



CAN AI SAVE THE LIFE SCIENCES BUSINESS?

ADVANCED EXECUTIVE PROGRAM

Howie Rosen

June 15, 2026

Warsaw, Poland

BIO: HOWIE ROSEN

Independent BOD Member



General Management

- Current BODs: Entrega, Hammerton
- Executive Chair/Chair: Kala (NASDAQ), Alcobra (NASDAQ), Hopewell, PaxVax
- CEO/President: AcetRx (NASDAQ), Pearl, ALZA/J&J
- Gilead (VP, Commercial Strategy)
- McKinsey & Company
- Live in Costa Rica part-time
- Fun Fact: Avid Cyclist (Rode Across US in 25 Days)

BIO: HOWIE ROSEN

Independent BOD Member And An Engineer Too!



Email: hrosen@stanford.edu

From Engineer to General Management

- Current BODs: Entrega, Hammerton
- Executive Chair/Chair: Kala (NASDAQ), Alcobra (NASDAQ), Hopewell, PaxVax
- CEO/President: AcetRx (NASDAQ), Pearl, ALZA/J&J
- Gilead (VP, Commercial Strategy)
- McKinsey & Company
- Live in Costa Rica part-time
- Fun Fact: Avid Cyclist (Rode Across US in 25 Days)

Education

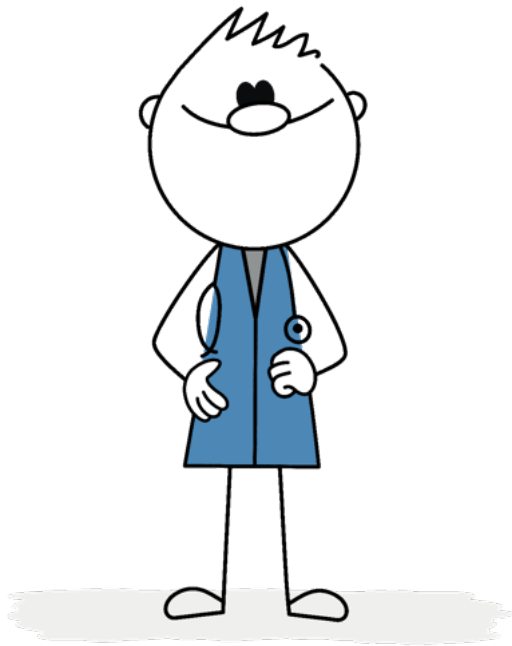
- Stanford University (MBA)
- MIT (MS Chemical Engineering)
- Stanford (BS Chemical Engineering)
- Adjunct Professor, Department of Chemical Engineering, Stanford
- Lecturer in Management, Stanford Graduate School of Business
- Elected to National Academy of Engineering¹, Home Secretary

¹Like the Akademia Inżynierska w Polsce

HAVE YOU USED A CHATBOT TO DIAGNOSIS A HEALTH ISSUE?

