



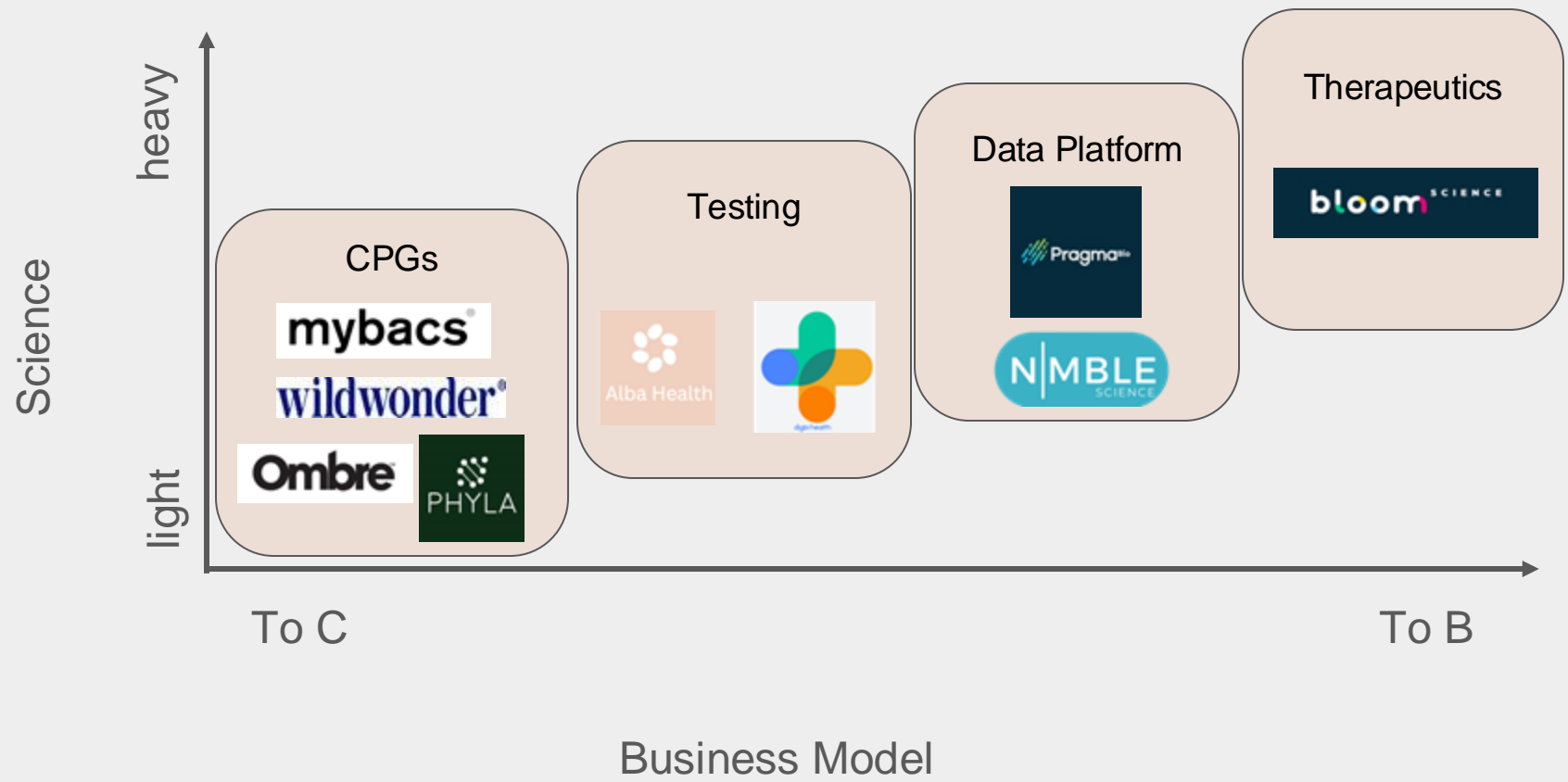
# The Microbiome Funding Landscape & Innovation Spotlight

Jun Deng, PhD  
Joyance Partners  
Nov 21st, 2024



- ❑ **The first fund established in 2012**
- ❑ **5 funds under Social Starts**
- ❑ **Joyance Partners established in 2017**
- ❑ **3 fund families, investing out of the US and UK-EU**
- ❑ **Thesis: Delightful Moments of Human Life**
- ❑ **Stage: Pre-seed, Seed and Series A**
- ❑ **Verticals: Consumer health & wellbeing, genomics & microbiome, brain health, women's health, longevity, beauty**





“

IT WAS THE BEST OF TIMES ;

”

IT WAS THE WORST OF TIMES.

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# Content

## ***Best of times***

- Sequencing costs continues to decrease.
- More datasets are now available.
- Powerful computational power.
- It's easier for startups to develop new products or assets.

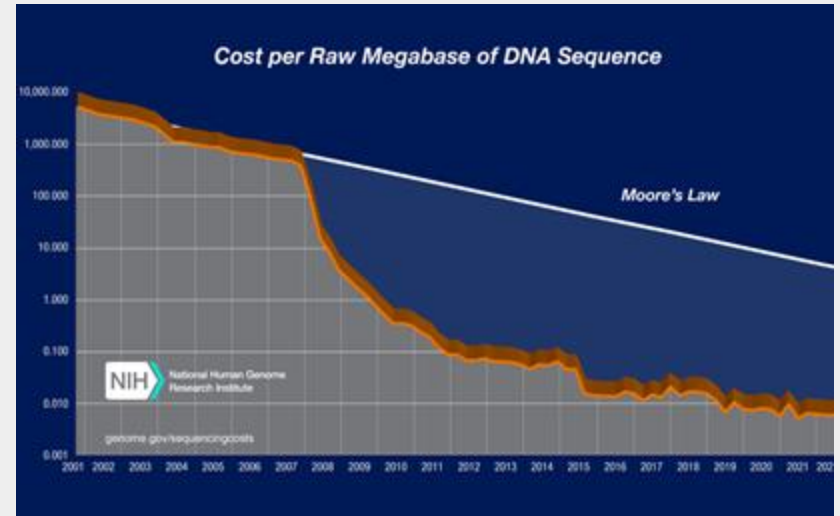
## **Worst of times**

- Overall VC activity is down.
- Microbiome investment is still in its infancy.
- It's challenging to find the right business model.
- Fundraising for microbiome startups is difficult.

## **Trends & Lessons**

## The Drop in Sequencing Costs: A Driver of the First Wave of Innovations

- Cost per genome has fallen from 100 millions to hundreds of dollars in two decades.
- Recent advances in sequencing technology:
  - 16s sequencing
  - Shotgun sequencing
  - Long-read sequencing



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## Greater Access to Abundant & Diverse Datasets

- **Large-cohort longitudinal** prospective studies

*HMP, HMP2, The American Gut Project, FGFP, The Dutch Microbiome Project, CHILD, UK Biobank etc*

- **Multi-omics** data expanded beyond genomics

*proteomics, epigenomics, metabolomics, transcriptomics, lipidomics, and pharmacogenomics*

