

MICROBATM

**PRECISION MICROBIOME
THERAPEUTICS**

24 July 2023

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The background of the entire image is a 3D visualization of a microbiome. It features a dense field of grey, rounded, finger-like structures representing the mucosal surface. Scattered throughout this field are numerous small, colorful, rod-shaped and spherical objects representing various types of bacteria. The overall scene is illuminated from the top, creating a sense of depth and highlighting the texture of the mucosal surface.

MICROBA™

up to **95%**
coverage

up to **34x**
more accurate

Published in

 **frontiers**
in Microbiology

Other
Technology

Microba
Technology

MICROBA™

1 Calculated by analysing more than 10k samples across Microba's databank

2 Microba achieves 6-34x lower false discovery rate than academic competitors Parks, Donovan H., et al. "Evaluation of the Microba Community Profiler for Taxonomic Profiling of Metagenomic Datasets From the Human Gut Microbiome." *Frontiers in microbiology* 12 (2021).

Services



Testing

Microba provides testing and data analysis for a fee to **clinicians, consumers** and **research customers**

Data



Databank

Proprietary databank



Health Data



Biome Data

Driving discovery of novel therapeutic leads

Therapeutics



Insights



Novel Therapies

Data-driven product platform developing novel live biotherapeutics

Two core business segments driven by a proprietary databank

Company Snapshot



Continuous YoY revenue growth over 5 years of operations



Partnerships with market leaders incl. **Sonic Healthcare** (ASX: SHL), **Ginkgo Bioworks** (NYSE: DNA), **SYNLAB** (GR:SYAB) + more



Large, unique, proprietary microbiome databank



3 key therapeutic programs with lead IBD drug candidate **in Phase I trial**



World-leading technology in the emerging and rapidly growing **US\$4.89 billion** microbiome sector¹

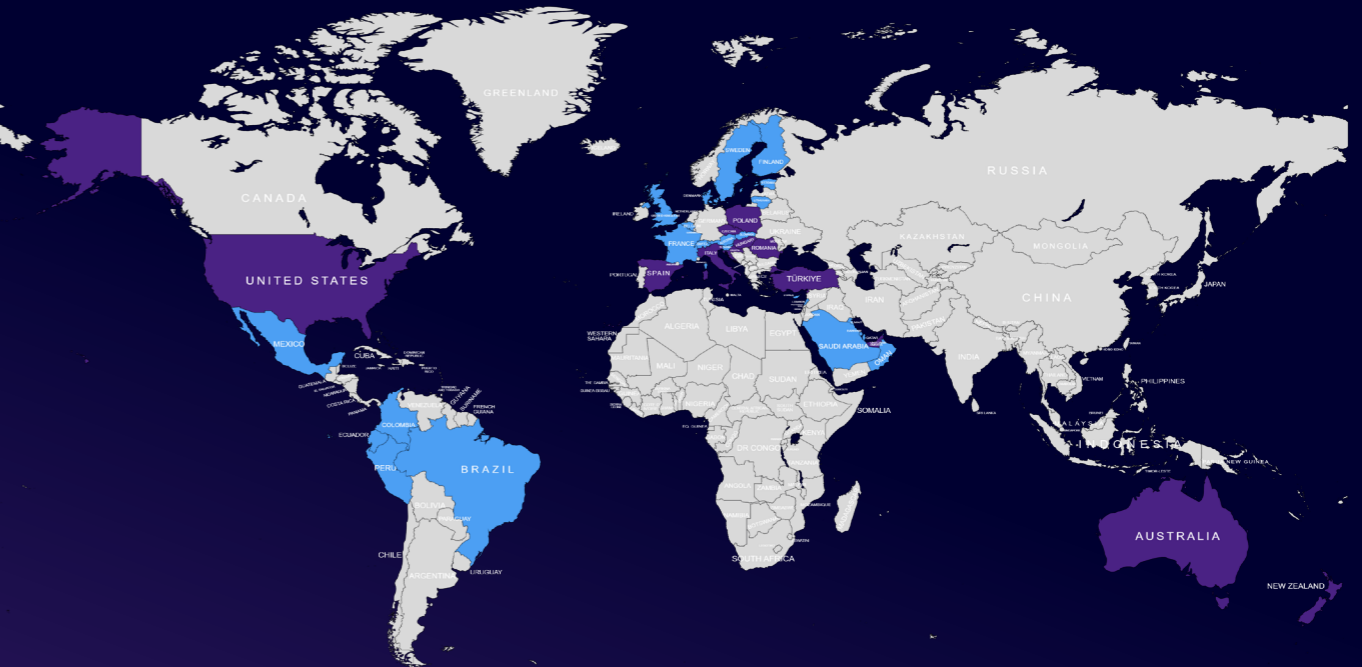


Globally **leading microbiome expertise** complemented by drug discovery experts including Prof. Ian Frazer

Microbiome testing services business



- Continued YoY revenue growth
- Leading bench of global partners provides access to 35 countries with 13 now operational
- At the forefront of rapidly emerging microbiome testing market
- Opportunity to disrupt diagnostic markets including infectious disease testing



Driving global revenues and databank growth

- Contracted partner/s operational
- Access to this country through existing distribution partner network

Precision Microbiome Therapeutics

- Precision microbiome analysis platform delivering unparalleled accuracy, coverage & depth.
- Data driven discovery platform utilising one of the worlds most advanced & highly curated microbiome datasets.
- Next generation approach to microbiome drug development identifying and isolating single keystone species to develop Live Biotherapeutics.



Novel Pipeline of Microbiome Therapies

- ✓ Potent and novel biology mediated by Live Biotherapeutic strategy
- ✓ Scalable GMP manufacturing for high dose oral delivery
- ✓ Excellent safety profile

