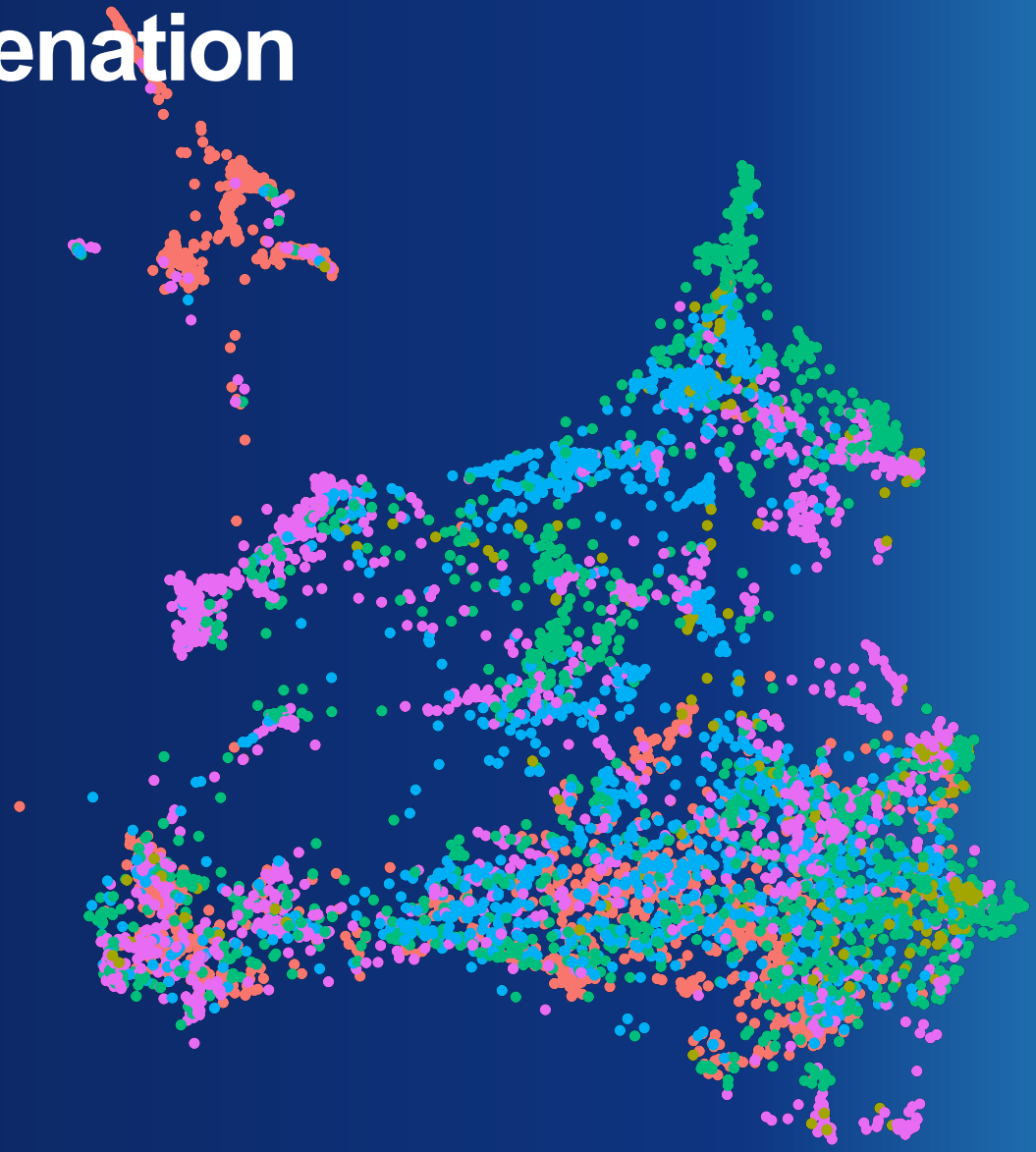
A path to safe cellular rejuvenation



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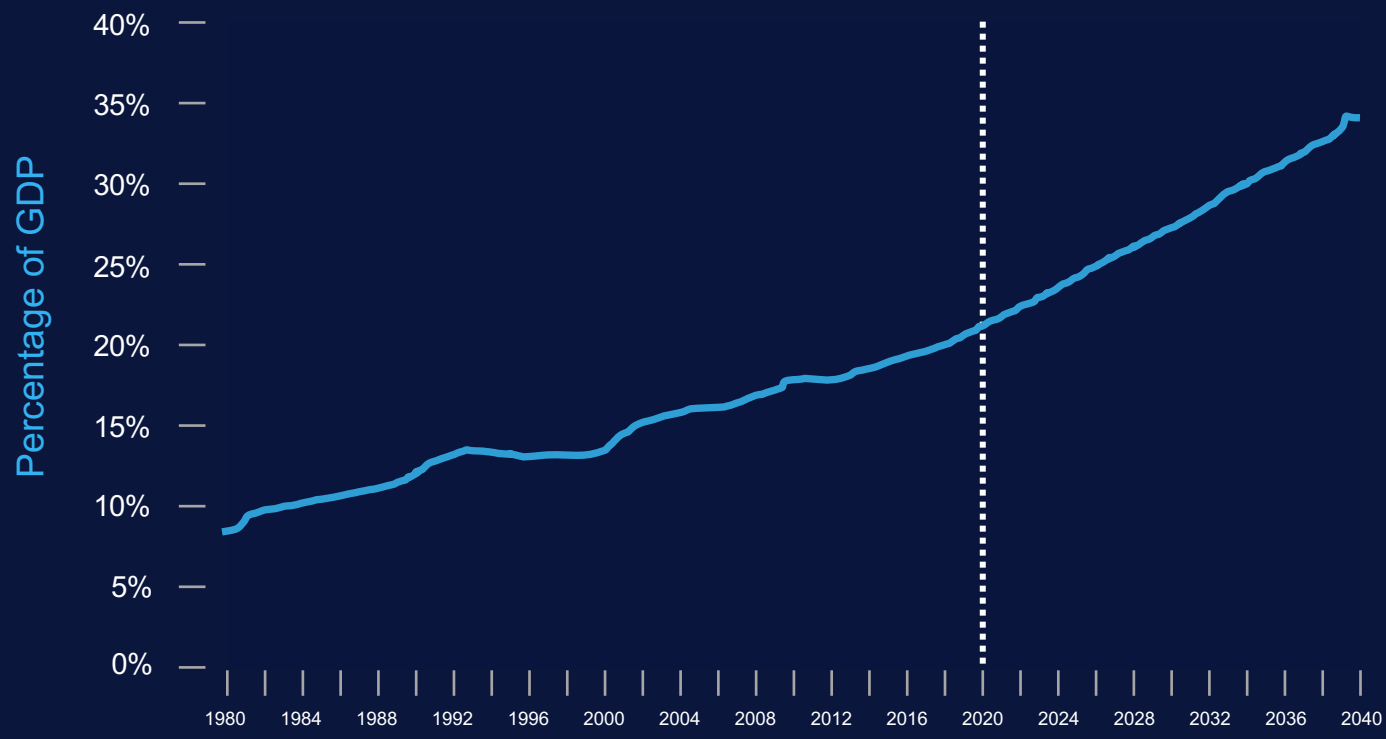
Investor presentation 2H21

Aging is tragic and expensive

Due to an aging population, US healthcare spending will rise from the current level of 18% of GDP to reach 34% of GDP by 2040.