- **Multimodal** human biological, behavioral & environmental data

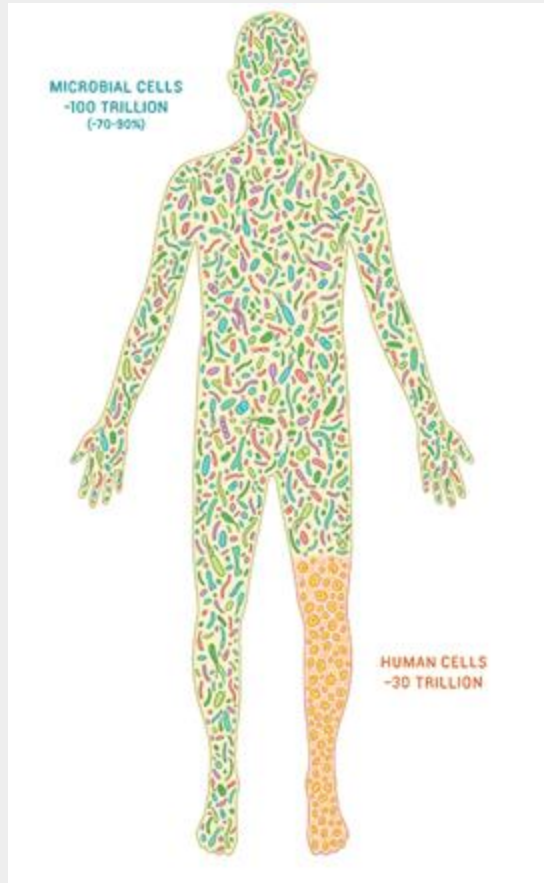
*EHR, EEG, ECG, EMG, prescription, environmental, wearable etc.*

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## Enhanced Computational Power: A Catalyst for the Next Wave

- The rapid advancement of **computational hardware** technologies, including both GPUs and CPUs, is making them more powerful than ever.
- **Cloud computing** offers flexible storage, faster data transfer, and scalable processing power, simplifying access to large datasets (e.g., genomic data, clinical data) for collaboration across institutions.
- **Artificial Intelligence** is poised to handle large data cohorts in a more scalable way, excel at managing data complexity, uncover hidden patterns, predict drug interactions and efficacy, accelerate clinical trials, and personalize treatment plans.





The gut microbiome influences every aspect of health:

- Gut
- Brain
- Heart
- Immunity
- Sleep
- Mood
- Skin
- Sports Performance
- Sexual Wellness
- Response to Medication ...

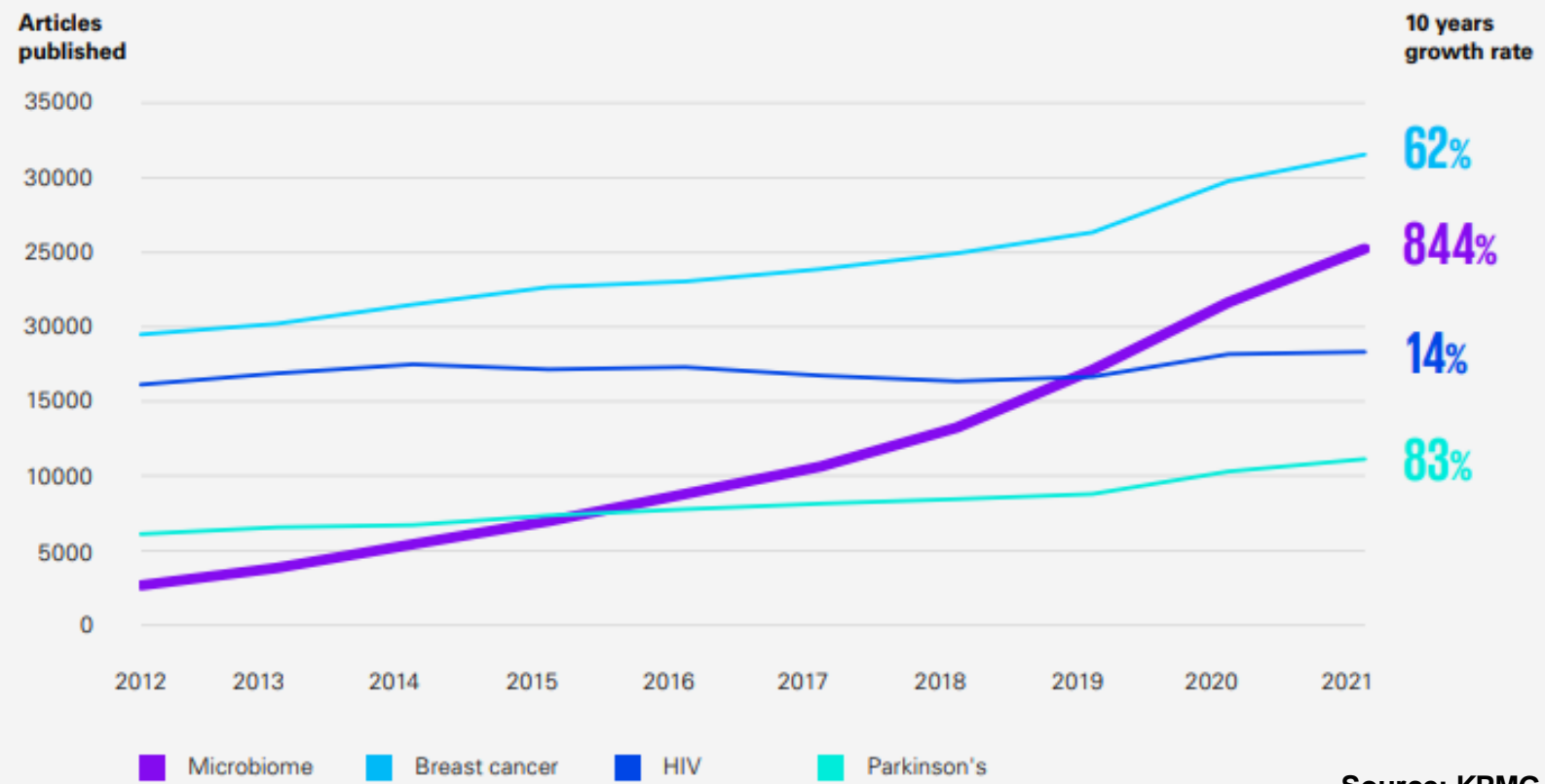
“ **The Gut Microbiota in Inflammatory Bowel Disease** ”

“ **The Gut Microbiota (Microbiome) in Cardiovascular Disease and Its Therapeutic Regulation** ”

“ **The Gut-Brain Axis: Influence of Microbiota on Mood and Mental Health** ”

“ **Gut Microbiota-Produced Tryptamine Activates an Epithelial G-Protein-Coupled Receptor to Increase Colonic Secretion** ”