Experienced Leadership



Luke Reid
CEO



Trent Munro
SVP Therapeutics



Prof Ian Frazer
Director & MAB Chair

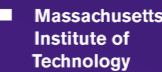


Prof Gene Tyson
Co-Founder



Prof Phil Hugenholtz
Co-Founder

Microba Partners



Evolution of Microbiome based Therapeutics

1 First Generation



Fecal Doner Derived



FDA approval Nov 30 2022
Faeecal doner derived enema drug product



FDA approval April 27 2023
Faeecal doner derived oral capsule drug product

2 Second Generation



Bacterial Consortia



Vedanta Biosciences
Vedanta Biosciences Raises \$106.5M in Funding



SER-155
Phase Ib showing engraftment reduction in pathogens

3 Next Generation



Single Strain & Small Molecule



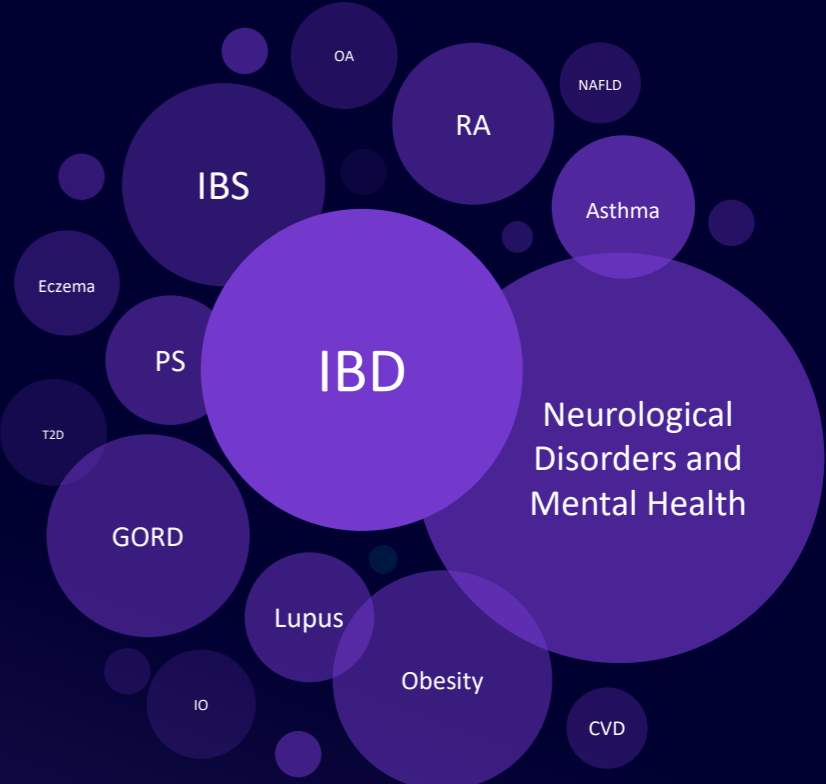
MAP 315
Phase I H1 FY2024

Human data driven insights

Microbiome Databank

Health Data

Biome Data



Precision Microbiome Therapeutics

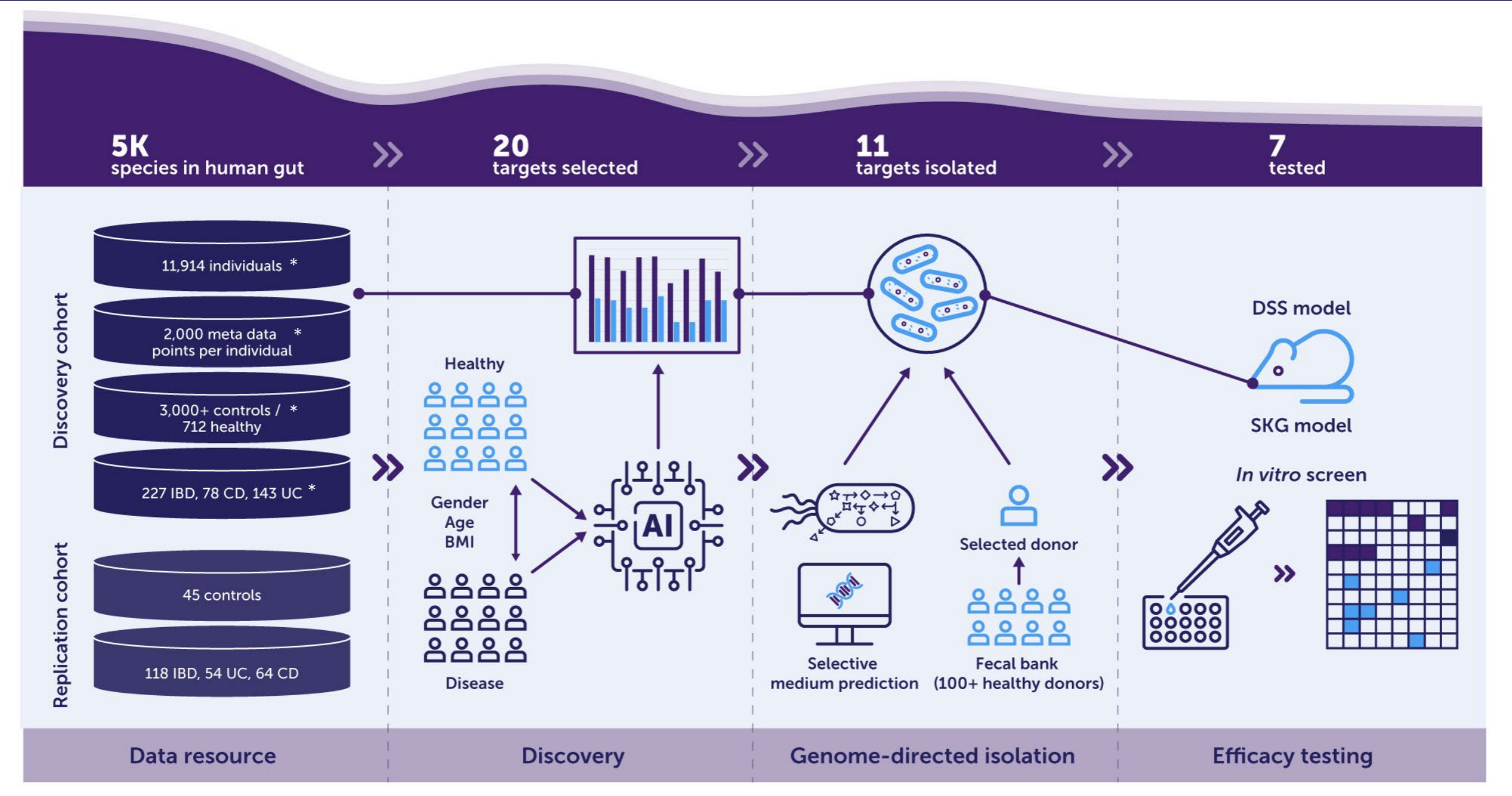
Therapeutic Pipeline



* Phase I clinical trial commenced first dosing in June 2023, result expected to be available in December 2023

