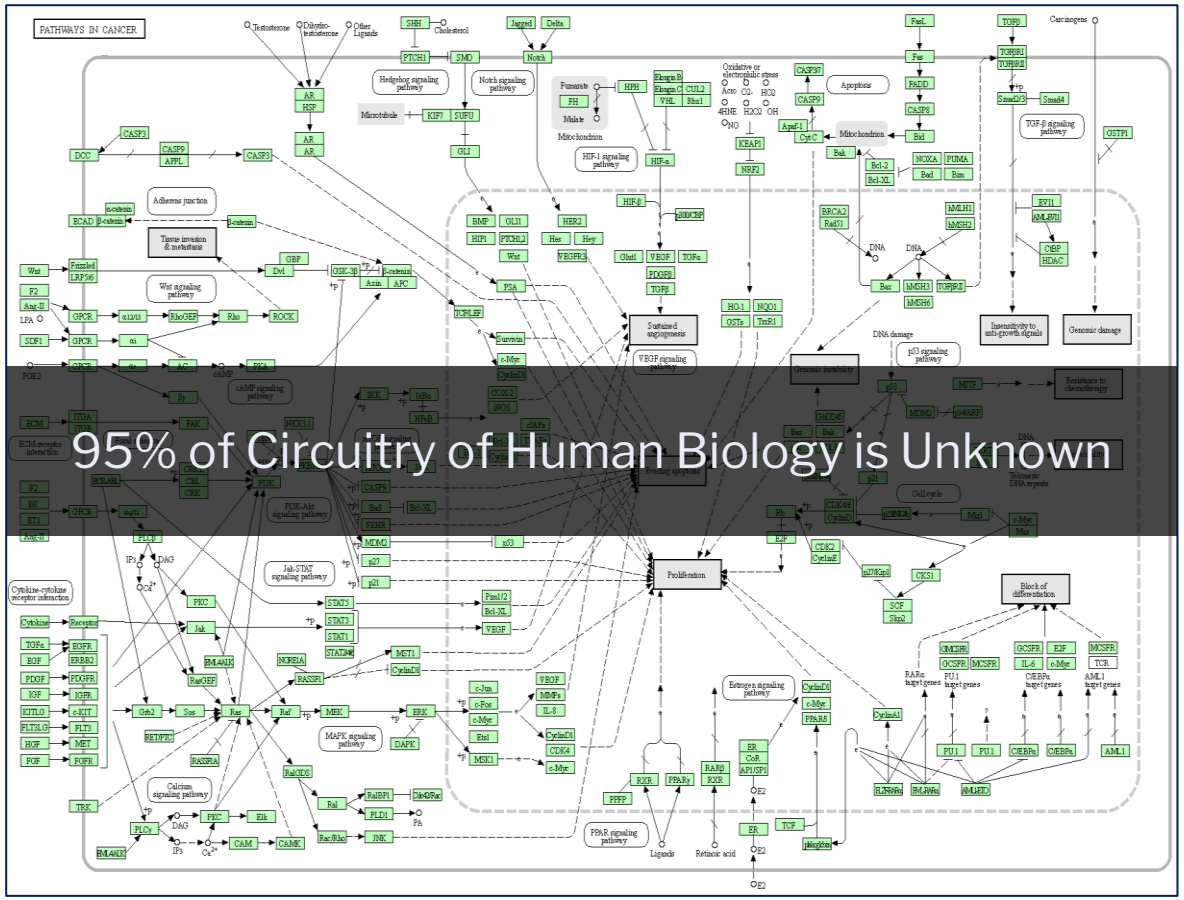
Despite ~80 Years of Molecular Biology Research, Only 5% of the Biological Circuity Driving Human Disease is Known



~95% of the biological circuitry driving human disease **remaining unexplained** leads to **limited progress in** discovering **novel targets and drug candidates** causally linked to clinical outcomes and **better selecting patients for clinical trials**