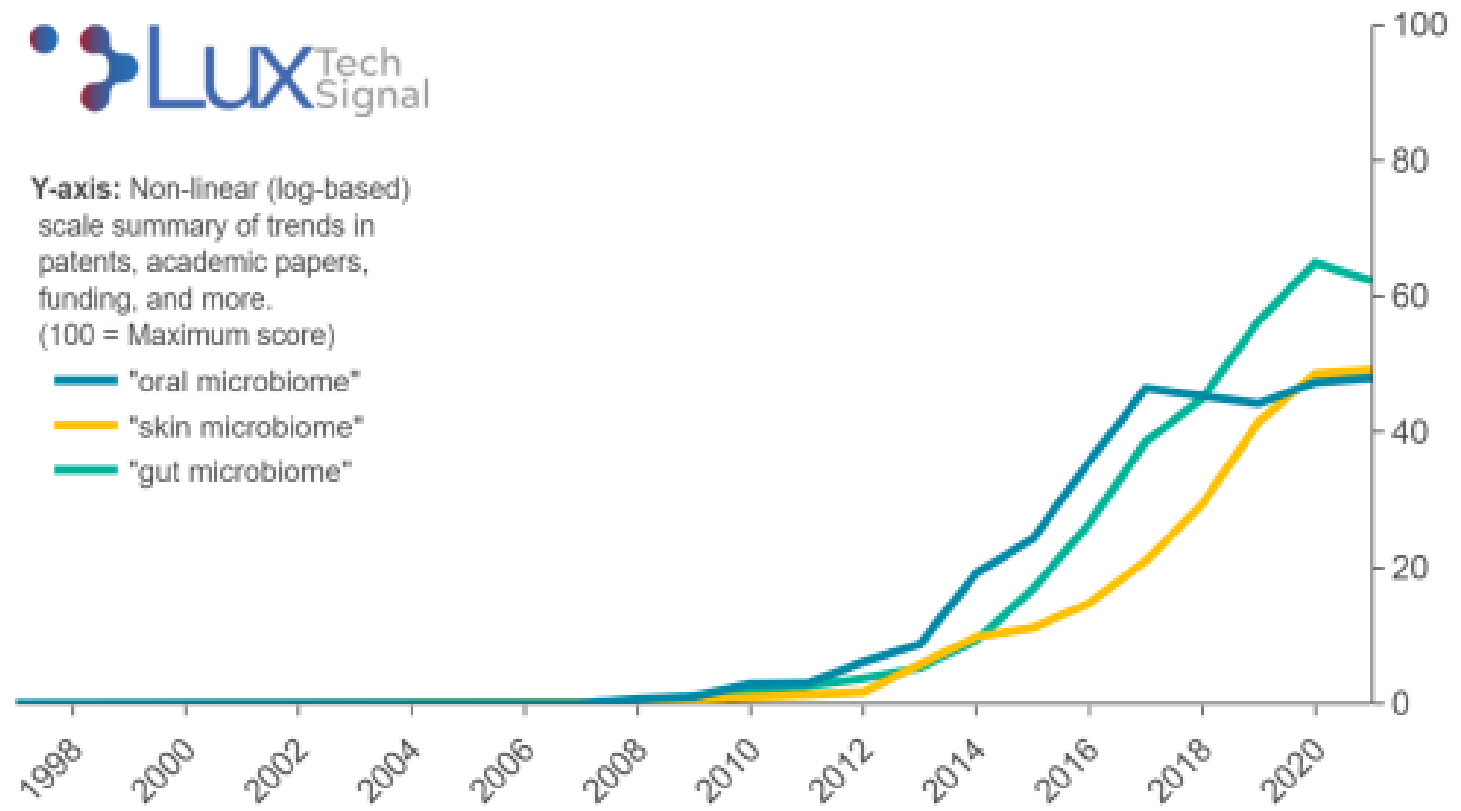
**Number of scientific articles published in different fields over the 2012-2021 period**

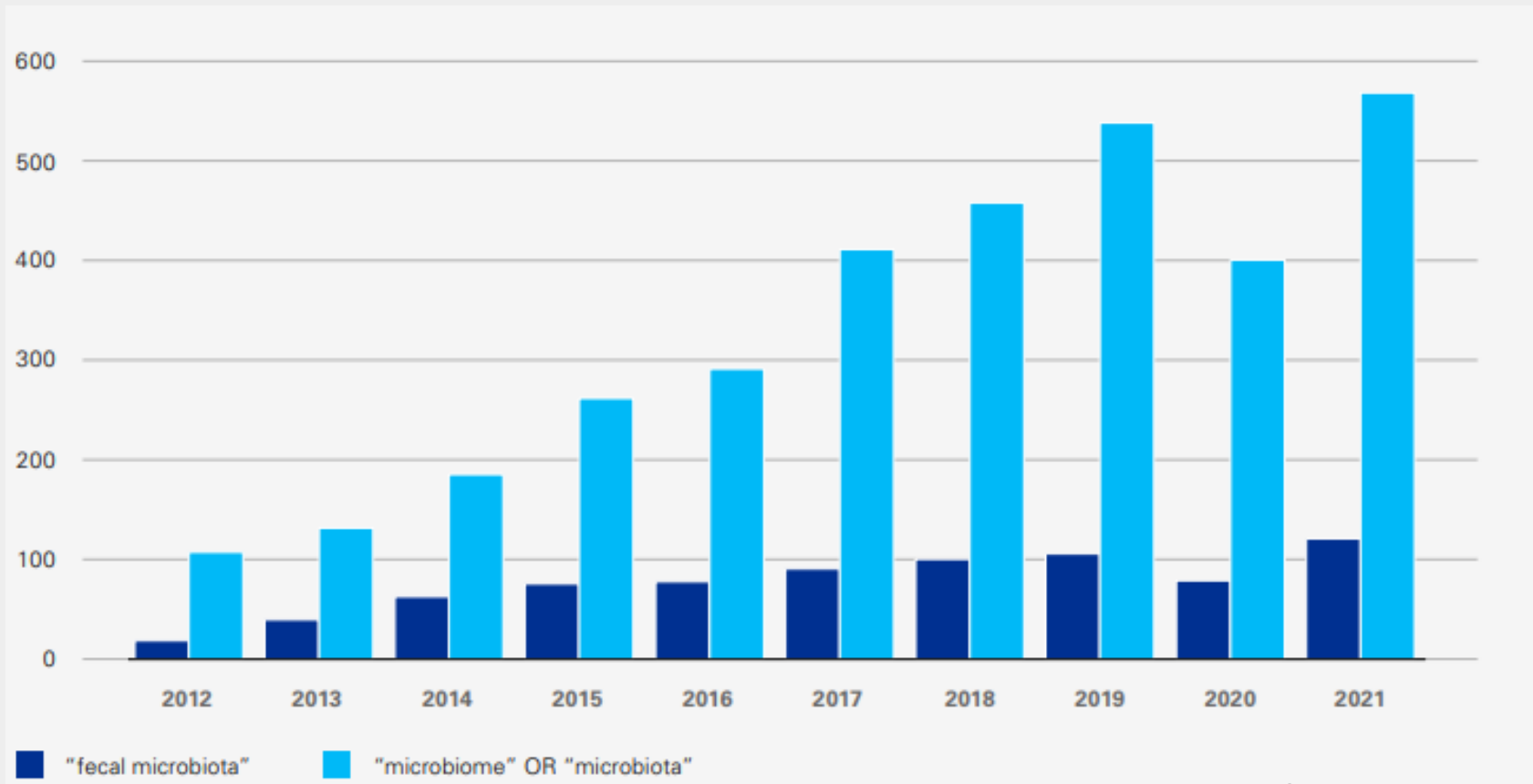




Y-axis: Non-linear (log-based) scale summary of trends in patents, academic papers, funding, and more.  
(100 = Maximum score)

- "oral microbiome"
- "skin microbiome"
- "gut microbiome"