Inflammatory Bowel Disease

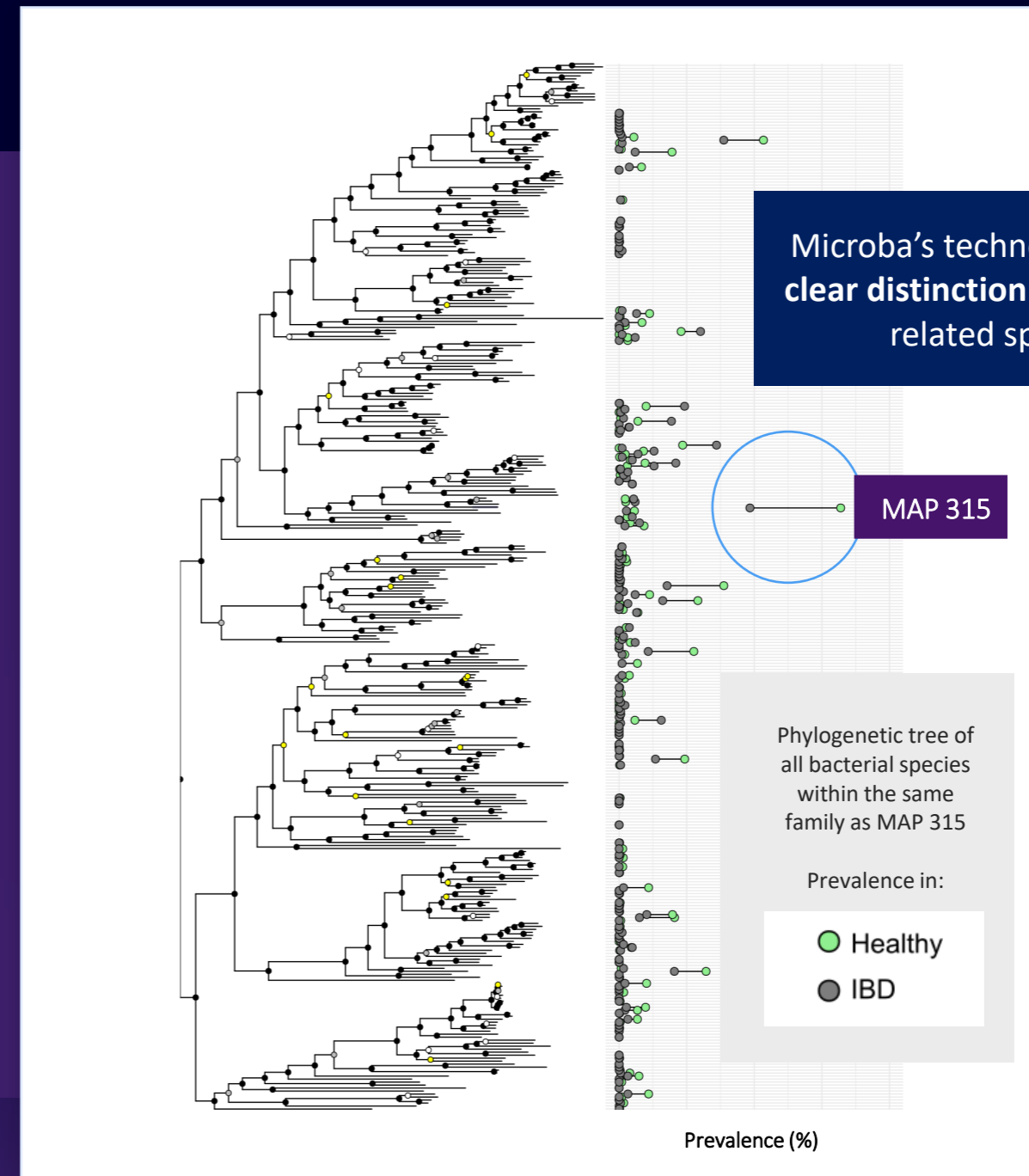
Data-driven platform driving discovery of novel biotherapeutics



IBD Program: Clinical data-driven discovery

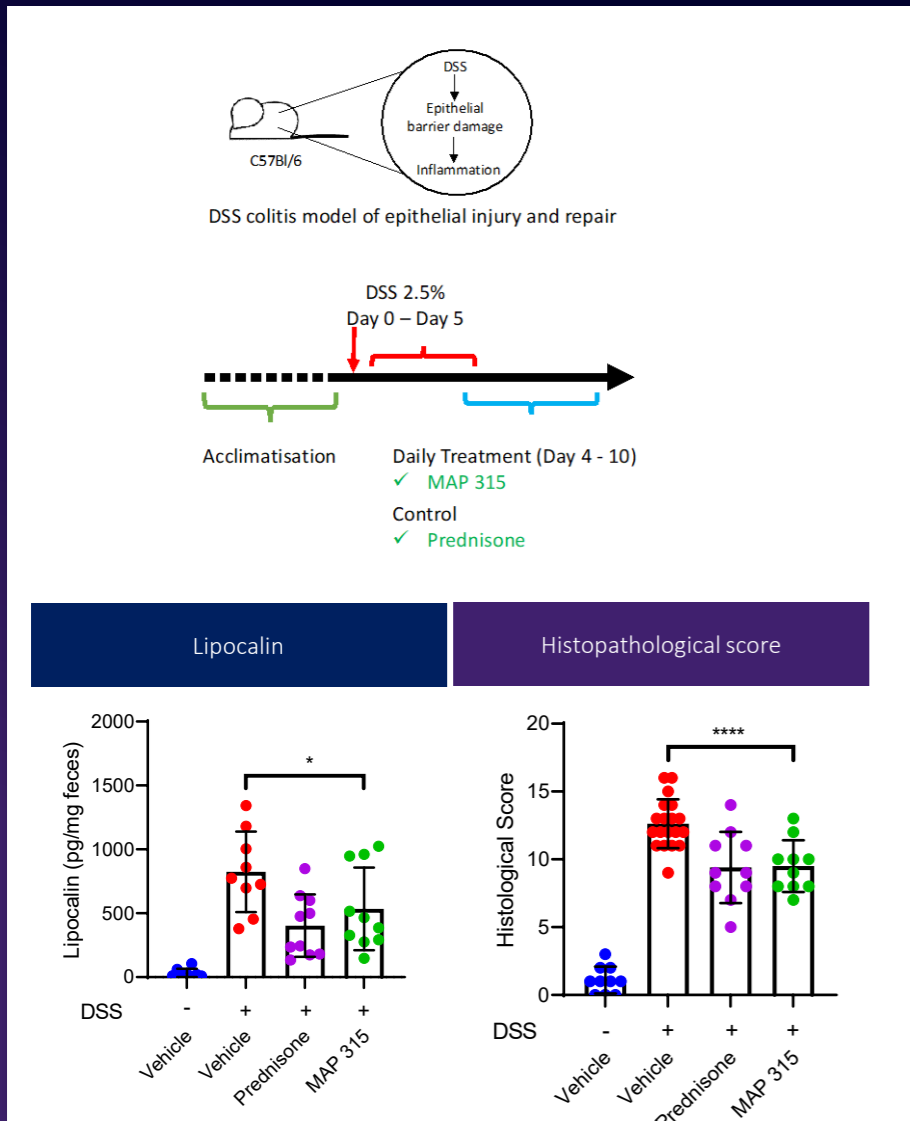
Lead candidate MAP 315:

- Identification enabled by Microba's **precision microbiome measurements**
- A previously uncultivated, uncharacterized species
- Rationally discovered and replicated in human datasets
- Clearly stands out from other species