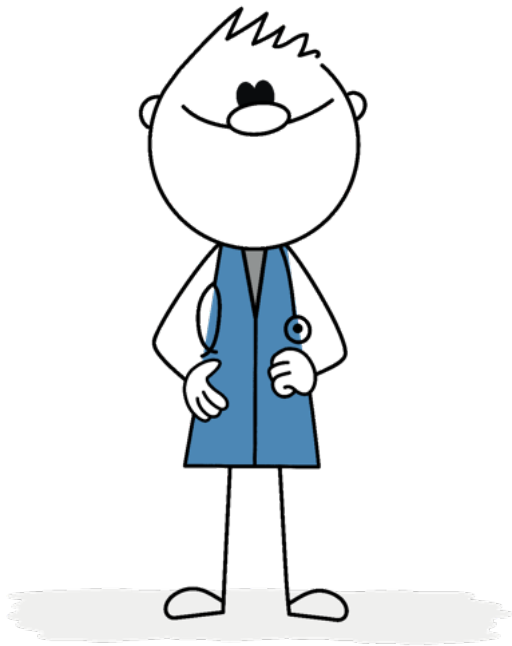


Today's Objectives



1. Life Sciences is a challenging business
2. How AI may help
3. Robust Q&A

Today's Objectives



- 1. Life Sciences is a challenging business**
2. How AI may help
3. Robust Q&A

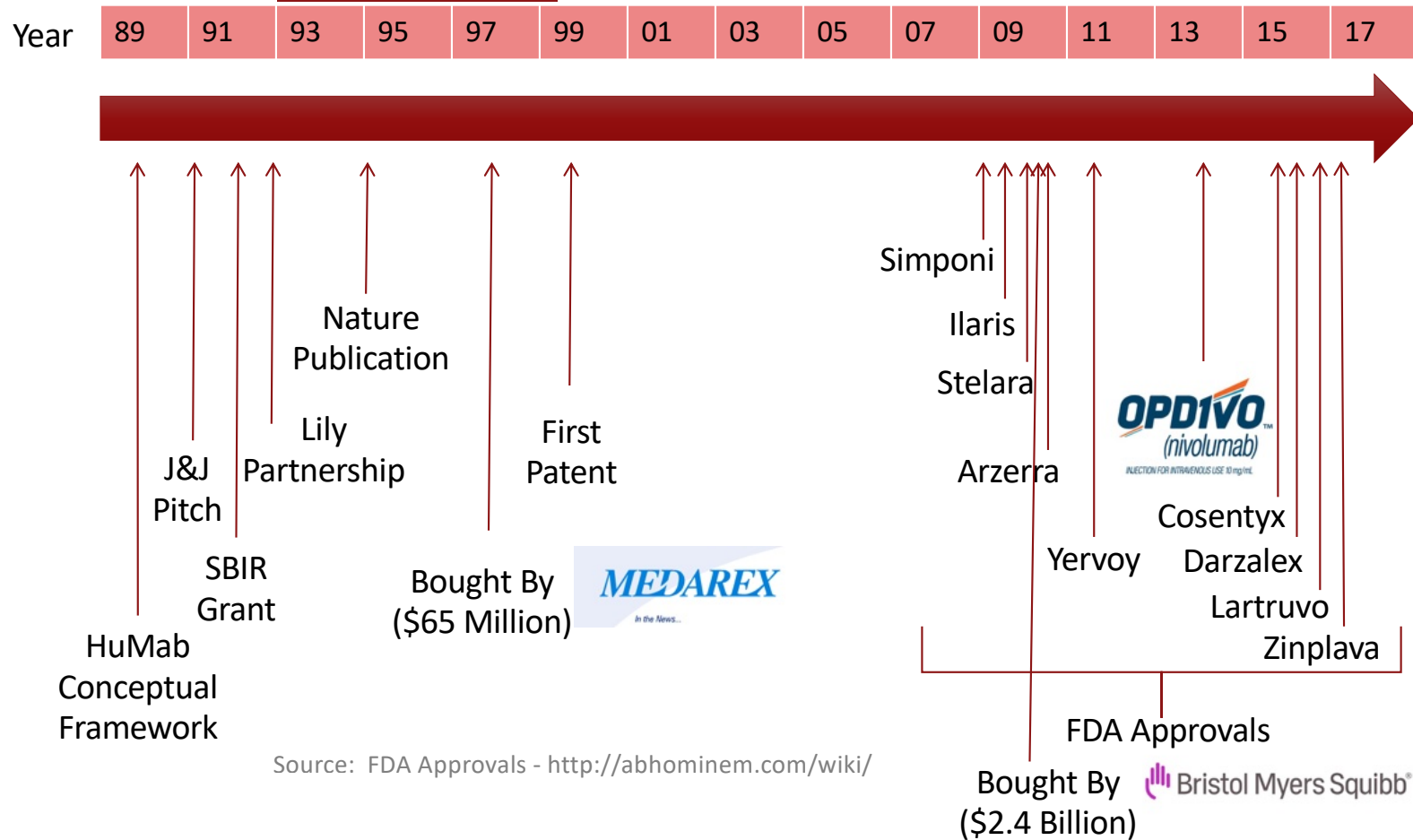
LIFE SCIENCE TIMELINES ARE LONG E.G. GENPHARM INT'L

- Concept was to create transgenic mouse that would make human antibodies – challenging.
- First presentation to potential partner in late 1989 was a single PowerPoint slide; no lab work.
- Took 3 years, extensive lab work, to sign first partner.
- 1999 (10 years) before first patient treated.
- 2009 (20 years) first product came to market.
- Very successful – 14 human antibodies on market from GenPharm mice: \$45+ billion sales¹.