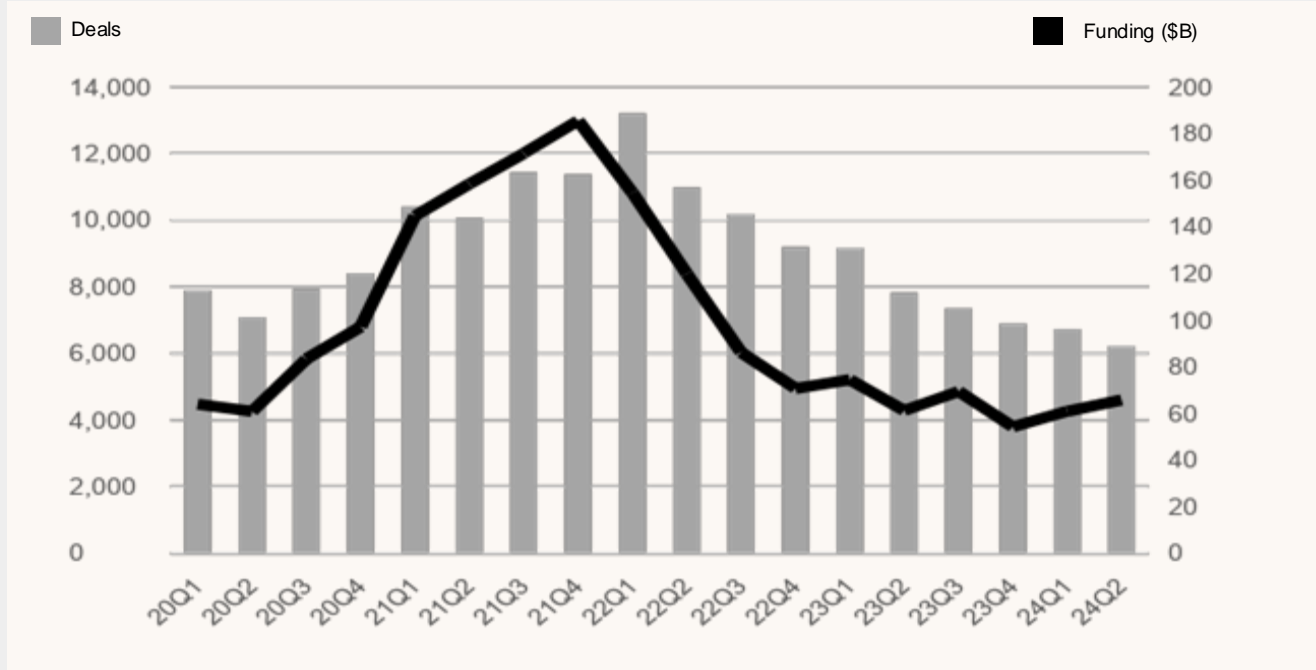


## Best of times

- Increasing consumer awareness is driving interest in the **microbiome and overall wellness**.
- Growing consumer demand for **personalized** and **preventative** healthcare solutions.
- Technological innovations and abundant datasets are lowering the costs of discoveries
- **Research is fueling innovations**
- Advancement in **computational infrastructure** will be the catalyst for the next wave startups

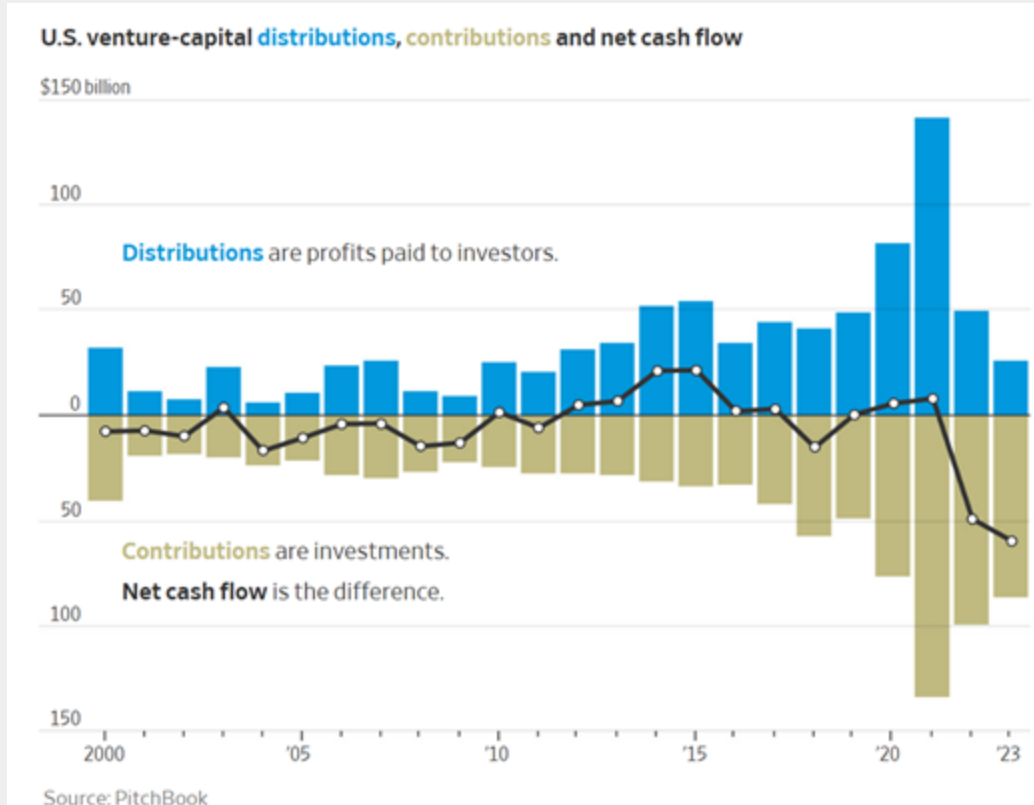


# State of VC: VC activities are recovering, but still cautious



Source: CBInsights State of Venture, Carta VC Fund Performance

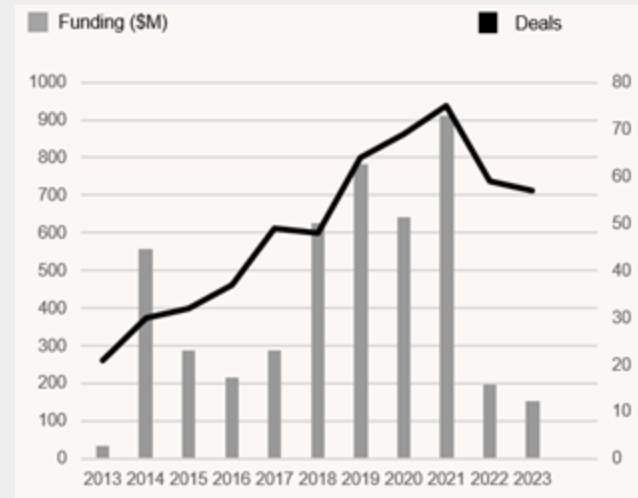
# State of VC: Venture Firm's Profits Hit All-Time Low





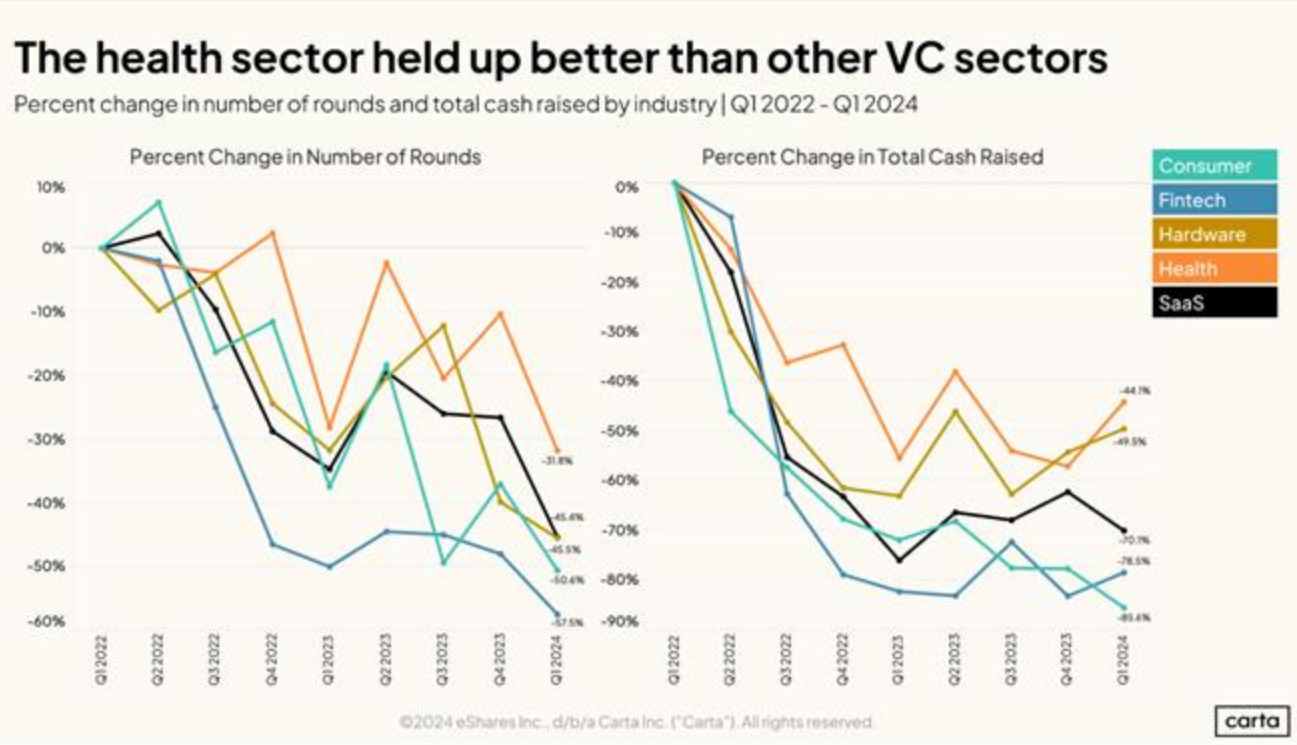
## Consumer Investment Facing Significant Challenges