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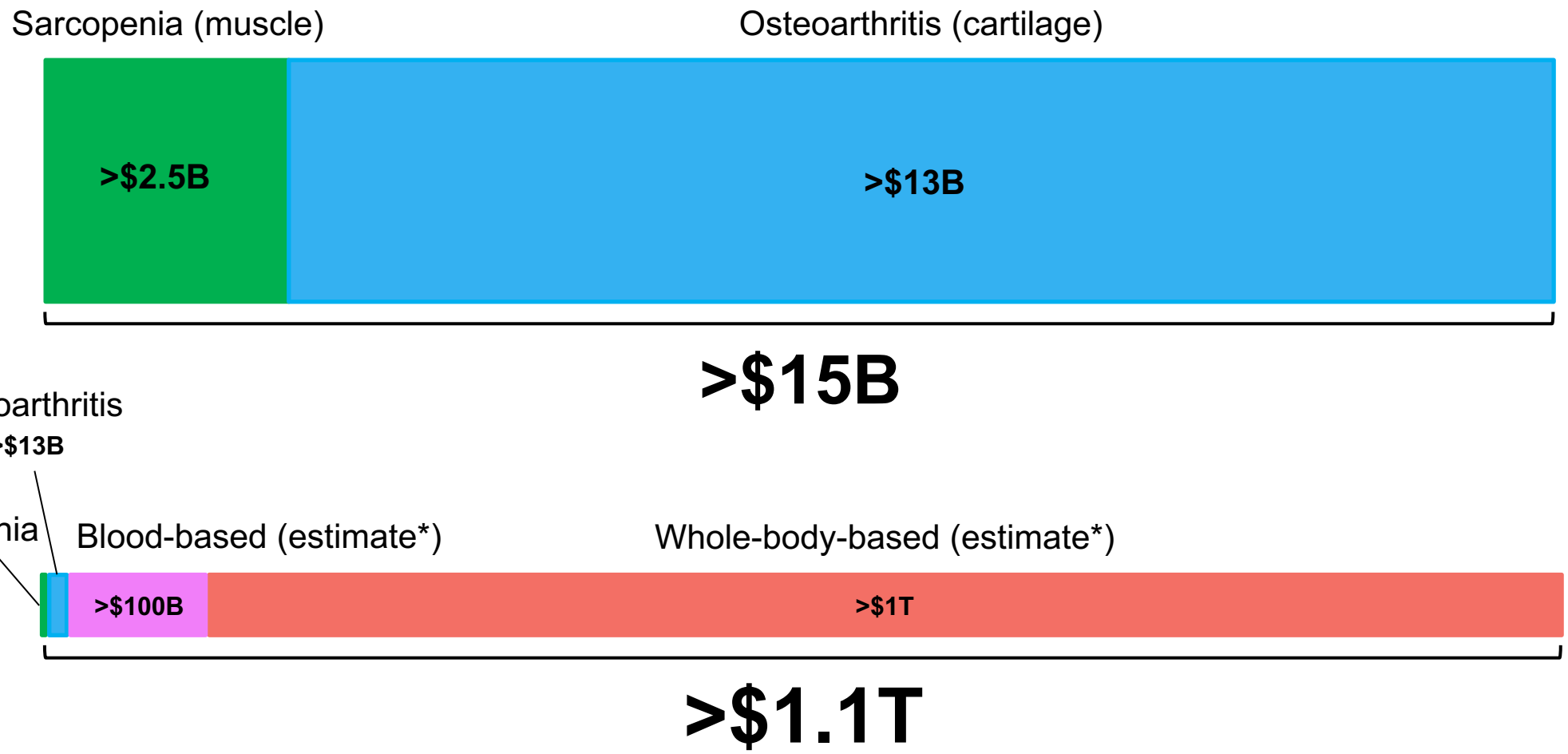
The unprecedented economic value of rejuvenation



*Andrew Scott et al, The economic value of targeting aging. *Nature Aging* (2021)

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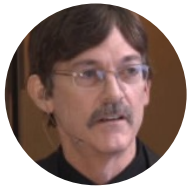
Two active frontiers in rejuvenation science

Tissue-based rejuvenation



Greg Fahy
Intervene Immune
Phase 2, Somatotrophin+metformin+DHEA
2yr GrimAge reversal, thymus atrophy reversal (humans)

Tony Wyss-Coray
Alkahest, $146M acquisition (Grifols)
Phase 2, blood plasma-fraction
Cognitive impairment reduced in Parkinson's (humans)

Irina Conboy
IMU
Phase 2, therapeutic plasma exchange
Cognitive impairment / inflammaging reduced (old mice)

Harold Katcher
Nugenics Research
Pre-clinical, novel therapeutic
50% reversal of DNAm age, increased function (old rats)

Cellular rejuvenation by OSKM reprogramming

David Sinclair
Iduna Therapeutics
Pre-clinical, OSK gene-therapy
DNAm clock reversal, vision restored (old mice)