¹Estimate for 2023 worldwide sales (from Nils Lonberg – personal communication 4/14/24)

GENPHARM'S PLATFORM DEVELOPMENT WAS DIFFICULT, SLOW, UNCERTAIN, **EXPENSIVE** BUT SUCCESSFUL!



HARD TO MAKE MONEY (UNLIKE IN TECH)

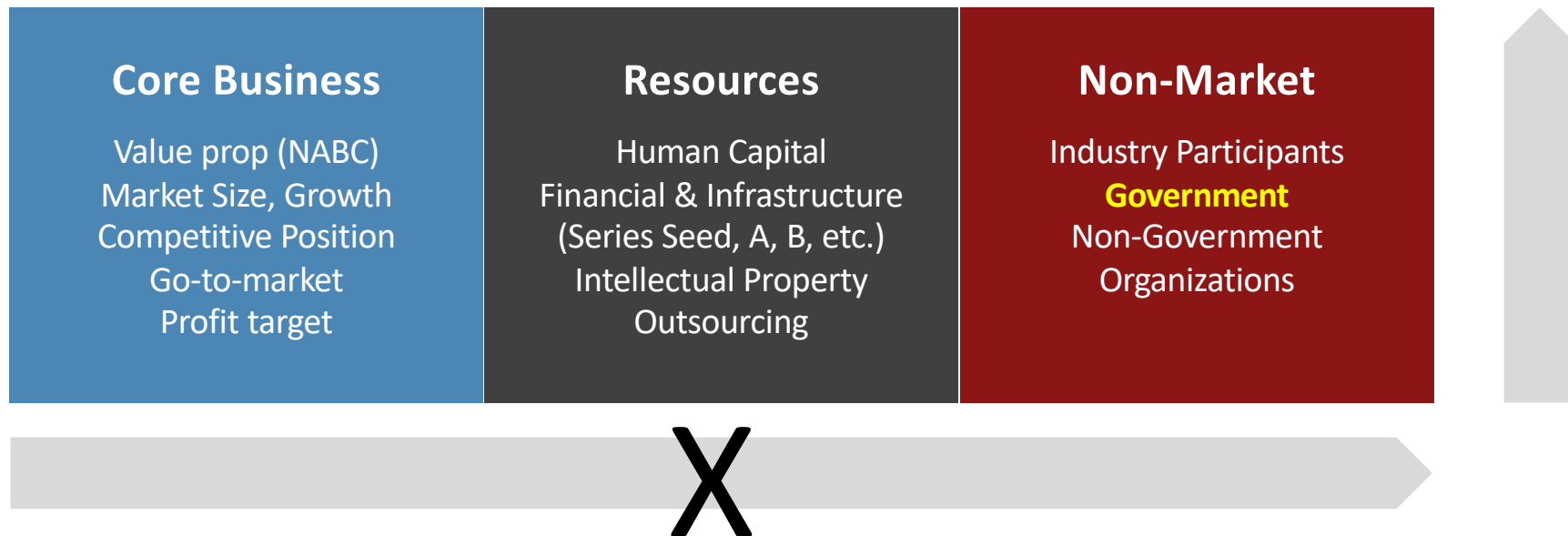
- Only 14 of Forbes 400 in “Life Sciences”
- Highest - #29 (Hospitals)
- Lowest - #388 (Pharma)
- 4 From Stryker (Medical Devices)
- 3 Biotech - #204, #289, #335