- Consumers are pulling back their discretionary purchases under **high inflation and unemployment**, ~20-30% since early 2023
- The middle class, who were the backbone of premiumization, has also seen **purchasing power decline**; becoming more hesitant to try new products in niche, premium categories
- Raw material **inflation** is stressing product margin - a tougher path to profitability  
*Price of sugar up 58%, dairy up 23%, meat up 22% in 2024 compared to 2020*
- Rising **marketing cost** takes away the high DTC margin vs. the old days  
*Cost per click rose 20% in 2024 vs. 2023, in addition to content saturation and ad fatigue*
- Average **EV/Rev multiple** down from 9.9x to 2.6x in 2021-2024  
*Unfavorable to most unspecialized VCs due to exit challenge, negative sentiment and return dilution*



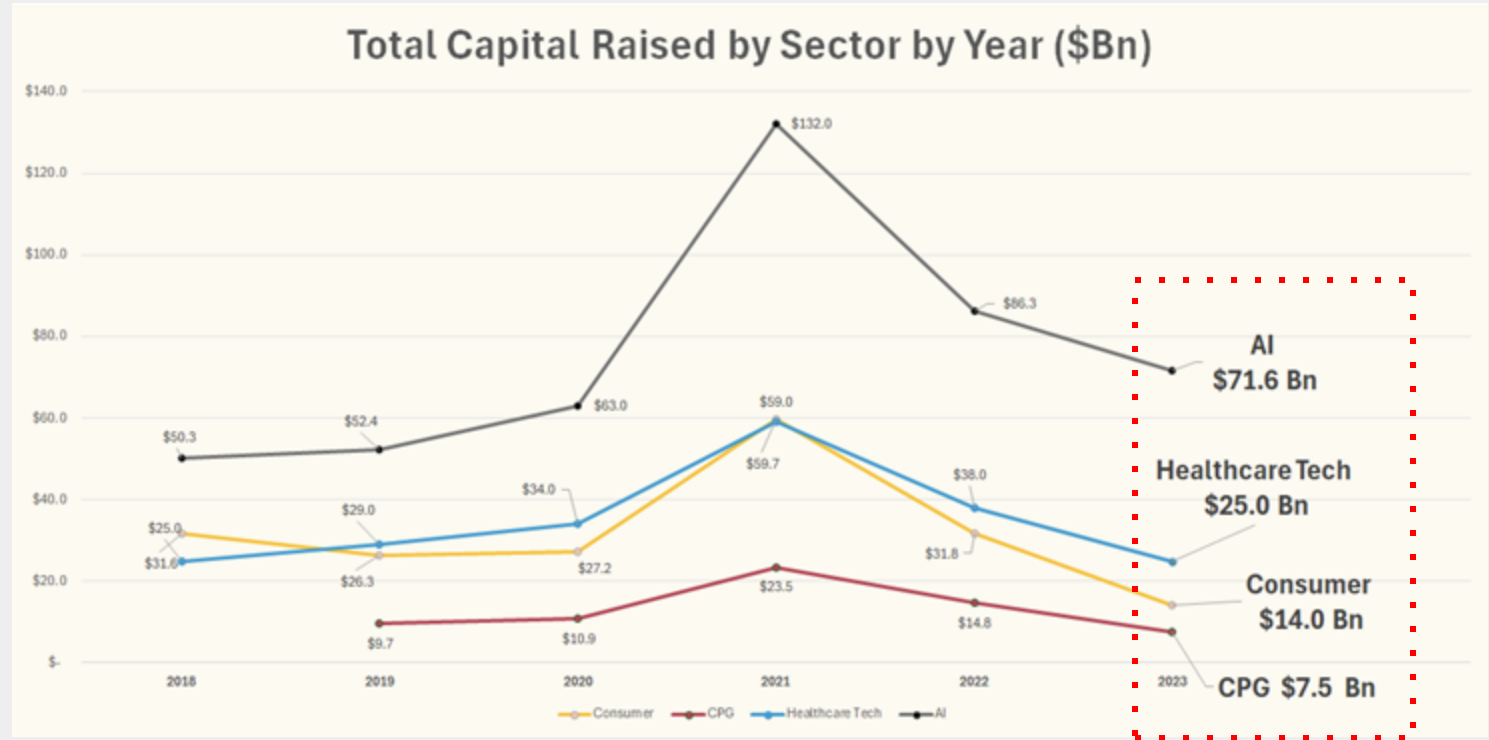
Funding and deal counts in CPG

# VC funding in healthcare has been more resilient than other industries



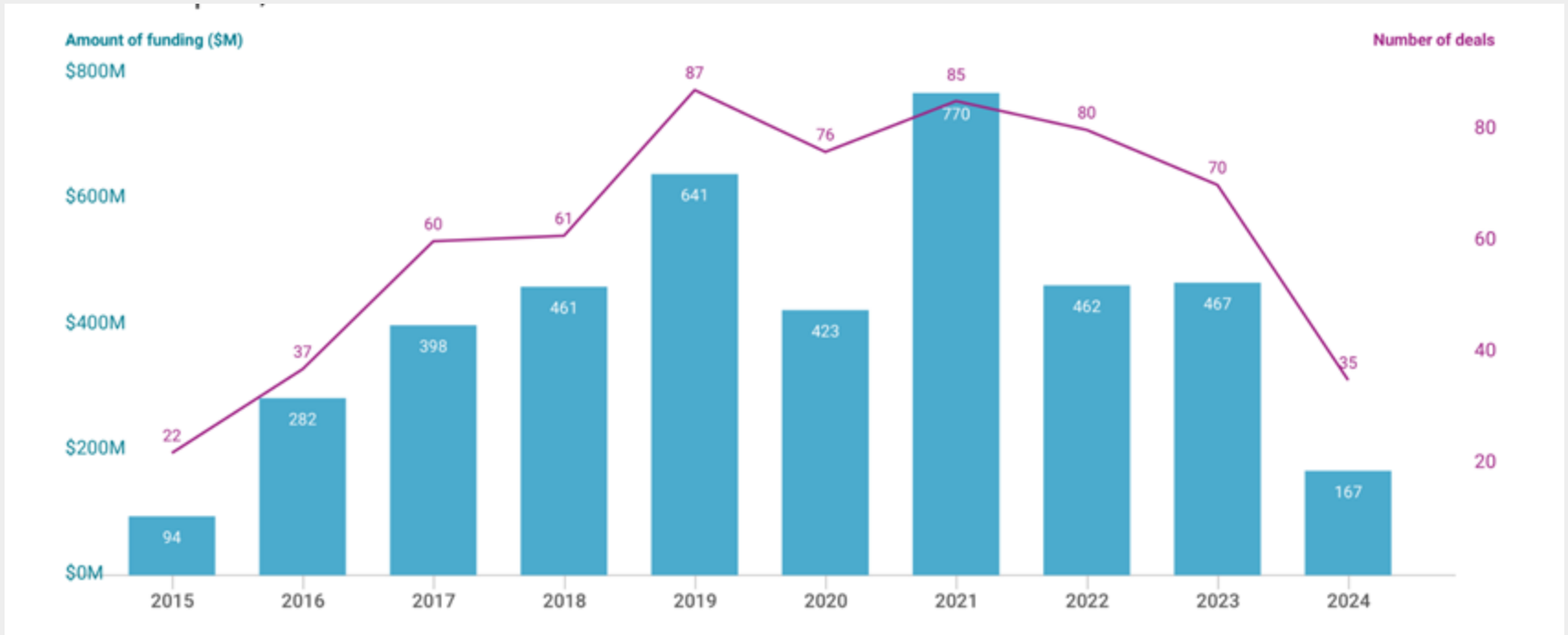
Source: Carta

# AI companies collected 40% of all US VC deals in 2023

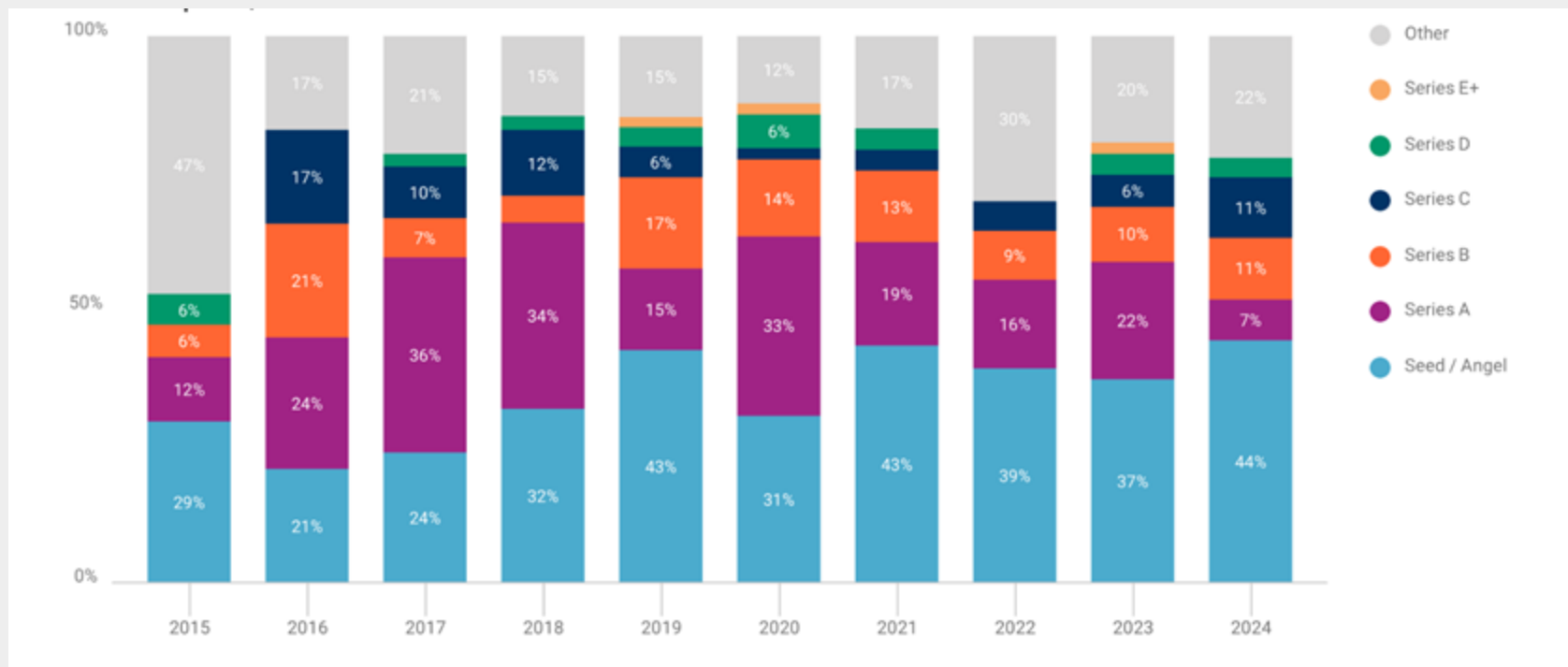


Source: Carta State of VC and Pitchbook

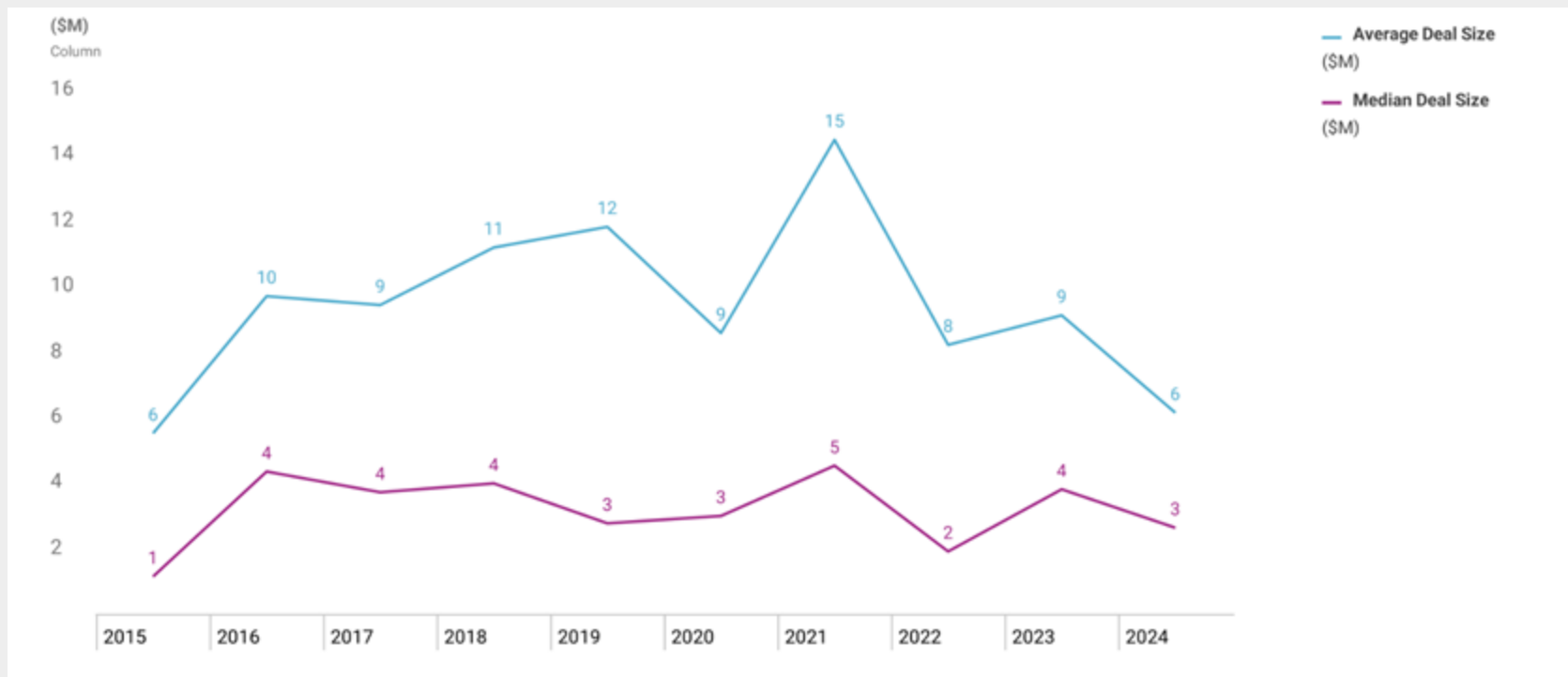
## VC INVESTMENT IN MICROBIOME (Sept, 2024)