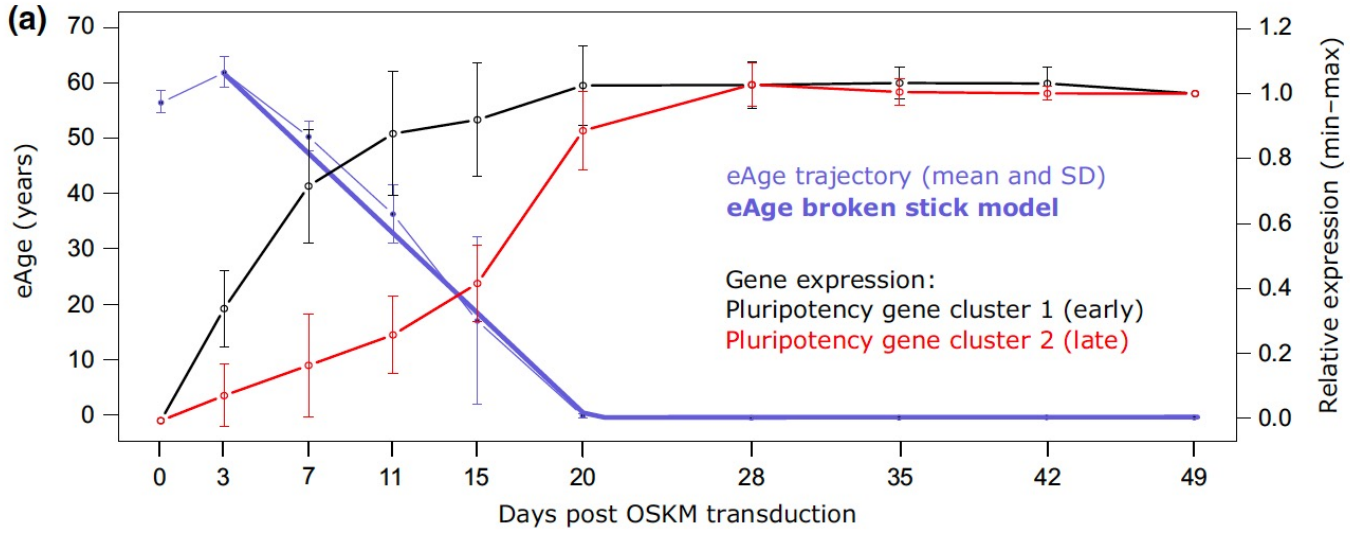
Vittorio Sebastiano
Turn.Bio
Pre-clinical, OSKMLN mRNA
DNAm clock reversal, functions restored (human cells)

Rick Klausner
Altos Labs, >$270m raised (Bezos, Milner)
Discovery, machine learning approach
Stealth

Cynthia Kenyon
Calico, >2.5B raised (Alphabet)
Discovery, OS & MSX1 transgenes, single-cell 'omics
Age-sig' reversal, ½ impact on identity (human cells)

Rejuvenation by OSKM reprogramming promises the greatest efficacy.

However, reprogramming carries significant therapeutic hazards, which must be addressed before it can leave the dish.

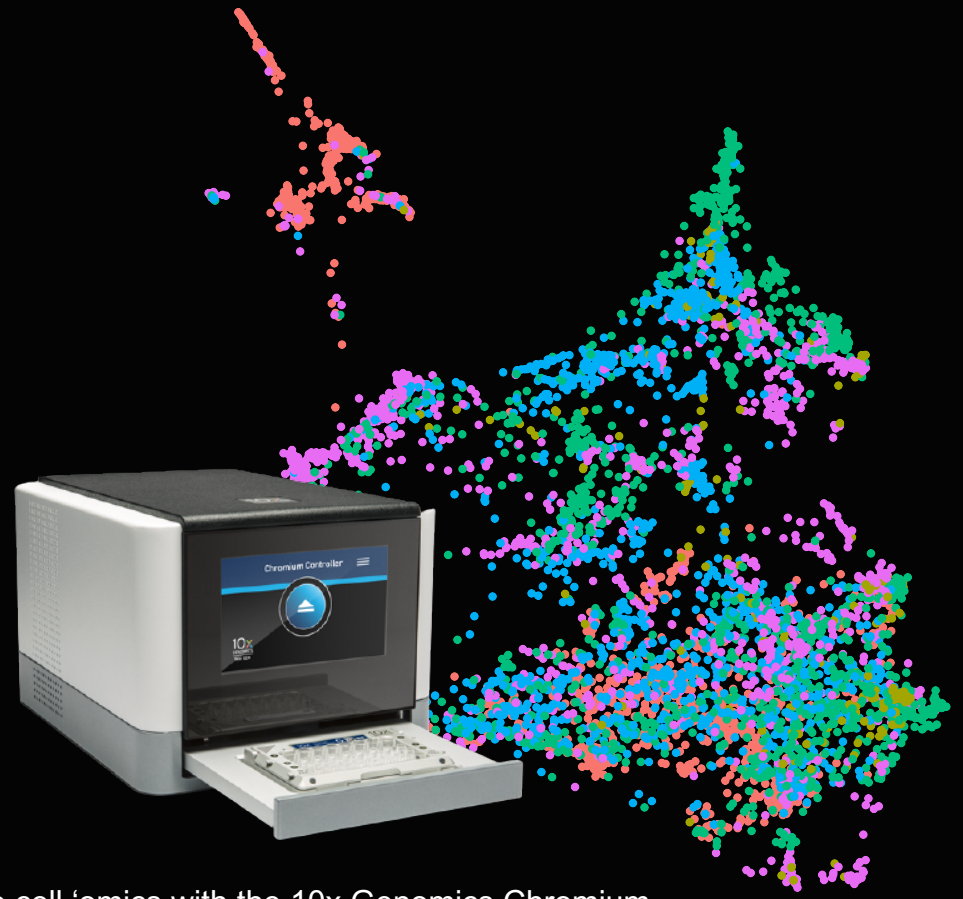


Rapid-reversal of DNA methylation age with OSKM driven reprogramming (Olava *et al* 2018)

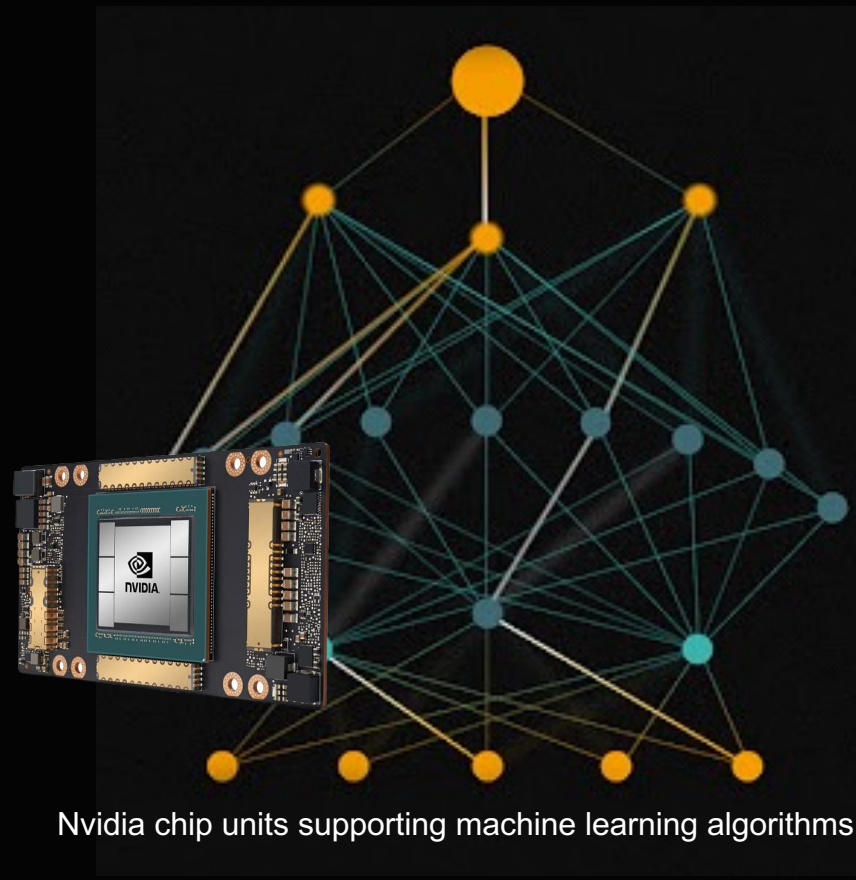
Can the ‘black box’ of OSKM reprogramming be understood to reveal a pathway for safe cellular rejuvenation?