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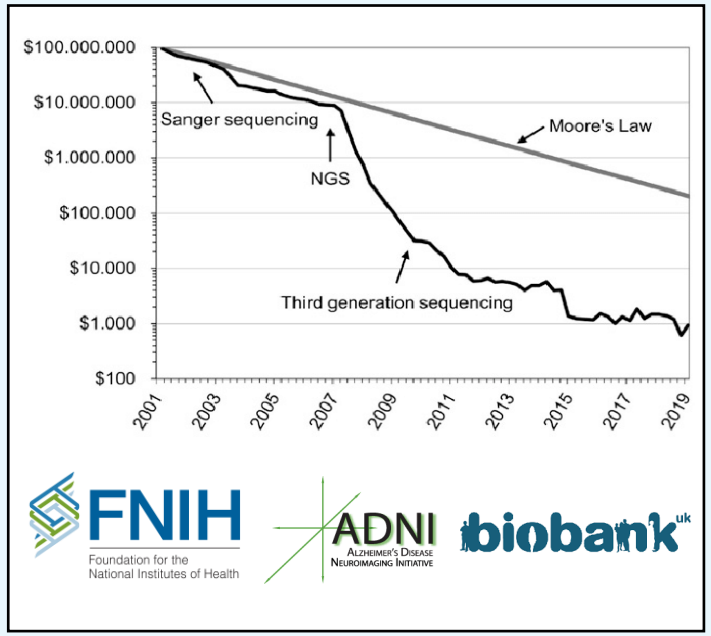
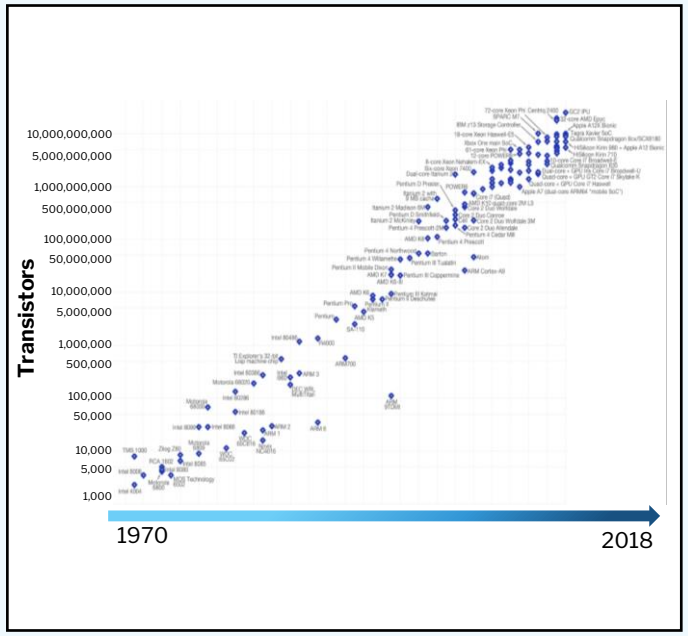
Three Major Trends in Data and Technology Have Converged to Now Enable a Solution to this Critical Bottleneck

Exponential Rise in Human Multi-omic Data

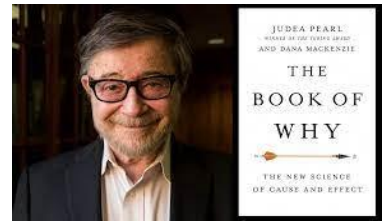


Exponential Rise in Computing Power

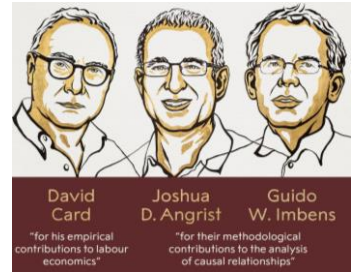


Emergence of Causal AI

2011 Turing Prize



"To reach the higher fruit, AI needs a ladder, which we call the Ladder of ***Causation****"*
-Judea Pearl