Source: <https://www.forbes.com/forbes-400/>



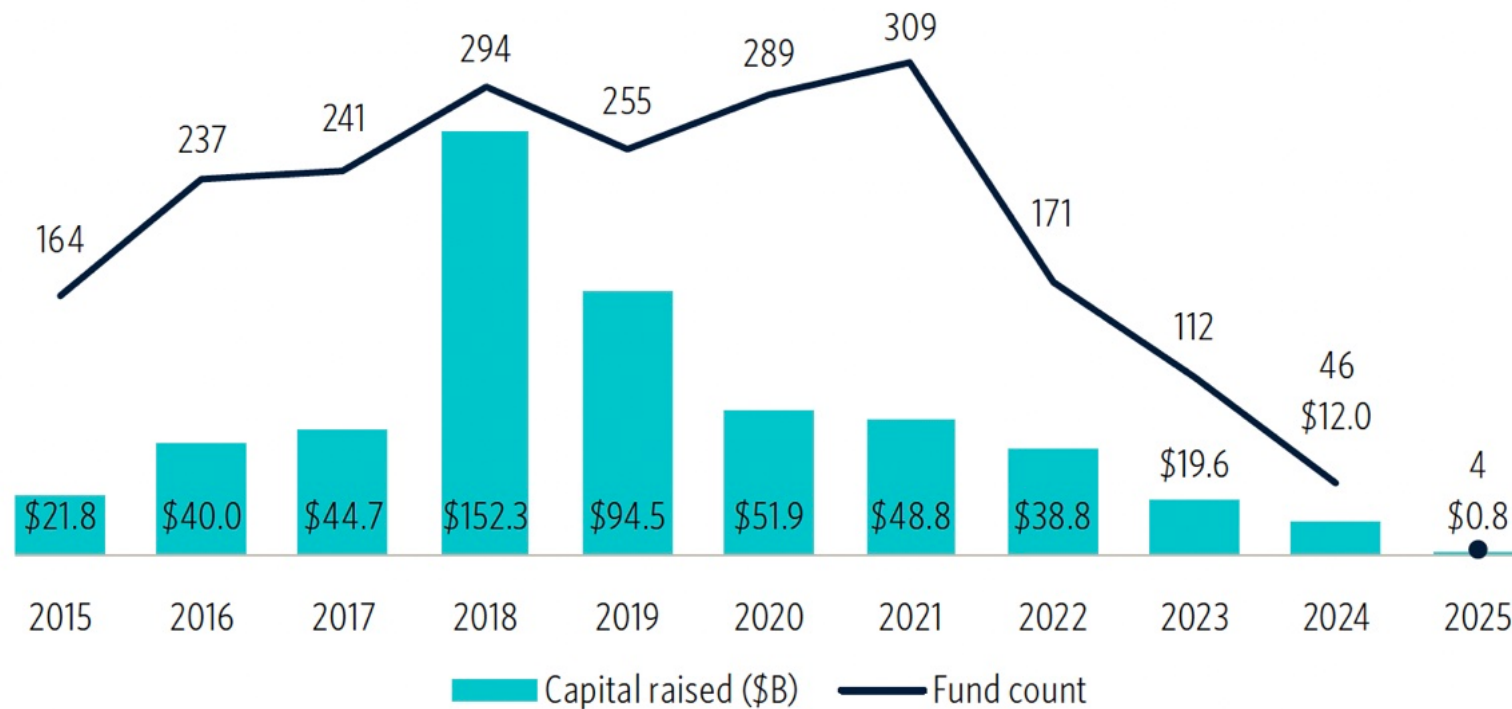
LIFE SCIENCES ARE HEAVILY REGULATED SO NEED TO WORK **IN PARALLEL**, NOT SEQUENTIALLY

Food & Drug Administration (FDA), Pricing, Limited Exclusivity (Generics)
“The government is constantly shoveling dirt into your moat!”