Teratomas (above) are tumors made up of several types of tissue.
Reprogramming with OSKM induces teratomas in mice (Ocampo *et al* 2016)

New power to measure and interpret biology



Single cell ‘omics with the 10x Genomics Chromium



Nvidia chip units supporting machine learning algorithms

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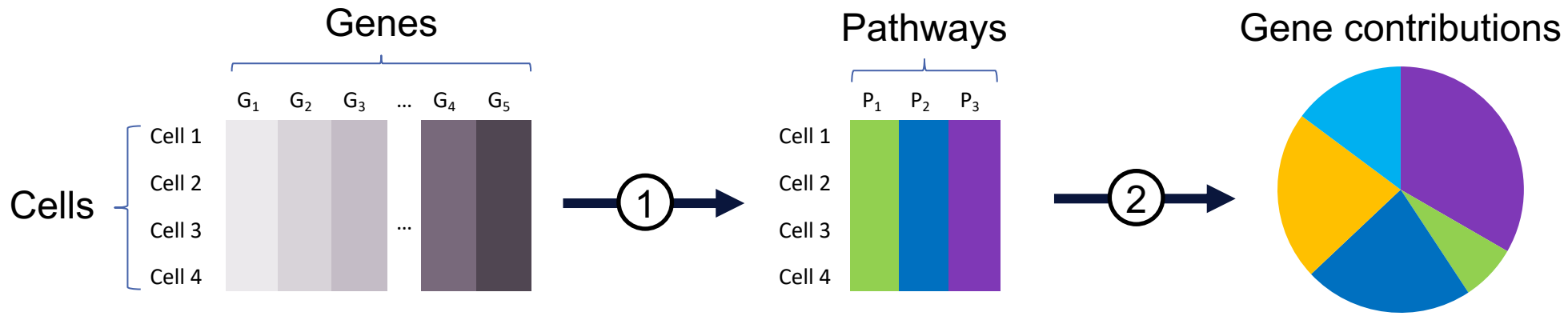
Our patented machine learning makes it possible to untangle the cellular rejuvenation pathway



1. Take gene expression data from across a time series of samples and convert to de novo pathways, to **highlight key changes and remove noise**. Patent filed in July 2021 (EP218).

2. Apply machine learning to pathways to **find pathways correlated with rejuvenation & key genes**

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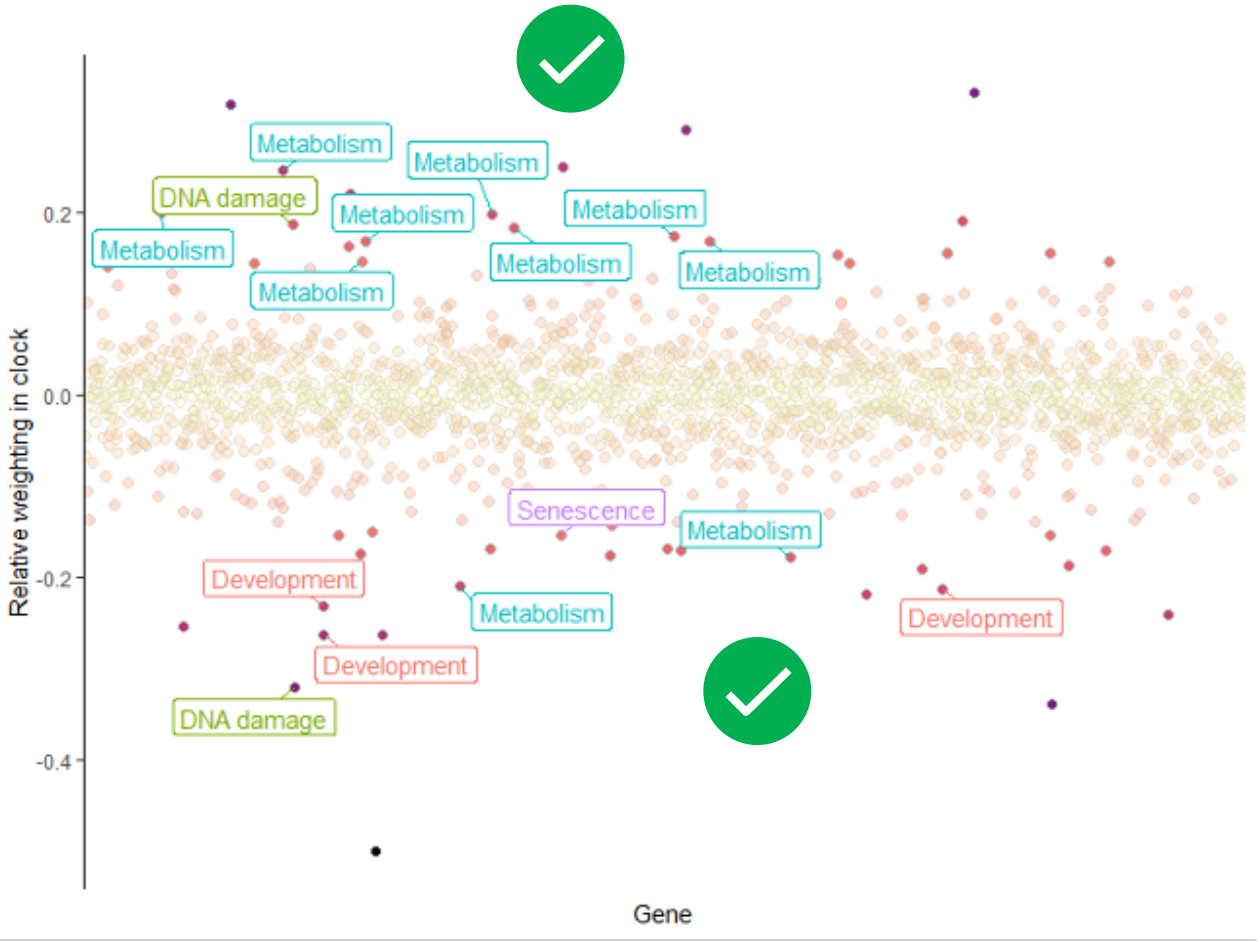
Enrichment of causal or driving genes in aging



Here our technology predicts causal or driver aging genes from a time course of aging cells. This contains genes from biological pathways linked to aging, such as metabolism, senescence and development (e.g. positive controls).