Causality and Natural Experiments: **the 2021 Nobel Prize in Economic Sciences**

Unraveling the 95% Hidden Biological Circuitry

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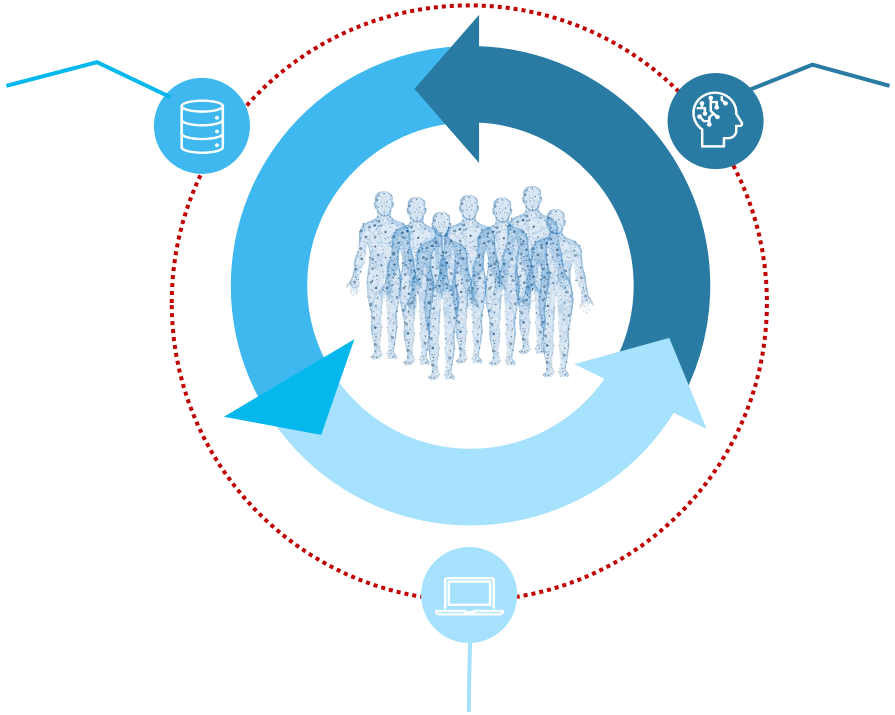
Nobel Prize Illustration by Niklas Elmehed

Aitia's Causal AI Reverse Engineers the Missing 95% of Circuitry from Human Multi-omic Data to Create Gemini Digital Twins

*Aitia's **Digital Twins** are **computational representations of disease** that capture **genetic and molecular interactions** that **causally drive** clinical and physiological outcomes*

Multi-Omic Human Datasets

Aitia develops Digital Twins from **Human Multi-Omic data** sources, ensuring the targets and insights discovered are driving **Human clinical outcomes** rather than outdated animal models



Causal Artificial Intelligence

Digital Twins are built on top of REFS, Aitia's proprietary causal AI platform; REFS goes beyond statistical correlation to enable causal simulations (*in silico* experiments) that identify the **true drivers and underlying biological mechanisms** of human disease

Advances in Computational Power

Aitia continuously updates the platform to capitalize on improvements in supercomputing and **run more computational experiments faster**