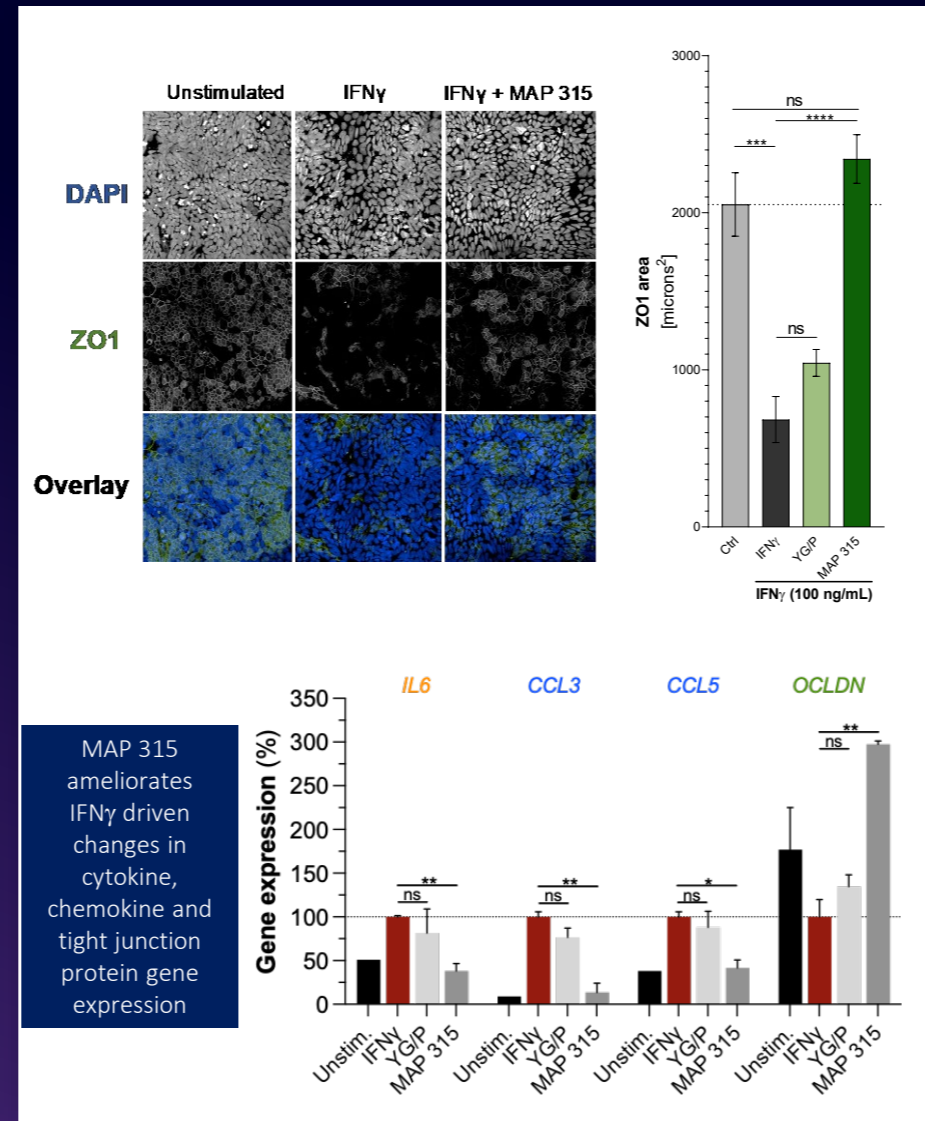


IBD Program: MAP 315 Biology

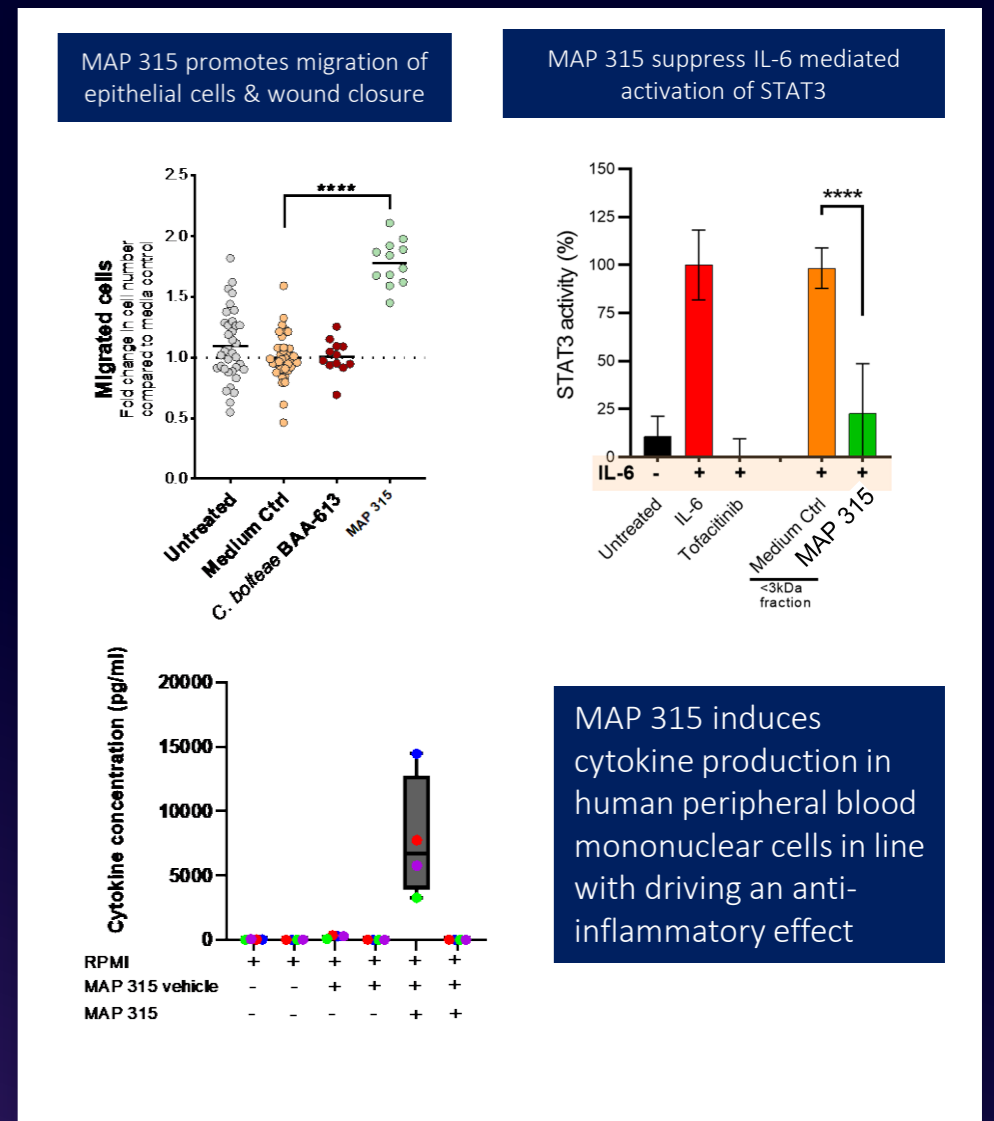
1 Improved pathology in induced colitis mouse models



2 Supports barrier integrity by modulating gut epithelial cell tight junctions

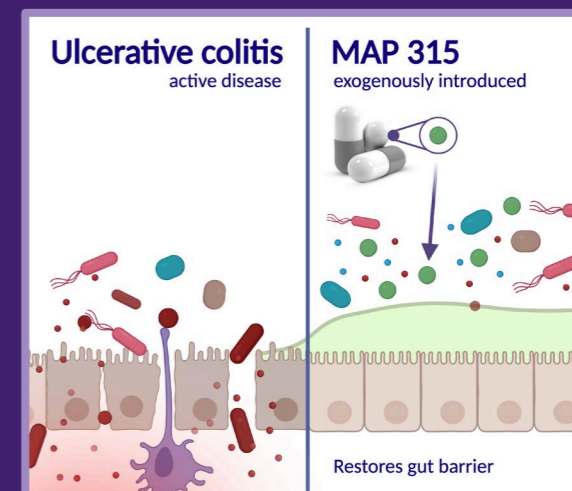


3 Promotes epithelial cell migration & suppresses cytokine driven inflammatory response



MAP 315 at the forefront of live biotherapeutics a new potential major class of therapeutics

- MAP 315 has the potential to provide **novel, potent therapeutic benefit** to UC patients through addressing a **key gap** in existing care – **epithelial and mucosal healing**
- MAP 315 is a **clinical stage, orally delivered, single strain live biotherapeutic** differentiated from donor derived or microbiome cocktail approaches **simplifying CMC and regulatory pathway**