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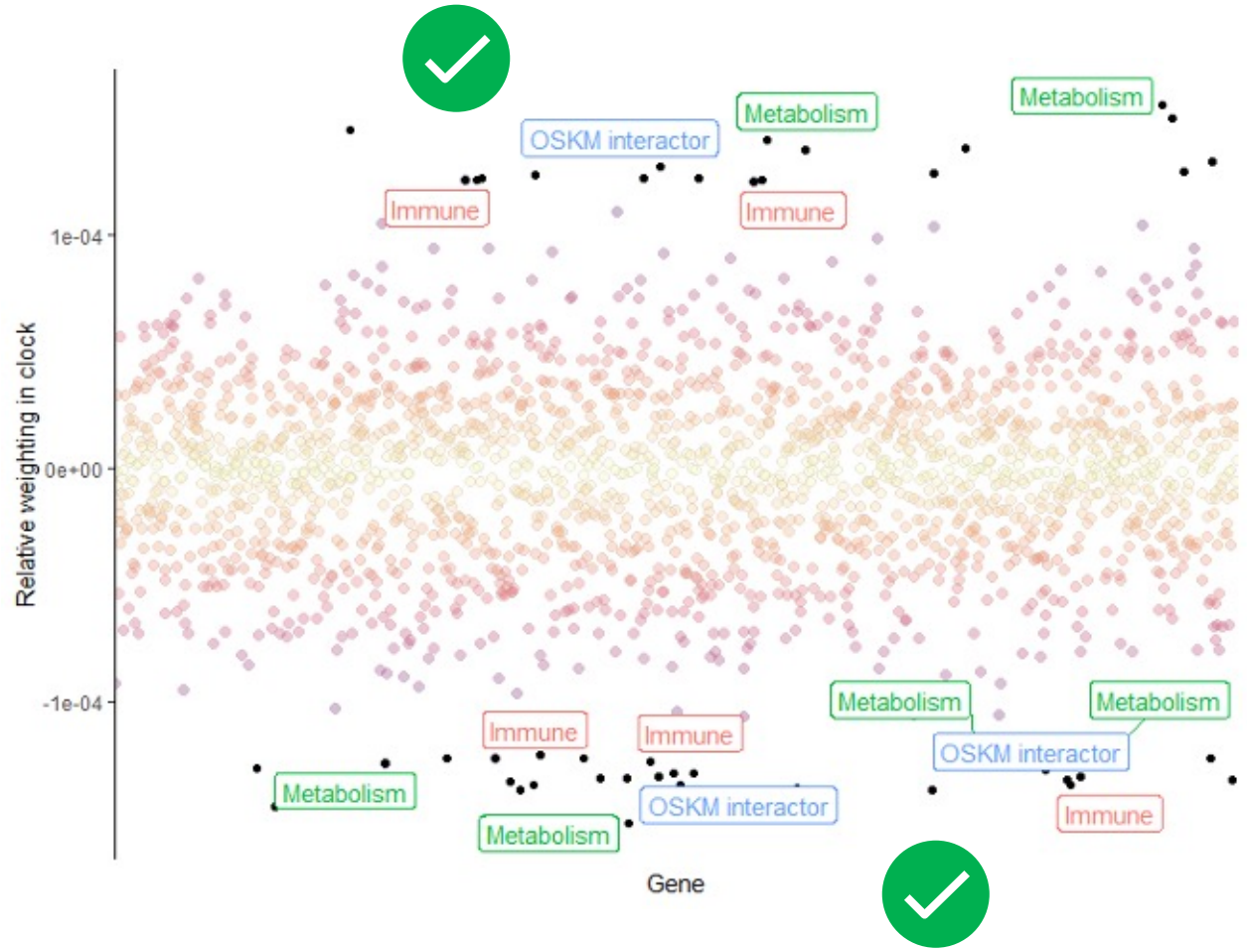
A putative rejuvenation pathway without OSKM



Applied to cell reprogramming, our machine learning method suggests **gene targets for safe rejuvenation.**

Here our technology predicts causal or driver genes from OSKM-driven cellular reprogramming (e.g. OSKM interactors as positive controls).

We see genes from biological pathways linked to aging appear, but this time they are regulated in the opposite direction (e.g. they go down with aging and up with rejuvenation).

This is exciting, because it suggests a plausible candidate for the rejuvenation biological pathway, which is safe

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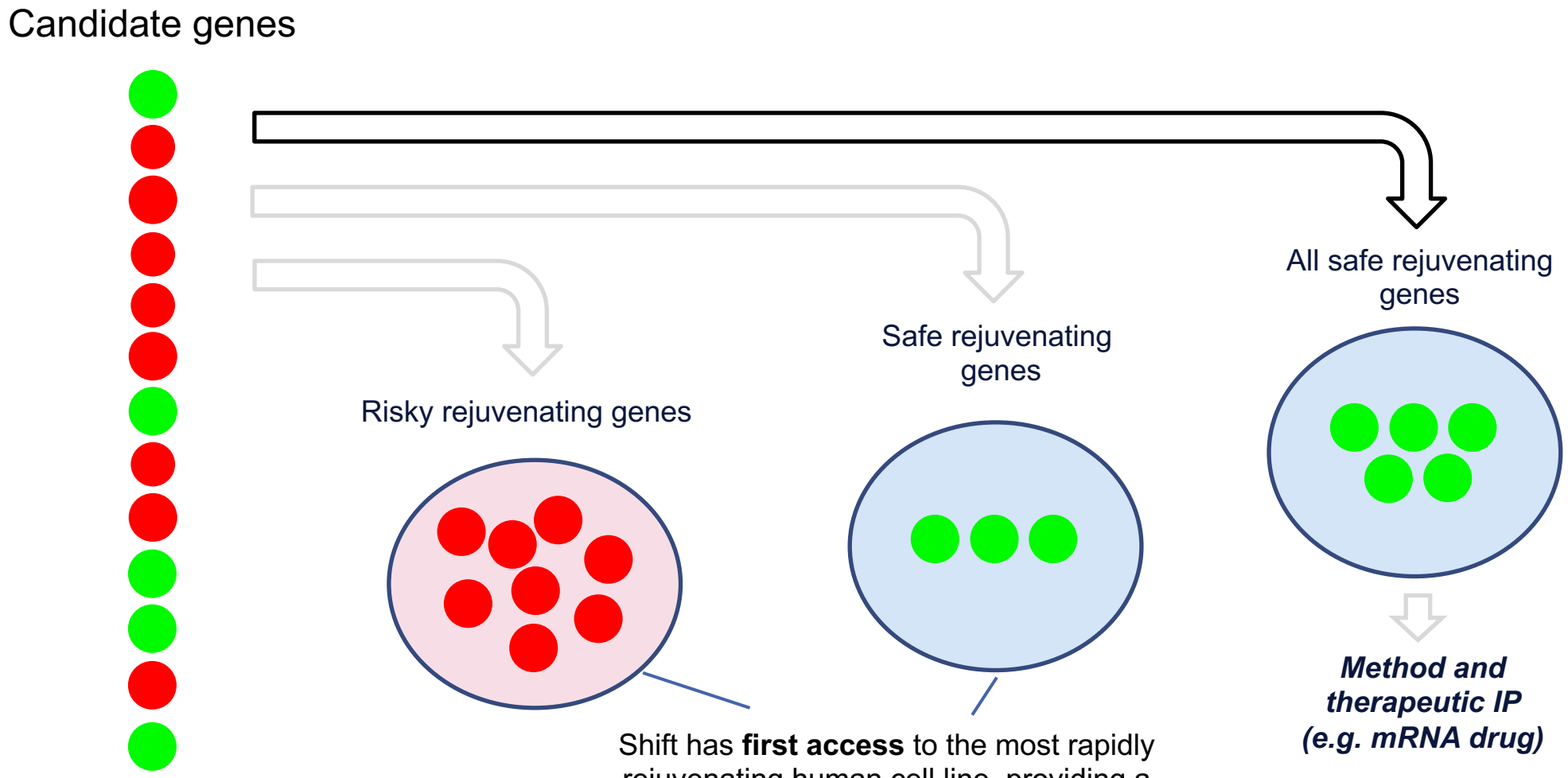
The next step is to confirm safe rejuvenating genes