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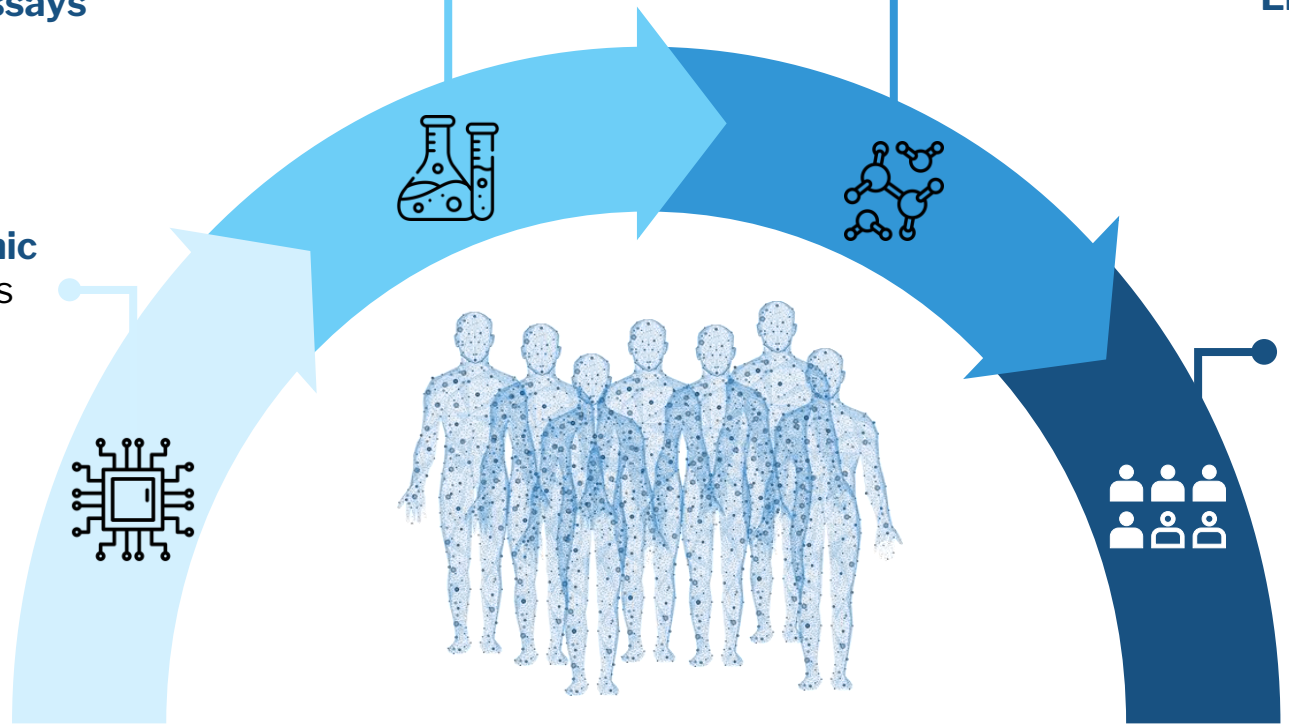
Using the Digital Twins, Aitia Discovers Novel Targets & Drug Candidates in Stratified Patient Populations

Genetically and **Biologically Validate Novel Targets** across Multiple Human **Multi-omic Digital Twins** and **Datasets** and a Battery of **Wet Lab Assays**

Reverse Engineer Hidden Circuitry from **Human Multi-Omic Data** to Discover Novel Targets Casually Linked to Clinical Endpoints



Discover Novel Small Molecules via AI-enabled Discovery Platforms and Progress to a **Development Candidate** or to **IND Enabling Studies**

Use of the Digital Twins to **Inform on Translational Medicine** Throughout Drug Development and to **Identify** the **Right Patient Population** to **Optimize** Clinical Trial Design

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Aitia's Pipeline Contains a Large Number of Differentiated, Novel Targets, Enabling First-in-Kind Drugs, Rather Than Follow on Drugs

The first two drugs on the market capture over 70% of the market share[1]

Aitia's novel target approach enables Aitia and its partners to capitalize on the first mover advantage

Additionally due to the early identification of target populations, subpopulations that are historically difficult to treat can be prioritized to further enhance the first mover advantage

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1. https://www.mckinsey.com/industries/life-sciences/our-insights/pharmas-first-to-market-advantage

Aitia's Pipeline is Centered on Neurodegenerative Disorders and Oncology with More Digital Twins in Development

Disease Area	Discovery Programs	Biology	Early Discovery	Late Discovery	Pre-Clinical	Early Clinical
Alzheimer's Disease	3	Linked to Lipid Transport Theory				
	2	Involved in cell lifecycle				
Huntington's Disease	3	Linked to Mis-Match Repair				
	5	TBA				
Multiple Myeloma	1	Linked to DNA Metabolism				
	3	TBA				
Prostate Cancer	4	TBA				

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Aitia's Business Model Creates Synergies and Enables Fruitful Partnering Deals

License drug candidates with identified patient populations to biopharma at Development Candidate or Pre-IND Stage

- Drug candidates are taken far enough in process to realize a significant value inflection without the binary risk of clinical trials
- A large enough number of drug candidates are being advanced in the pipeline to spread the risk

Partner to discover novel targets causally linked to clinical outcomes

- Near-term revenue to offset costs of internal pipeline development
- Targets that are not optioned by our partners are fed back into the Aitia pipeline