## MORE EARLY STAGE DEALS



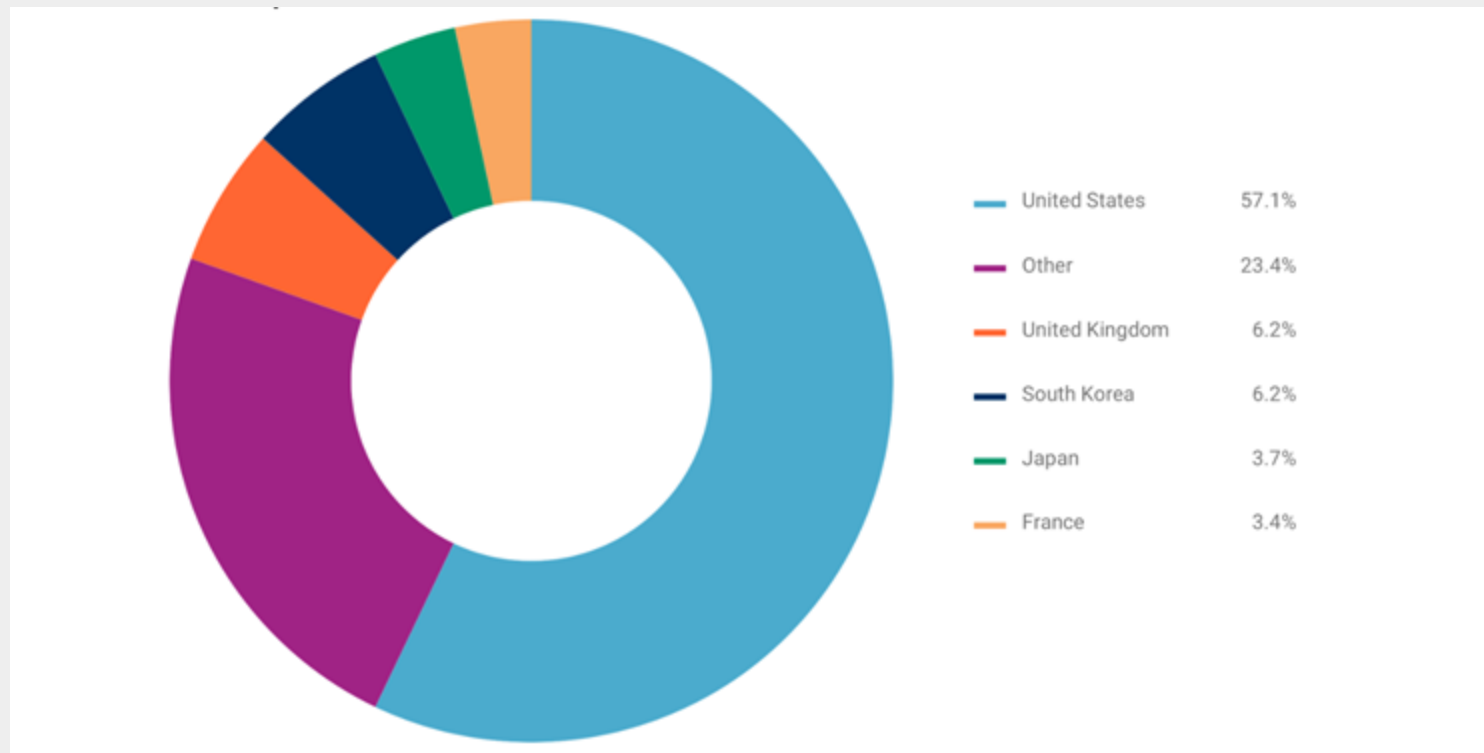
## AVERAGE DEAL SIZES REMAIN SMALL



## THE MOST ACTIVE INVESTORS ARE ACCELERATORS

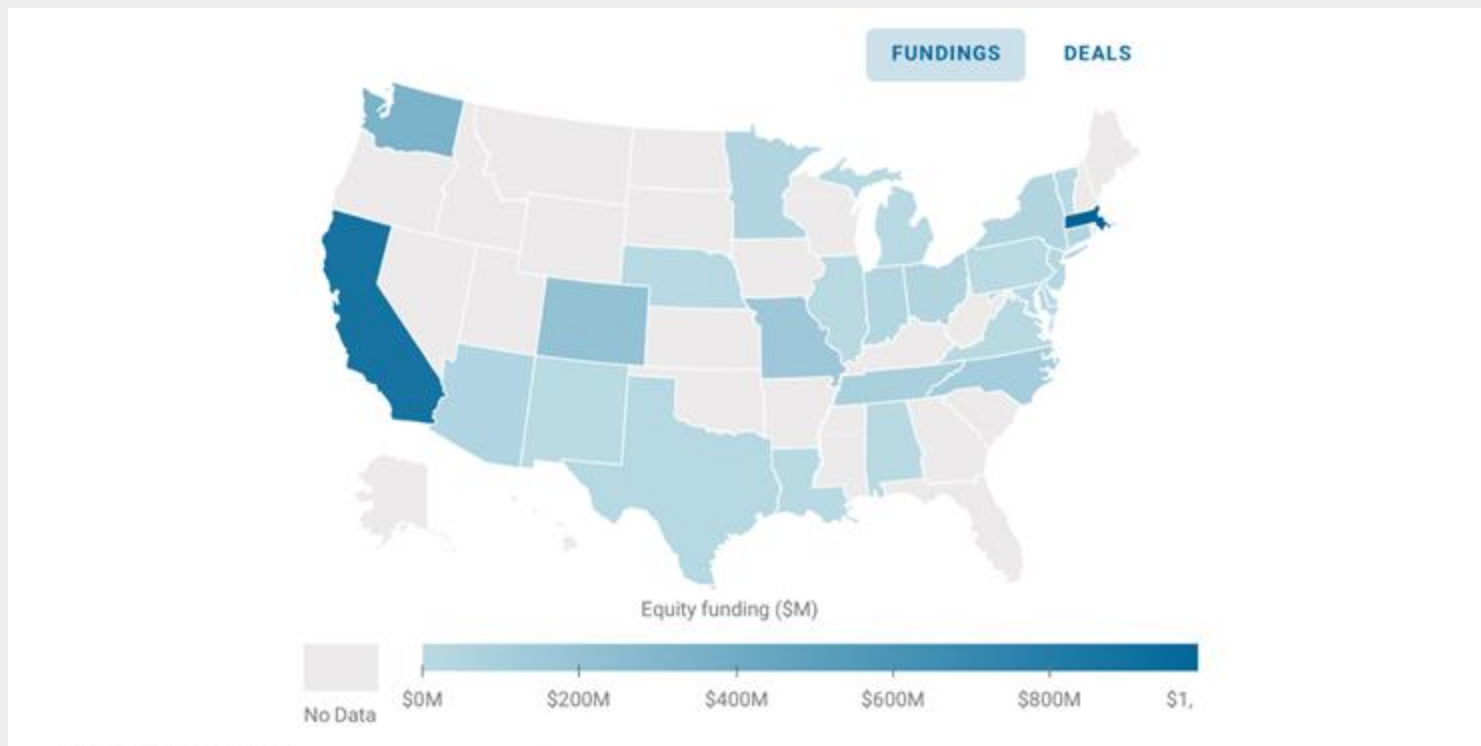
| Name                          | Type                  | Country       | Last 3 Months | Last Year | Last 2 Years | All Time |
|-------------------------------|-----------------------|---------------|---------------|-----------|--------------|----------|
| SOSV                          | Venture Capital       | United States | 0             | 1         | 7            | 41       |
| IndieBio                      | Incubator/Accelerator | United States | 0             | 0         | 5            | 35       |
| JLabs                         | Incubator/Accelerator | United States | 0             | 0         | 1            | 30       |
| Seventure Partners            | Venture Capital       | France        | 0             | 3         | 5            | 29       |
| National Science Foundation   | Government            | United States | 0             | 0         | 1            | 20       |
| Khosla Ventures               | Venture Capital       | United States | 1             | 2         | 4            | 14       |
| National Institutes of Health | Government            | United States | 0             | 0         | 2            | 14       |
| Illumina Accelerator          | Incubator/Accelerator | United States | 0             | 0         | 0            | 14       |
| Plug and Play                 | Incubator/Accelerator | United States | 0             | 0         | 0            | 13       |
| TIPS Program                  | Incubator/Accelerator | South Korea   | 0             | 1         | 3            | 13       |