Shift has **first access** to the most rapidly rejuvenating human cell line, providing a **4x speed advantage for data generation**

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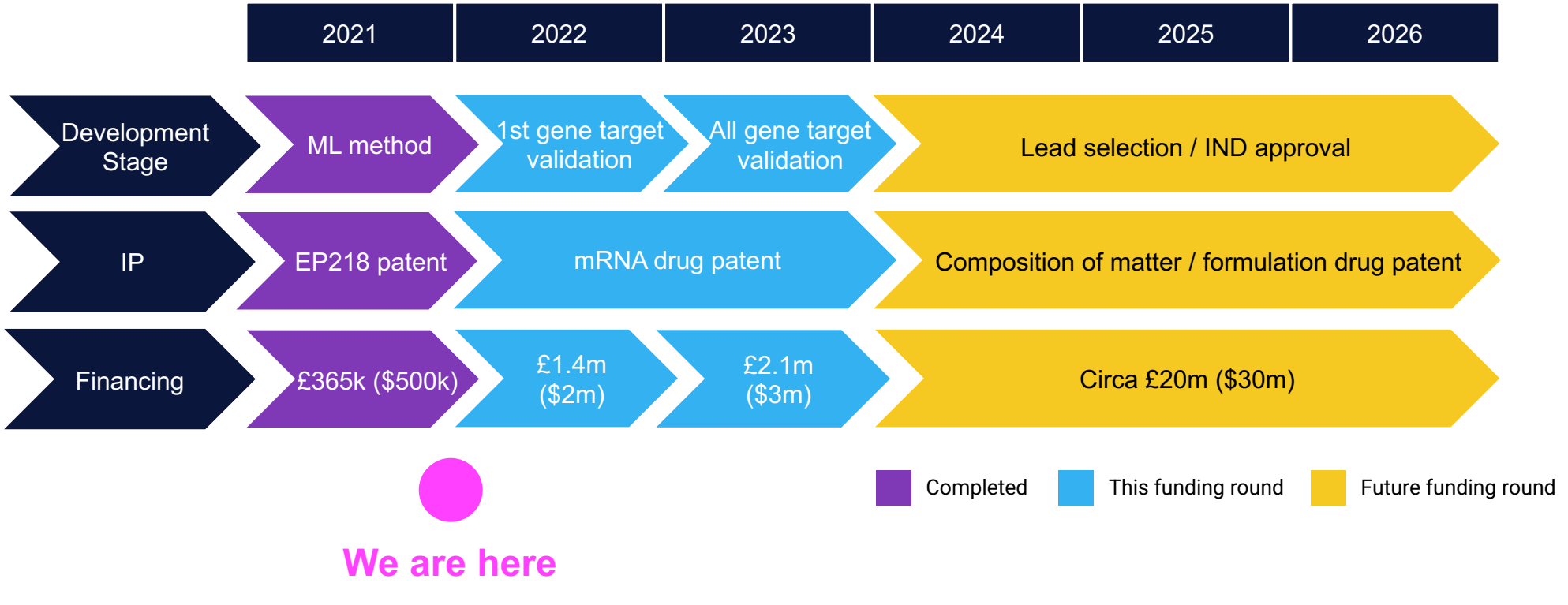
Roadmap



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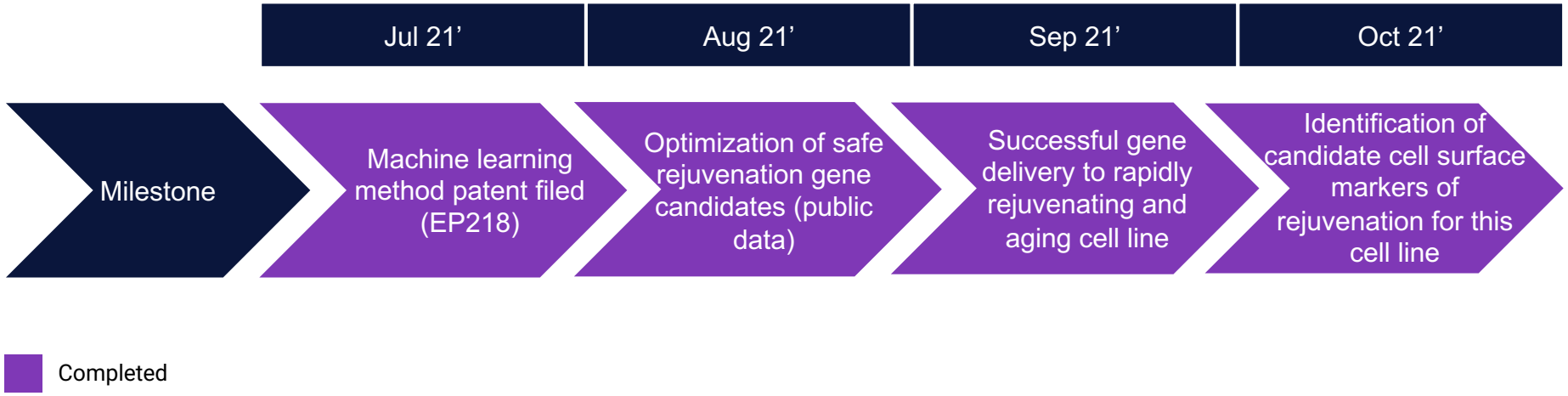
Recent Milestones