BIOTECH VENTURE CAPITAL IS BECOMING HARDER TO FIND

Biotech VC fundraising activity



Source: PitchBook, (Geography: Global As of March 31, 2025)

OVERALL, LIFE SCIENCES HAS MANY BUSINESS CHALLENGES

CHALLENGES

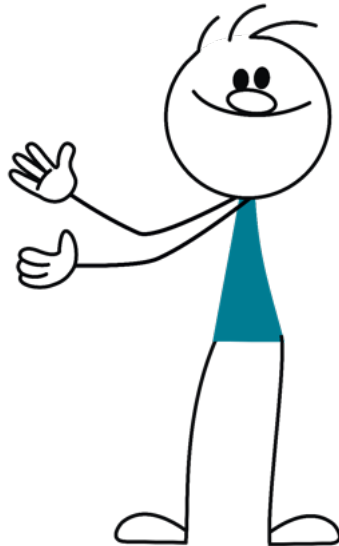
Product development takes a long **time**

Product development is **expensive** and risky

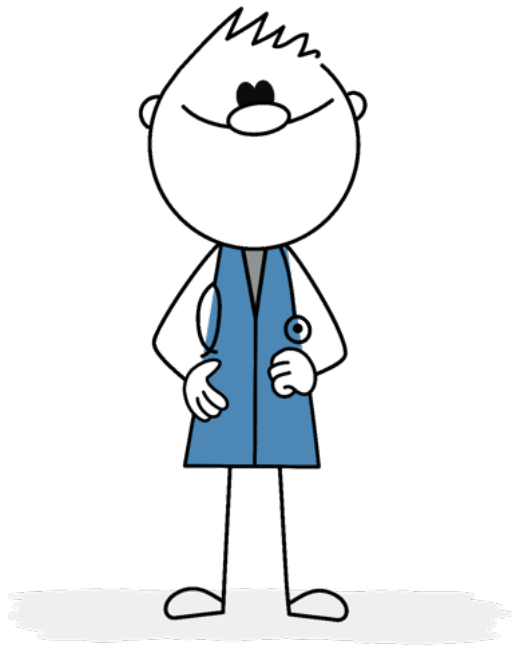
It is hard to make **money**

Regulation impacts every facet of the business

Venture capital is getting harder to find



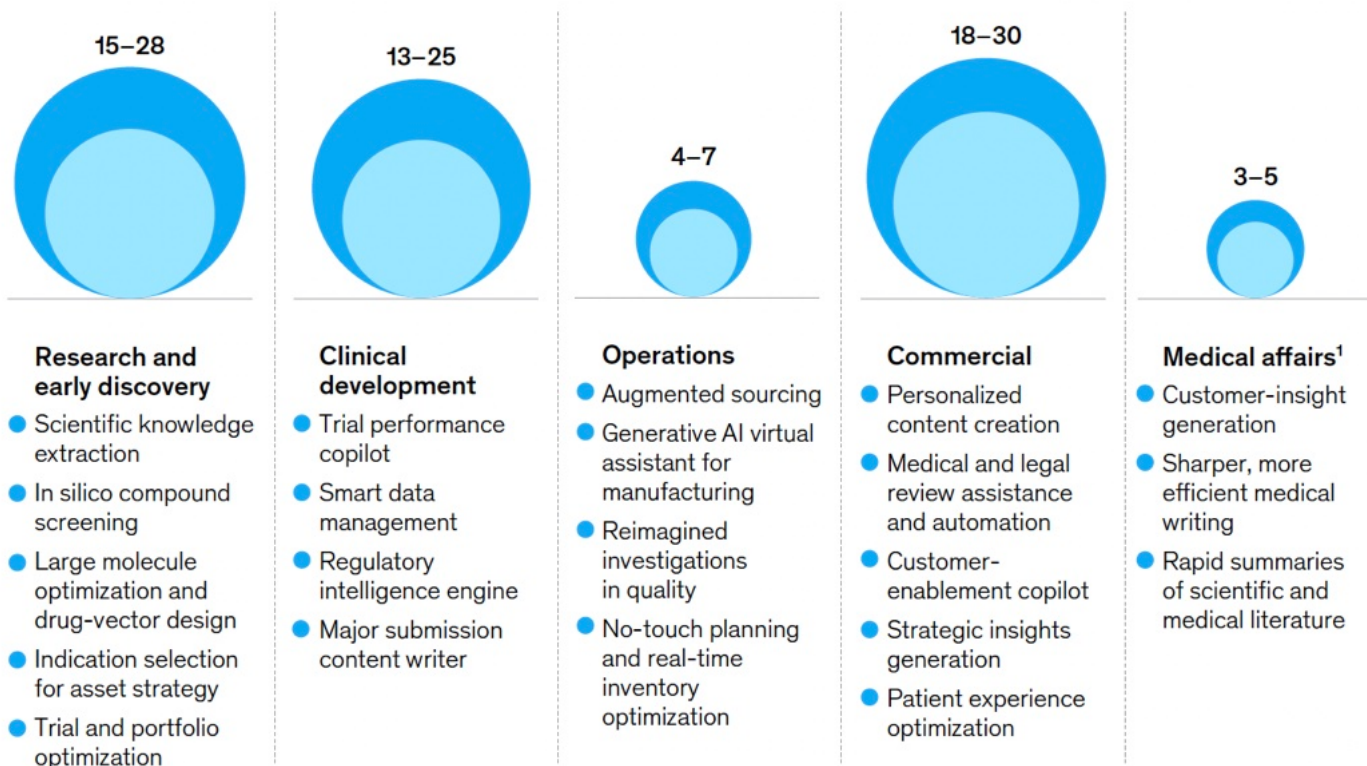
Today's Objectives



1. Life Sciences is a challenging business
- 2. How AI may help**
3. Robust Q&A

AI COULD IMPACT LIFE SCIENCES' BUSINESS IN MANY AREAS

Expected value annually (not exhaustive), \$ billion