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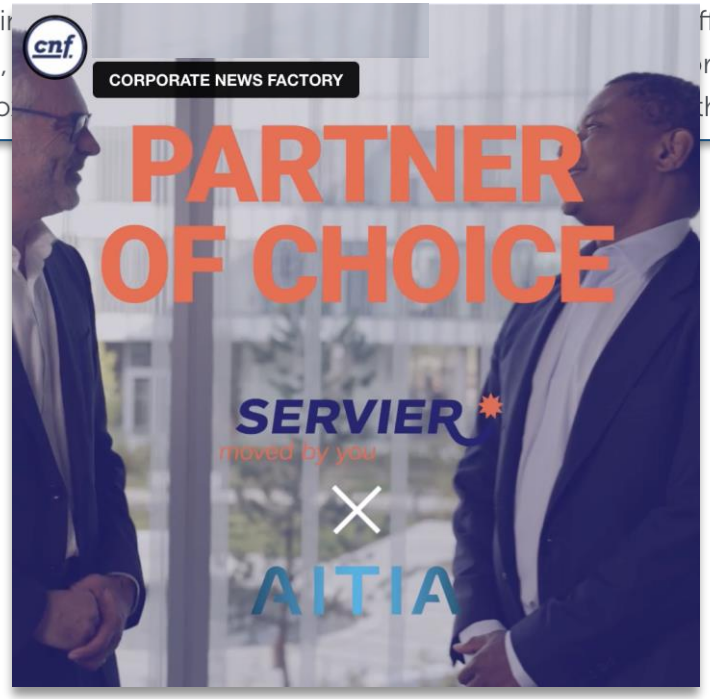
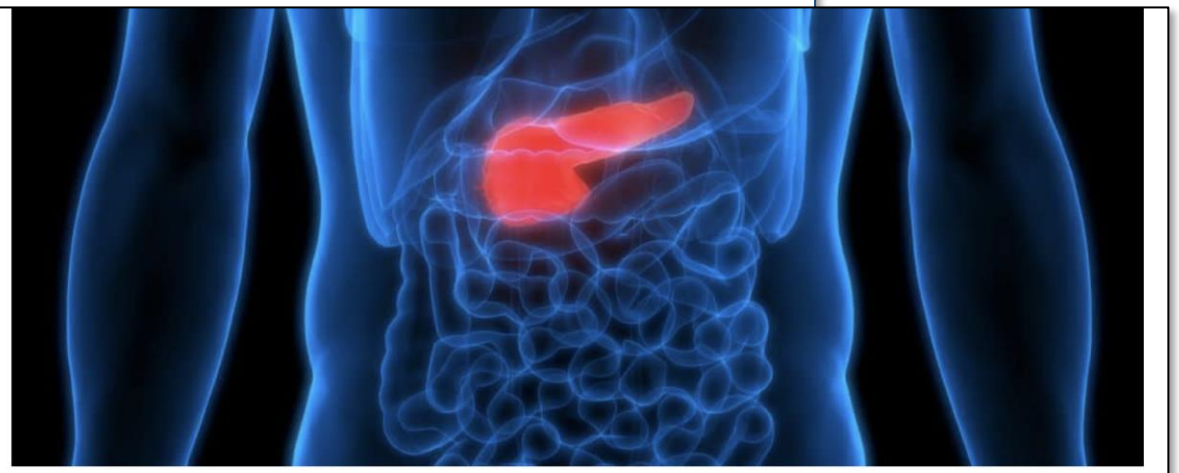
Strategic Pharma Partnerships Validate our Breakthrough Approach to Drug Discovery in Diseases with High Unmet Need

Aitia and UCB Announce Strategic Drug Discovery Collaboration in Huntington's Disease

Brussels, Belgium, and Somerville, MA, March 15th, 2023 (18:30 CET): UCB, a glo
application of Causal AI and "Digital Twins" to discover and develop new drugs, toda
the discovery and validation of novel drug targets and drug candidates for Huntingt
targets that are causally linked to clinical endpoints in Huntington's disease.