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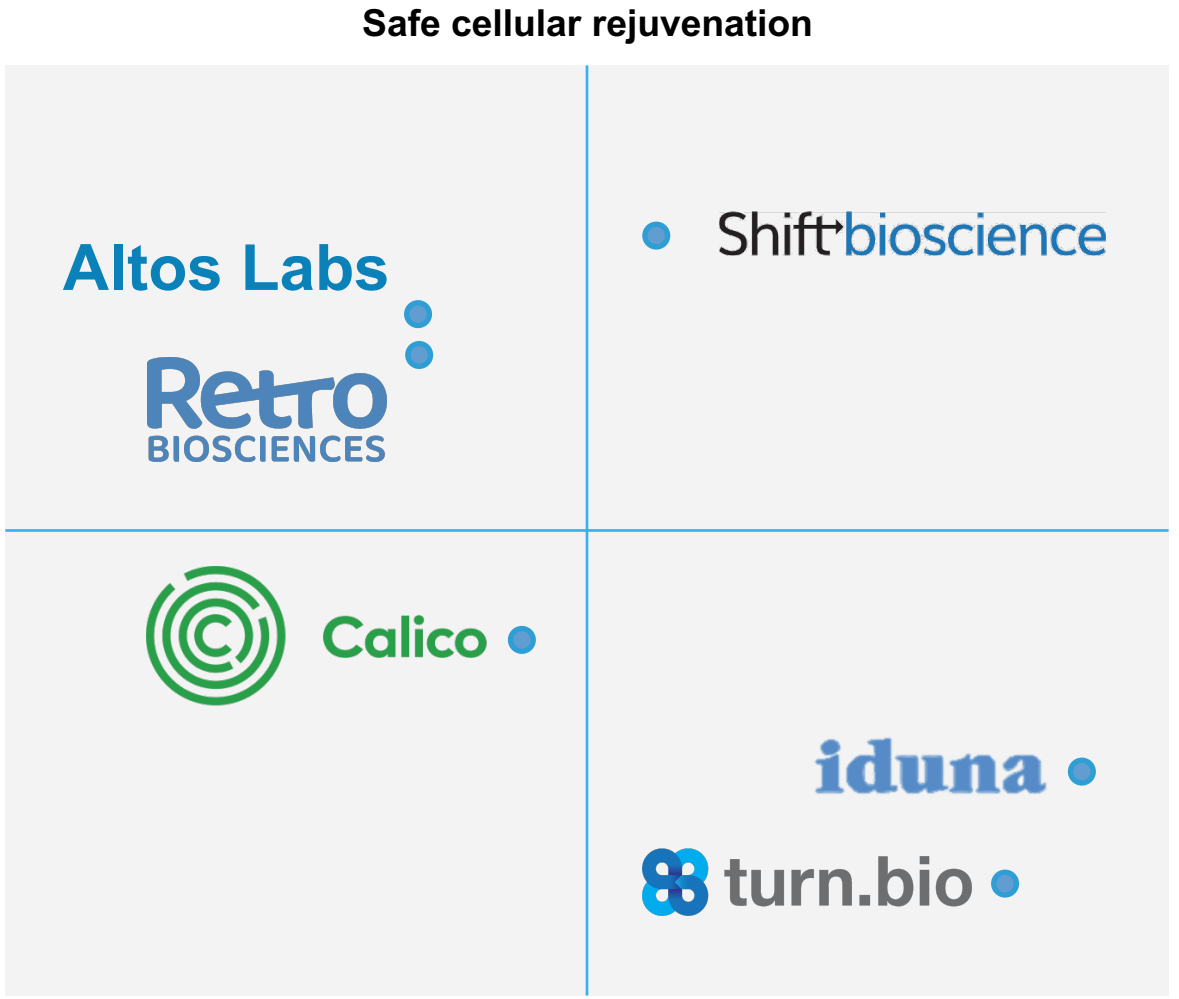
We have first mover advantage



Our platform is creating excitement

Really terrific [Shift Bioscience], everything about it. The idea, the preliminary data, you're terrific and congratulations.

Nir Barzalai M.D.
Professor of Medicine & Genetics
Albert Einstein College of Medicine
Setup the first clinical trial for aging with the FDA

An ingenious and unique approach to cellular reprogramming to reverse aging. We're delighted to be working with a team as talented and relentless as Shift Bioscience.

Nathan Cheng
General Partner
Healthspan Capital

Shift Bioscience is the start-up that has sparked the most excitement from mentors and funders of Foresight's Health Extension Accelerator.

Allison Duettmann
President
Foresight Institute

I am proud to have worked closely with Daniel on Shift Bioscience, which is driving the healthspan revolution. I expect this area of research to be the 'next big thing'.

Jonathan Milner PhD
CEO & Executive Director
Meltwind advisory LLP

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Cambridge-based expert team

Daniel Ives
PhD, CEO

Discovered the first molecule targeting mitochondrial DNA mutations (2-deoxyglucose)

PhD at University of Cambridge

Co-founder of Shift Bioscience

Brendan Swain
PhD, CSO

Invented a novel machine learning method enabling single cell aging / rejuvenation clocks

PhD at University of Cambridge

Co-founder of Shift Bioscience

Steve Ives
MBA, CFO

Cofounder and CEO at Aspective, Trigenix, Taptu (exits to Vodafone, Qualcomm)

MBA at Wharton, MA University of Cambridge

Co-founder of Shift Bioscience

Juned Kadiwala
MSc, Scientist

>7 years experience at the University of Cambridge iPSC Core Facility

Derived >120 disease specific iPSC lines

Setup HIPSCI iPSC core facility at the Sanger Institute

Lucas Camillo
BSc, Scientist

Inventor/author of the neural-net AltumAge clock

Specialized in biological interpretability of neural nets and molecular layers

BSc Biochemistry & Molecular Biology, Brown University

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We’ve attracted knowledgeable partners