¹Via efficacy gains on expenditures.

Source: McKinsey & Company: *Generative AI in the pharmaceutical industry: Moving from hype to reality*

THERE ARE **OPPORTUNITIES** FOR AI TO ADDRESS **CHALLENGES** BUT THERE ALSO ARE LIMITATIONS

Challenges

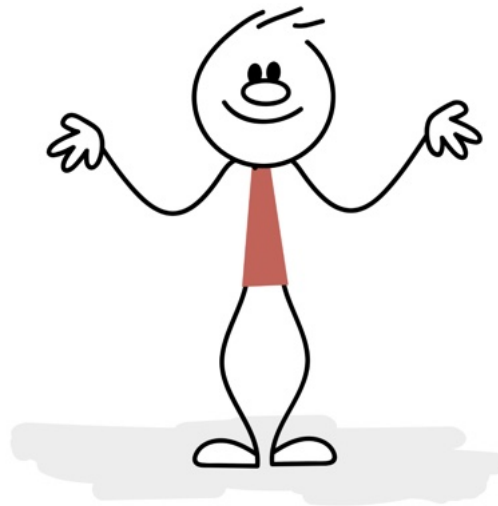
Product development takes a long **time**

Product development is **expensive** and risky

It is hard to make **money**

Regulation impacts every facet of the business

Venture capital is getting harder to find



AI Opportunities

Save **time** in early research and development

Reduce development **expense** and risk

Improve **financial** returns

Reduce **regulatory** burden across business

Provide new sources of **capital** investment

EXAMPLE #1: RESEARCH AND EARLY DISCOVERY (DATA EXISTS)