\$10B+

Inflammatory Bowel Disease

Ulcerative Colitis & Crohn's Disease ¹

Favourable safety profile

All patients regardless of line of therapy

Bringing the promise of precision microbiome therapy to IBD

→
Expanded Inflammatory Disease Opportunity

\$50B+

Large market for additional Inflammation-Driven Indications ²

Fibrosis

Atopic Dermatitis/Psoriasis

Rheumatoid Arthritis

Oncology

Advancing response to immune checkpoint inhibitors through the gut microbiome

Between **42% - 70%** of patients do not respond to ICI therapy^{1,2}

Modulation of gut microbiome using **fecal microbiome transplant** improved ICI response in Phase I and II studies^{4,5}

Over 30 published studies support the influence of the gut microbiome on ICI response

¹Leonardi et al. (2020). *International Journal of Oncology*. DOI: 10.3892/ijo.2020.5088

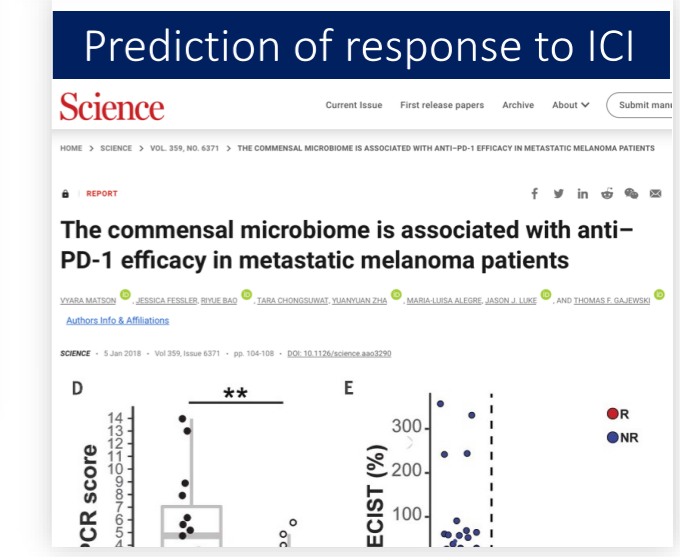
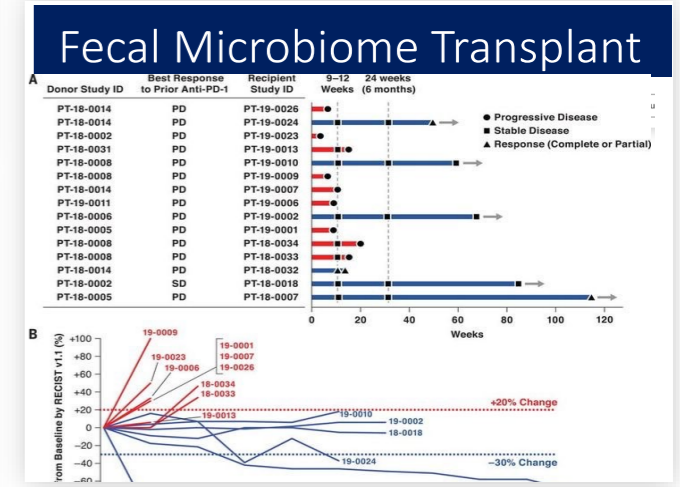
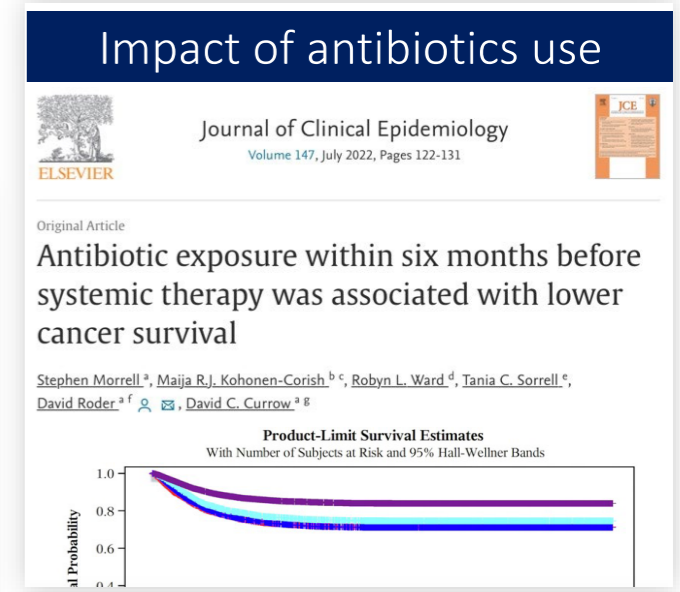
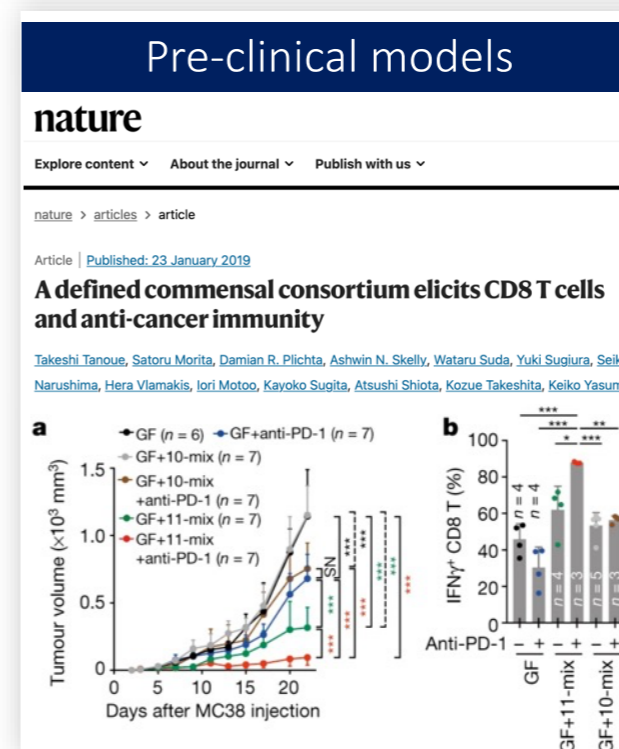
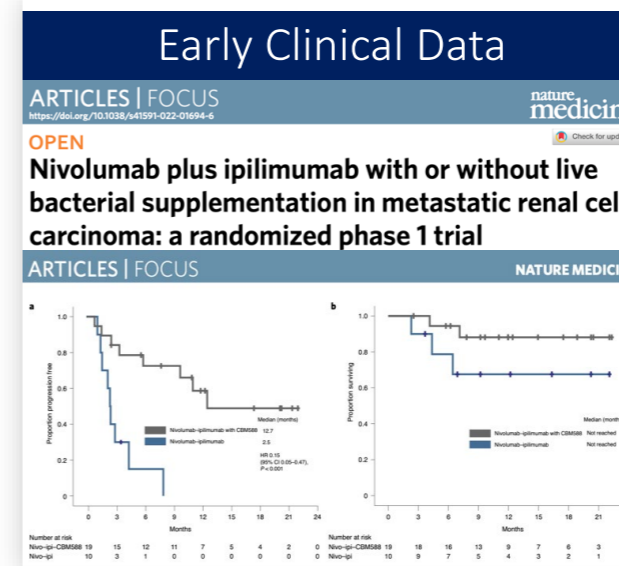
²Wolchok et al. (2017). *New England Journal of Medicine*. DOI: 10.1056/NEJMoa1709684