## THE US LEADS THE FUNDRAISE





## CALIFORNIA AND BOSTON ATTRACT MOST OF THE \$



## Worst of times

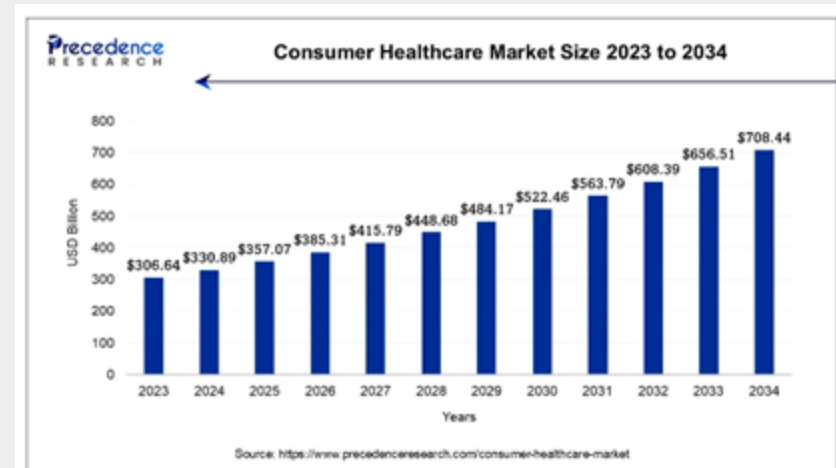
- Challenging VC fundraising environment.
  - Overall VC activities are yet to recover.
  - Consumer investment faces major challenges.
  - Healthcare investment slows down, with a valuation correction and more bridge rounds.
  - AI dominates all stages of deals.
- Microbiome investment is in its infancy.
  - The majority of deals are early-stage.
  - The most active investors are accelerators.
  - First-generation microbiome companies have yet to generate VC returns.
  - Breakthrough deals and exits are needed to attract more VC interest.

## Microbiome technology chain reveals areas of opportunity

| Tech value chain      | Discovery                                   | Novel application   | Scalability   | Formulation                                      |
|-----------------------|---|---|---|--|
| <b>Unmet need</b>     | Development and screening of novel -biotics | Mapping mode of action for novel applications beyond gut health | Production scale-up of novel -biotics, e.g., HMOs; novel sources of feedstock | Incorporation in downstream application matrices |
| <b>Probiotics</b>     | <b>HIGH</b> (gut and skin)                  | <b>HIGH</b> (gut and skin)                                      |   | <b>HIGH</b> (gut and skin)                       |
| <b>Prebiotics</b>     |   |   | <b>HIGH</b> (gut)   |  |
| <b>Synbiotics</b>     |   |   |   |  |
| <b>Postbiotics</b>    |   |   |   |  |
| <b>Bacteriophages</b> |   | <b>HIGH</b> (skin)  |   | <b>HIGH</b> (skin)                               |

## Consumer

- The microbiome market is expanding rapidly with CAGR of 25.3%.
- Consumer are showing a growing interest in **holistic and natural approaches** that addresses comprehensive health benefits.
- Rising demand for **personalized** microbiome products, driven by Millennials and Gen Z.
- Brain health supplement market projected to reach \$13.38B by 2028 (8.3% CAGR).
- 45% of consumers link probiotics to **brain health**
- **Female-specific diseases** and conditions have been historically underfunded but the women's health sectors has undergone a remarkable transformation



## Therapeutics

- Despite the FDA's approval of the first orally administered fecal microbiome product for preventing the recurrence of *C. difficile* infection, the microbiome has not garnered significant interest from the pharmaceutical industry.
- Many pharmaceutical companies are **deviating away** from exploring microbiome-focused initiatives
- Establishing clear causal relationships, gaining a deeper understanding of the underlying biological mechanisms, and ensuring reproducibility are critical scientific challenges that microbiome therapeutic startups must address.

| Companies with Live Bacteria Product Candidates in Pivotal Trial |                         |                                   |
|--|-------------------------|-----------------------------------|
| Company Name   | Lead Product (Phase 3+) | Collaboration or Acquisition      |
| Rebiotix   | Rebyota                 | Ferring acquired Rebiotix in 2019 |
| Seres Tx   | SER-109                 | Nestle partnership                |
| Finch Tx   | CP-101                  | Takeda                            |

## Data Platform

- Data will become a commodity. The value of the startups will be driven by the actionable insights.
- AI is poised to play a crucial role.
  - **Data Complexity:** AI excels at analyzing high-dimensional, sparse microbiome data, uncovering patterns and insights that traditional methods may miss.
  - **Scalability & Automation:** AI automates microbiome research, increasing scalability for discovering novel therapies, diagnostics, and applications.
  - **Predictive Healthcare:** AI-driven analysis links microbiome composition to health outcomes, enabling personalized treatments and early disease detection.
  - **Multimodal Integration:** AI integrates microbiome data with other biological and environmental datasets, creating comprehensive models for advanced healthcare and biotechnology solutions.
- Limitations:  
Inconsistent data/ Incomplete data/ Difficult to interpret findings/ Difficult to incorporate into clinical workflow etc

# Lessons learned from the first generation of microbiome startups

## Science OR Marketing?

- Scientific breakthroughs haven't translated into strong consumer-facing brands yet
- Heavy research investment but minimal brand impact
- Scientific jargon established but not speaking the consumer's language
- Pure marketing with the name of microbiome yet no efficacy

Joyance thesis: True scientific differentiation with strong efficacy can build a brand that truly resonates with consumers.

## Datasets OR Insights?

- Datasets will become less scarce and more accessible.
- What actionable insights are derived from datasets and AI?
- How are the findings translated into high-impact outcomes for end users?
- How to protect data safety?

Joyance thesis: High-impact, actionable insights will be derived from databases tailored to meet end users' needs.

## The Future: A Vision for the Microbiome

The consumer healthcare market is **projected to triple** in the next decade. This expansion is fueled by an explosion of new scientific research and breakthroughs.

Consumers are becoming increasingly aware of the **microbiome influence on overall health**. Microbiome-based products and tests are poised to impact many aspects of our daily lives, from skincare and nutrition to mental health and immune support.

It's further accelerated by the rise of more comprehensive health data and advanced computational tools, enabling us to **unlock new insights and personalize microbiome** interventions with unprecedented precision.

At Joyance, we are highly optimistic about the future of microbiome investments. We believe we are **on the cusp of a tipping point**, where the true value of the microbiome sector will start to rapidly expand.





**Thank You**