Hunti ffects the brain, causing
brain, r, and cognitive abilities
appro there is no cure for the c





Servier and Aitia enter into R&D collaboration for pancreatic cancer using Digital Twins

James Spargo | May 18, 2023 | News story | Research and Development | Aitia, Digital Twins, Oncology, Pancreatic cancer, Servier

French pharmaceutical company Servier and US-based Causal AI and Digital Twins company Aitia have announced a collaboration to create Digital Twins as an aid to help treat pancreatic cancer. This collaboration builds on a previous multiple myeloma one which was announced in 2022.

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Led by a Team of Multidisciplinary of Industry Pioneers & Scientific Experts at the Interface of AI and Drug Discovery & Development

Leadership

John Maraganore, PhD
Chair of the Board

Venture Partner at ARCH; Venture Advisor at Atlas; Exec. Partner at RTW; Board Member of Takeda, Agios; Former founding CEO of Alnylam; Senior Exec. At Millennium

Colin Hill
CEO & Co-Founder

Tech Review Top 100 Innovators; Board Member of Centrexion; former board member of PPD (acquired by Thermo) and Biotelemetry (acquired by Phillips)

Jean-Michel Gries, PhD
President & COO

President of R&D at Hengenix Biotech, Inc.; Chief R&D Officer, Parexel and Covance; Head of R&D, Pharmaceutical Products at alcon (Novartis); Head of Clinical Pharmacology at Roche

Bruce Church, PhD
EVP R&D and Chief Math. Officer

Principle Inventor of REFS™ technology, former Cornell biophysics researcher

Jeanne Latourelle, D.Sc,
SVP, Precision Medicine

Former assistant professor at neurogenetics at Boston University School of Medicine

Advisors

Dr. Ole Isacson MD, PhD
Lead Neuro Advisor
Founding Director of the Neuroregeneration Research Institute at McLean Hospital; Professor of Neurology at Harvard Medical School & MGH

Jonathan Keats, PhD
Lead Advisor for Multiple Myeloma
Lead MM Researcher at TGen / City of Hope; Generator of data for MMRF patient registry

Current Investors

AMGEN

MERCK

Bristol Myers Squibb™

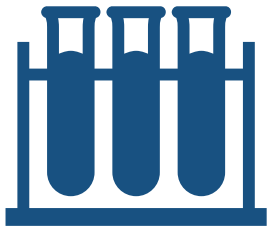
New Strategic Investor (to be announced in October)

AITIA

Aitia is Disrupting the Most Critical Areas in Drug Discovery & Development With First and Best-in-Class Technology by:

Deriving insights from **Human** datasets; by starting with Human data, Aitia eliminates the need to use **outdated model systems** that are poor predictors of human biology

Identifying targets causally linked to **clinical outcomes decades before** anyone else; Aitia runs counter factual *"in silico"* experiments testing hypotheses across millions of patient-data derived **Digital Twins**



Discovering targets at a **speed and scale** that is not possible through **high-throughput experiments or other AI platforms;** Aitia evaluates the impact of trillions of parameters on clinical outcomes in each of trillions of simulation experiments

Starting with targets tied to **specific patient populations** and identifying **responders vs non-responders** early in development