³Larkin et al. (2019). *New England Journal of Medicine*. DOI: 10.1056/NEJMoa1910836

⁴Baruch et al. (2020). *Science*. DOI: 10.1126/science.abb5920

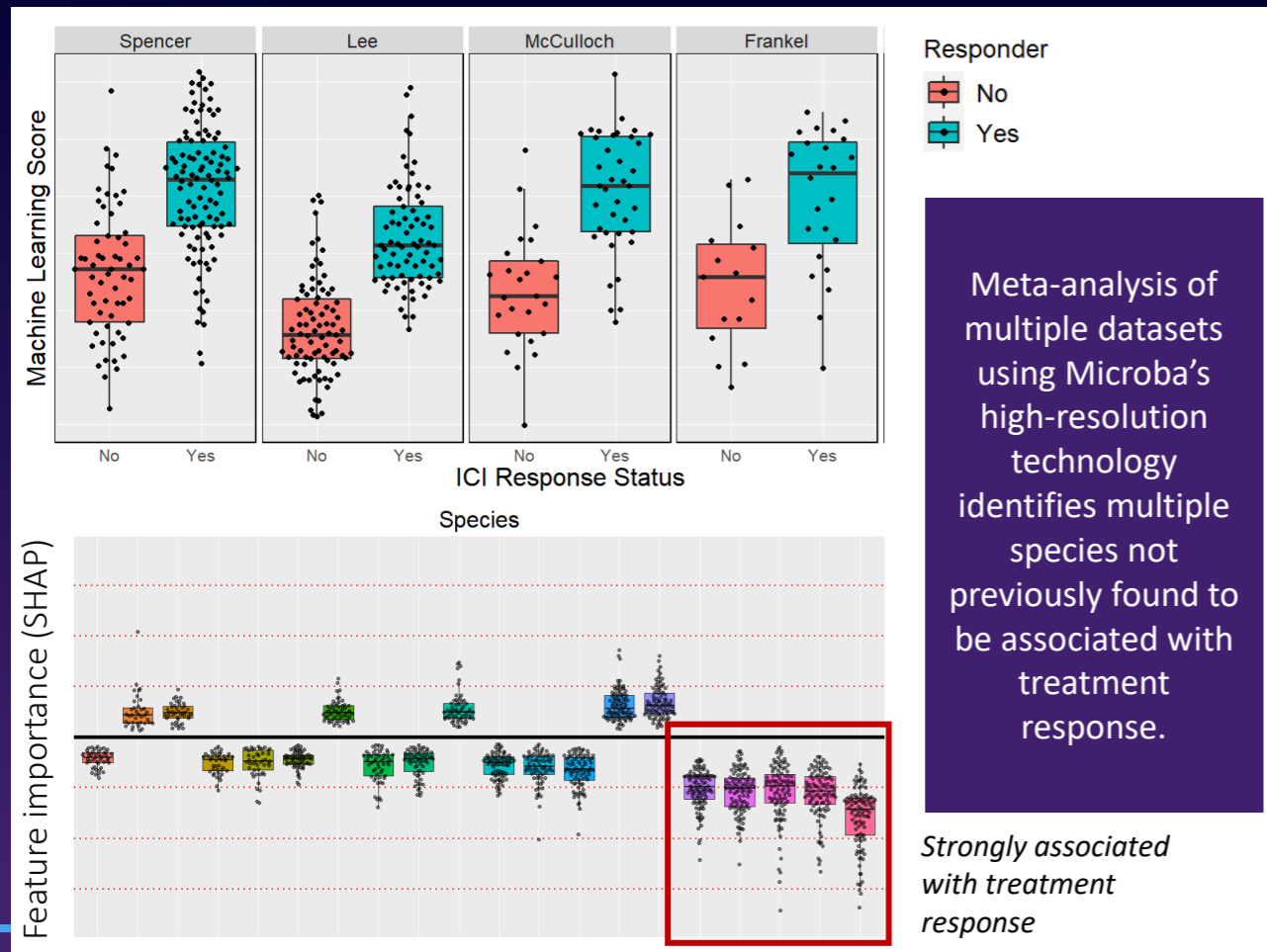
⁵Davar et al. (2021). *Science*. DOI: 10.1126/science.abf3363

* Immune-related adverse events



Oncology Program: Discovery & POC

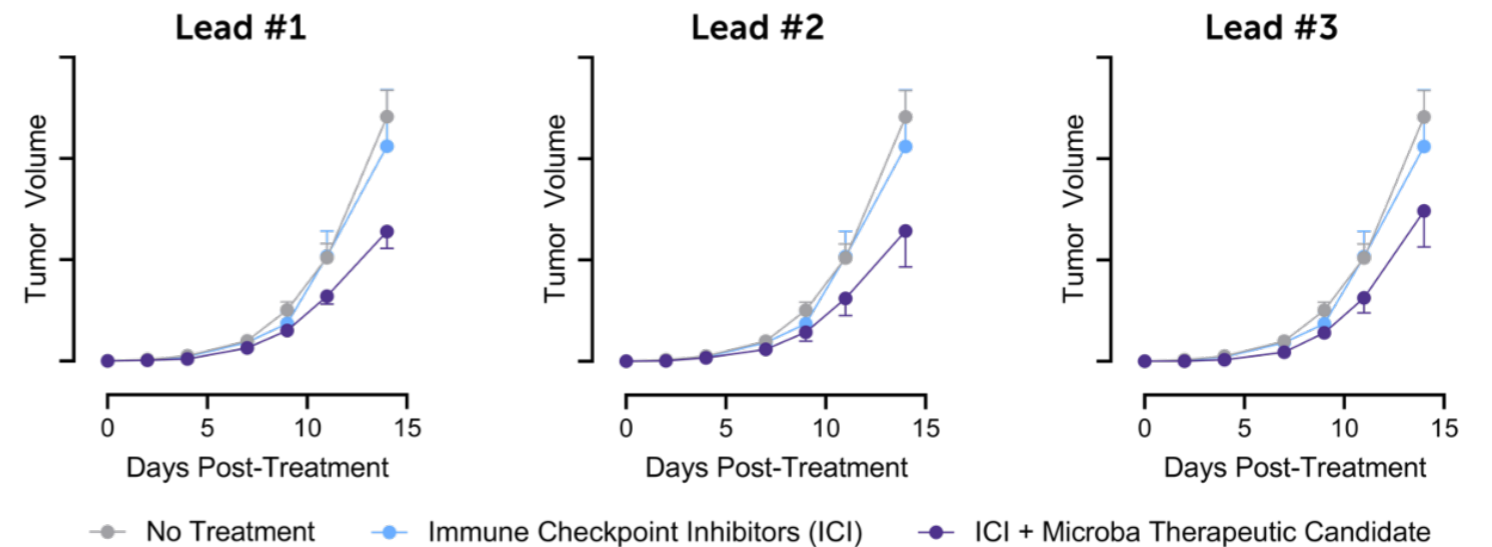
1 Human clinical data driven lead candidate discovery



2 Proof of concept achieved in immune checkpoint inhibitor (ICI) refractive mouse model

Positive animal efficacy data has been generated for Microba's immuno-oncology therapeutic leads.

A significant reduction in tumour size was observed in combination with immune checkpoint inhibitor (ICI) treatment in a mouse model of melanoma.