Jonathan Milner
PhD, investor

Cambridge-based angel investor

Cofounder of life science unicorn AbCam

Provided investment and support to three companies that reached IPO

Karl Pfleger
PhD, investor

CA-based angel focused on Longevity

Machine learning engineer at Google for >10 years

Ken Raj
PhD, collaborator

Biologist and coauthor on landmark epigenetic aging clock studies

Group leader at Public Health England

Wolf Reik
FRS, PhD, advisor

Reprogramming-based rejuvenation pioneer

First multi-tissue epigenetic aging clock for mice

Director of the Babraham Institute

NVIDIA INCEPTION PROGRAM

FORESIGHT INSTITUTE

Accelerate @Babraham

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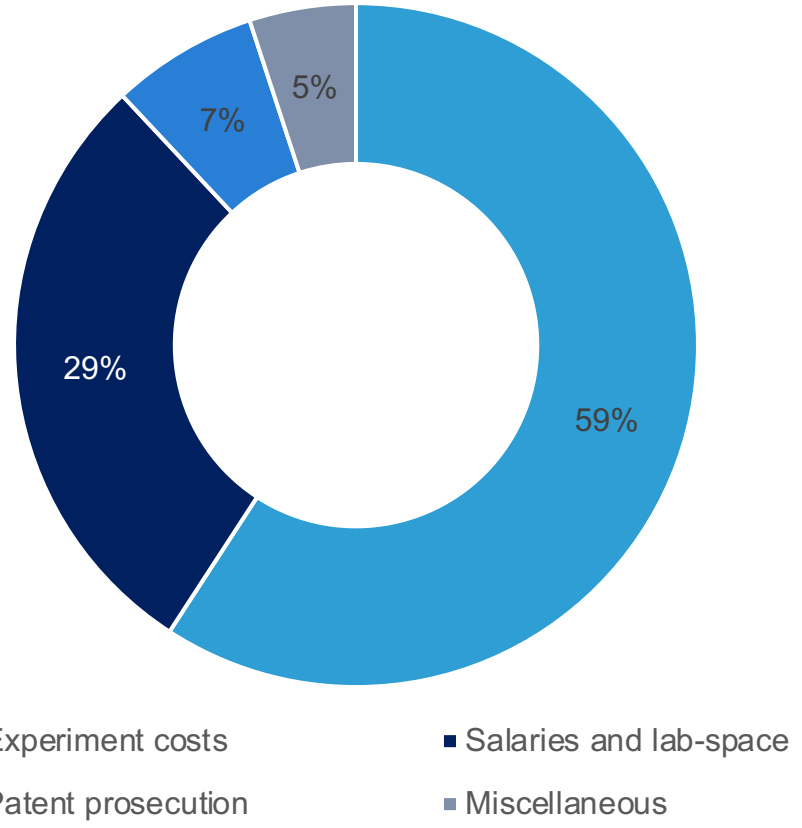
Investment rationale



We are seeking ***£3.5M** to accelerate our work

Our goal is to **patent mRNA drugs** targeting safe rejuvenating genes;

This valuable IP will be **licensed** to create world-changing rejuvenation therapies.

*£11m pre-money valuation, EIS qualifying, BTC or USDC accepted

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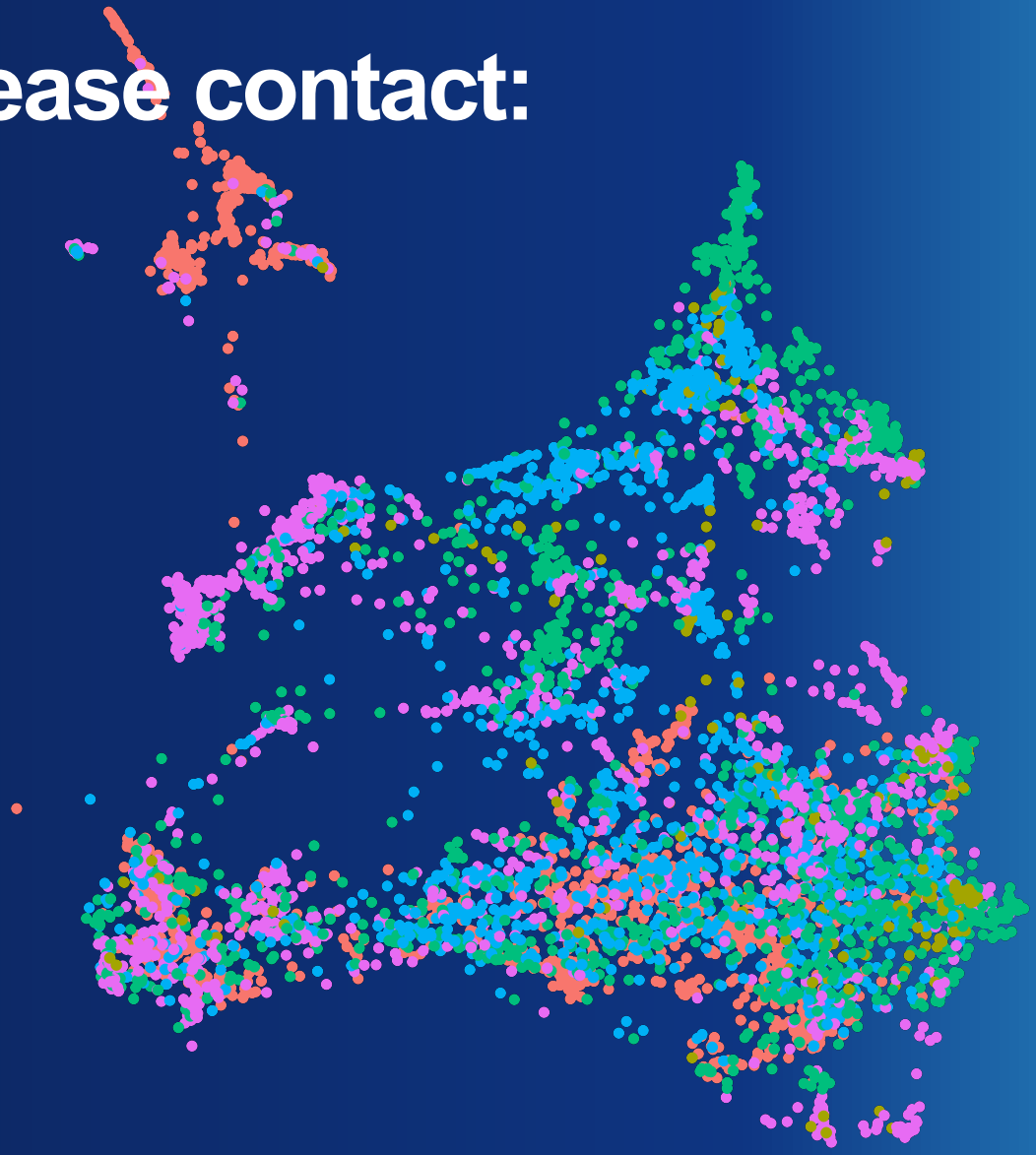
For further information please contact:

Daniel Ives
Founder & CEO

daniel@shiftbioscience.com



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