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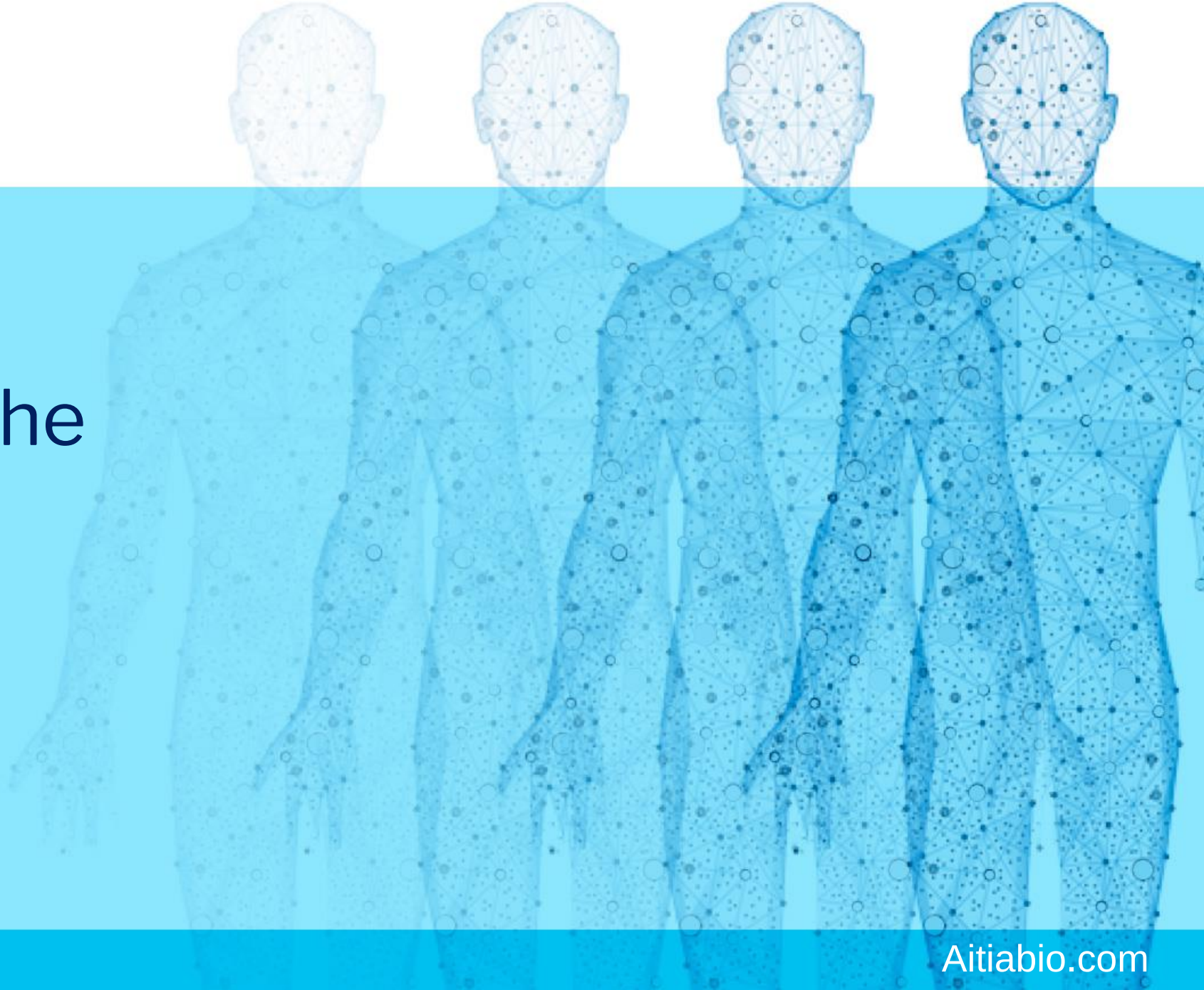
Being part of the ecosystem



We are Excited About the Possibility Within the Finnish Ecosystem…

Partnering Organizations

Academic Institutions

- Forge data partnerships to leverage research and collectively combat diseases of high unmet need

Research Institutions

- Partner on preclinical studies as well as clinical studies to test the safety and efficacy of experimental drugs or therapies

Biobanks

- Leverage vast repositories of patient data to support target identification, biomarker discovery, and aid patient stratification

CROs

- Further targets into preclinical and clinical research to accelerate research, development, and commercialization efforts

Business Finland

- Establish synergies providing mutual support for R&D, funding, networking, and innovative expansion efforts

Pharma / Biotech

- Collaborate on the discovery of new drug candidates, including target identification and validation, hit-to-lead optimization, and lead optimization

…and We Look Forward to Becoming a Part of the Ecosystem and Creating Impact*

Expansive Multi-omic Datasets

HUS

FINNGEN

Hypothetical

AITIA

Partnership Opportunities

1. Licensing Novel Drug Candidates
2. Collaborating to Discover and Validate Novel Drug Targets
3. Partnering to Simulate Drug Candidates ahead of Clinical Trials

BAYER Roche ORION

Experts in Disease Areas & AI / ML

Aalto University

HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

UNIVERSITY OF TURKU

AITIA

*Representative organizations, not current partners