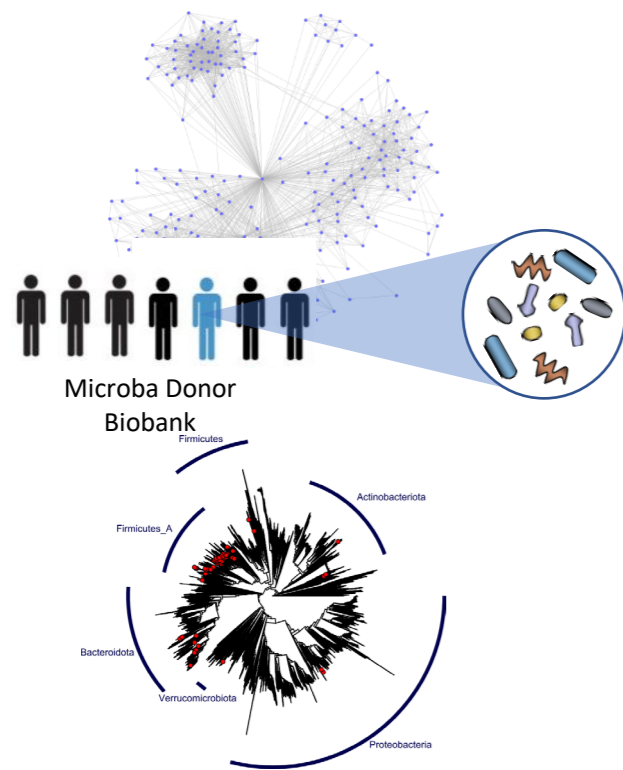


Developing breakthrough microbiome-derived cancer immunotherapy

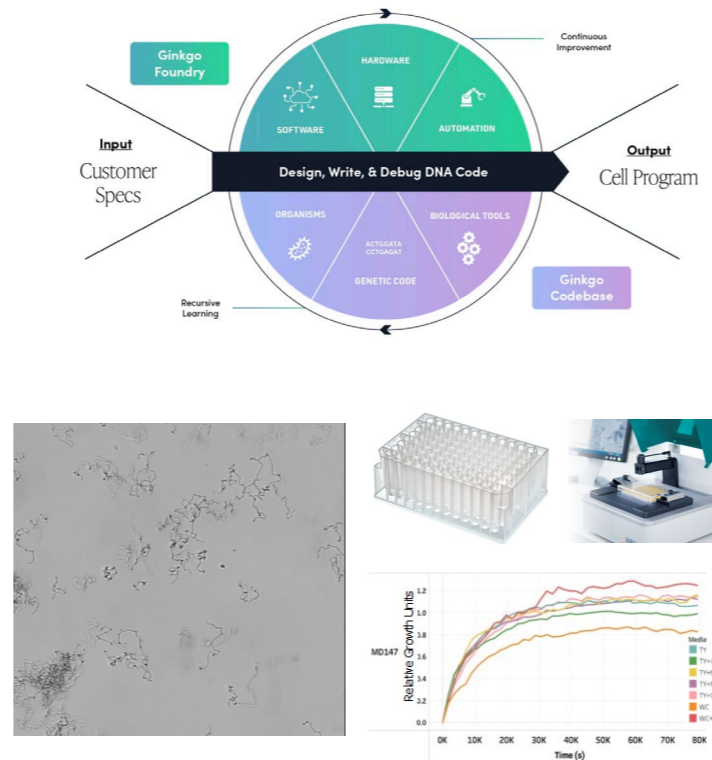
Autoimmune Disease

Autoimmune: Drug Discovery Program

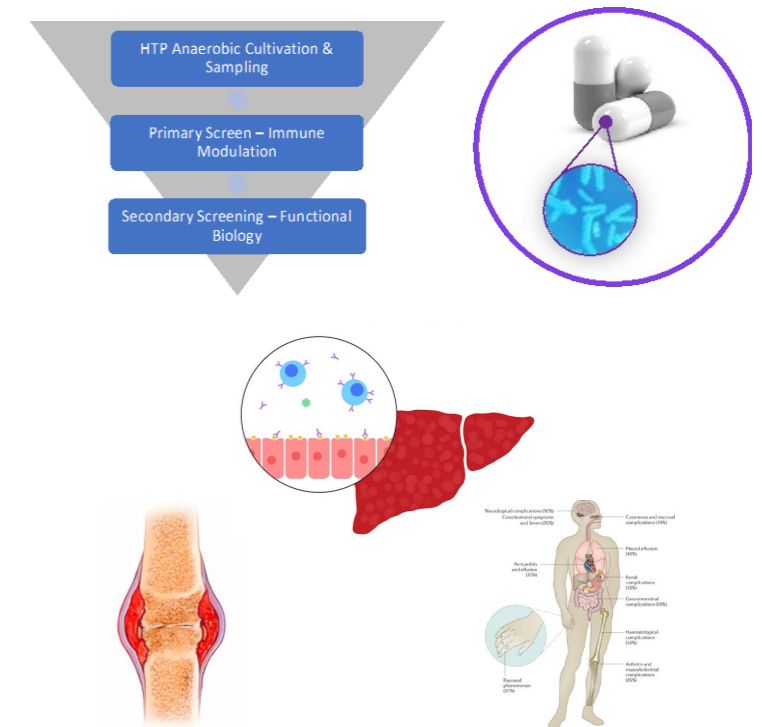
Human Data Guided Discovery Engine



Ginkgo Anaerobic Foundry



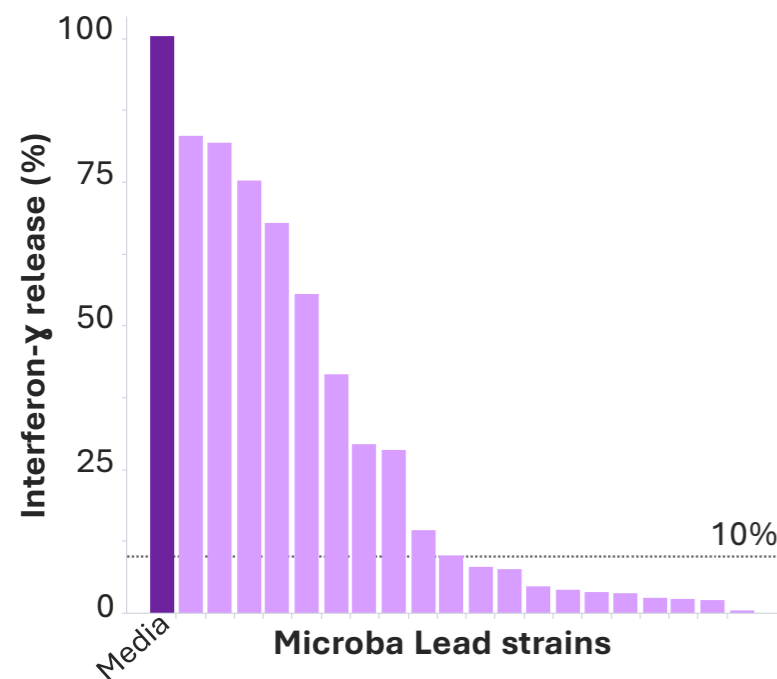
Drug Discovery Program for Autoimmune Disease



Microba and Ginkgo Bioworks have established a Microbiome Drug Discovery Program targeting Autoimmune Diseases including Psoriatic Arthritis, Autoimmune Liver Disease and Lupus.

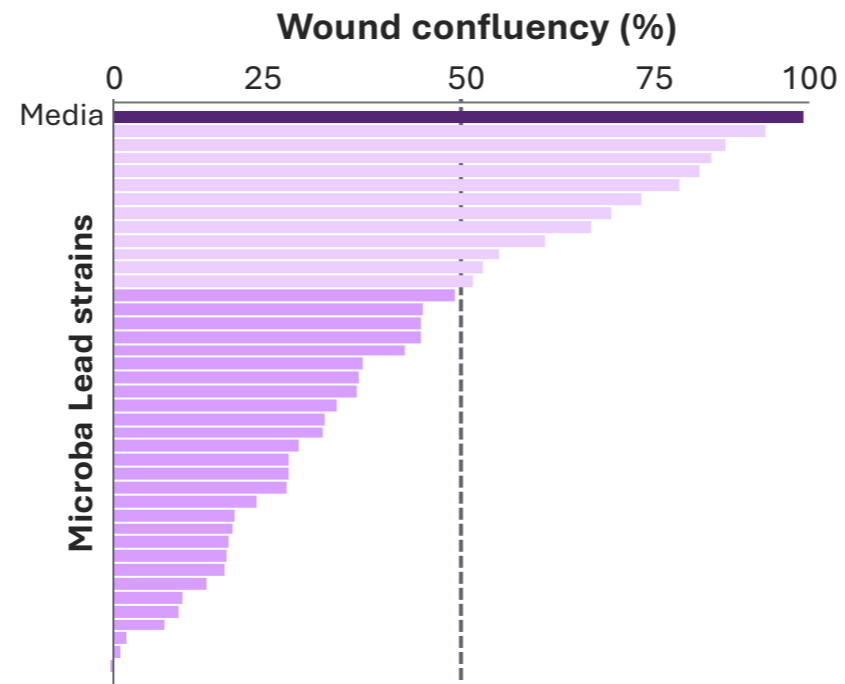
Autoimmune Program: Significant hit rate and potency observed in primary screens

Immune Suppression Activity



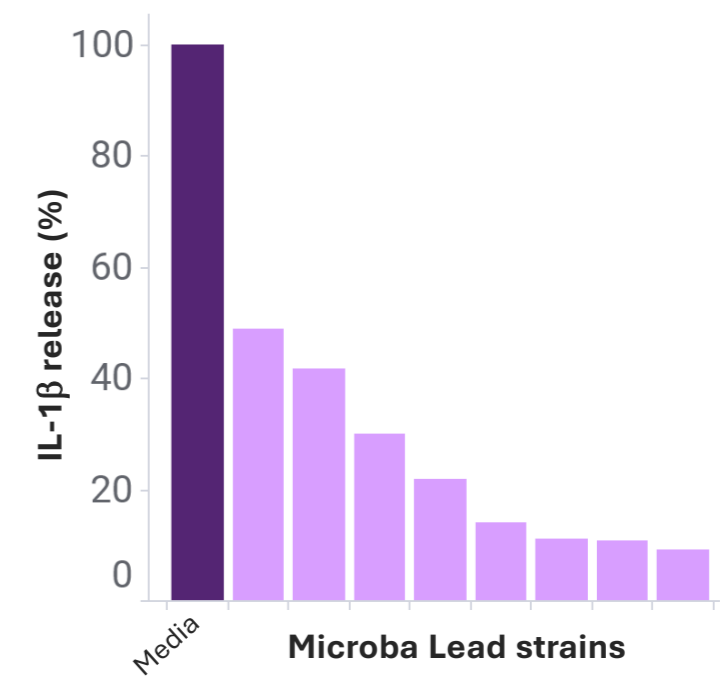
Immune suppression assay data in PBMCs showing suppression of IFN γ production

Reduced Cell Migration Activity



Fibroblast Migration Assay data showing activity relevant for fibrotic remodeling

Reduced Inflammasome Activity



Inflammasome activation assay in THP1 cells showing reduction in IL-1 β



Some recent IBD and microbiome deals

Licensee / Acquiror	Licensor / Target	Date	Type	Deal size	Indication / clinical stage
 MERCK	 Prometheus Biosciences	Apr 2023 (pending)	Acquisition	Total deal size: US\$10.8b	Ulcerative Colitis (phase 2) Crohn's disease (phase 2A) Autoimmune diseases (phase I or pre clinical)
 Nestlé HealthScience®	 Enterome	July 2022	R&D collaboration and license agreement	Total deal size: Undisclosed Upfront: €40m Sales / regulatory milestones: Undisclosed	Food allergies and IBD (pre clinical)
 Pfizer	 ARENA PHARMACEUTICALS	Mar 2022	Acquisition	Total deal size: US\$6.7b	Ulcerative Colitis (phase 3), Crohn's disease (phase 2/3), Atopic dermatitis (phase 2 complete)
 Roche Genentech <small>A Member of the Roche Group</small>	 NOVOME BIOTECHNOLOGIES	Nov 2021	R&D collaboration and license agreement	Total deal size: US\$605m Upfront: US\$15m Additional payments: US\$590m	IBD (Discovery)
 Nestlé HealthScience®	 SERES THERAPEUTICS	Jul 2021	Licensing agreement in US/Canada	Total deal size: US\$525m Upfront: US\$175m Sales / regulatory milestones: Up to US\$225m	Recurrent Clostridioides difficile infection (Phase 3)

<https://www.merck.com/news/merck-strengthens-immunology-pipeline-with-acquisition-of-prometheus-biosciences-inc/>

<https://www.enterome.com/news-events/enterome-signs-major-strategic-rd-collaboration-with-nestle-health-science-to-develop-and-commercialize-new-allermimics-and-endomimics-immunotherapies-for-food-allergies-and-inflamm/>

<https://www.pfizer.com/news/press-release/press-release-detail/pfizer-completes-acquisition-arena-pharmaceuticals>

<http://novomebio.com/wp-content/uploads/2021/11/Novome-and-Genentech-Enter-into-Strategic-Collaboration.pdf>

<https://ir.serestherapeutics.com/news-releases/news-release-details/seres-therapeutics-nestle-health-science-announce-ser-109-co>

Upcoming Milestones for 2023

2023 JAN – MAR	2023 APR - JUN	2023 JUL - DEC
Services New healthcare product full launch 	Services New international distribution deals 	Services New country expansion
Services New international distribution deals 	Therapeutics - IBD MAP 315 program HREC Approval for Phase I trial 	Services First Sonic partners operational
Therapeutics - IBD MAP 315 program Phase I HREC Submission 	Therapeutics - IBD MAP 315 program GMP manufacture complete Phase I 	Therapeutics - IBD MAP 315 program Phase I participant dosing complete
Therapeutics - IBD MAP 315 program FDA Pre-IND meeting outcome 	Therapeutics - IBD MAP 315 program Phase I trial commencement 	Therapeutics - IBD MAP 315 program Phase I complete
Therapeutics - IO Program Pre-clinical results 		Therapeutics – IO Program Immunological pre-clinical results
Therapeutics – Autoimmune Program First <i>in vitro</i> screening results 		Therapeutics - Autoimmune Program Stage 1 activity screening complete

MICROBA™

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