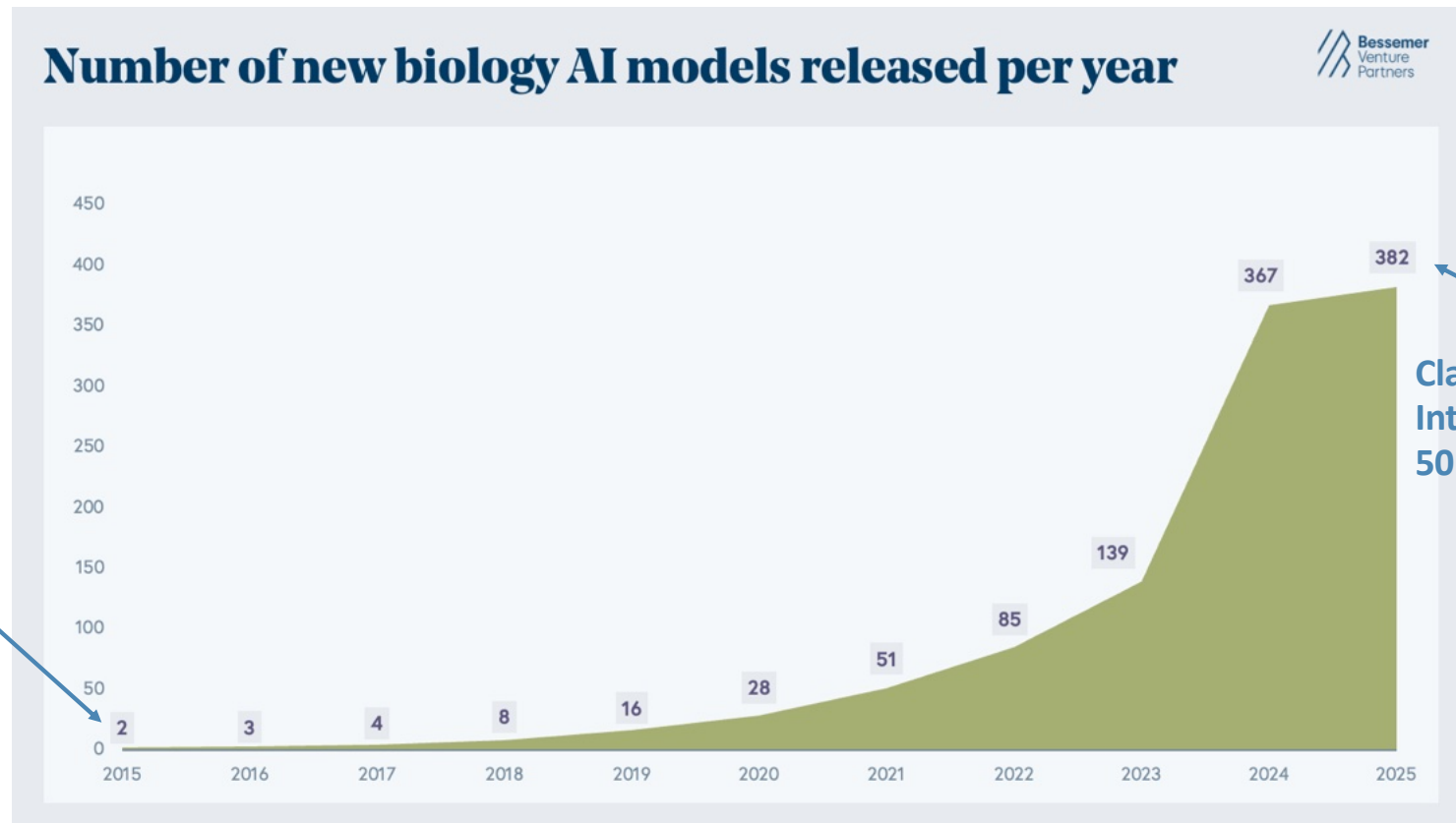
Opportunity

- AI that accesses data from 65 different types and sources (“Multi-modal”)
- 1500 different disease states can model
- In one afternoon, generate handful or two of potential novel compounds
- 3 months of further analysis by PhD biologists to narrow down to 2-3 leads
- **Save 18 to 24 months**

Limitations

- Diminishing competitive advantage (next page)
- Low-cost part of R&D
- Novel mechanisms of action and compounds seem positive but add clinical risk
- 10 - 15 years overall¹; $\leq 20\%$ reduction

NUMBER OF AI BIOLOGY MODELS HAVE GROWN DRAMATICALLY!



Aria
Founded –
65 Data Sources

Claude Life Sciences
Introduced (10/25) –
50 Data Sources

Source: https://www.bvp.com/atlas/building-biology-native-data-infrastructure-for-the-ai-era#page_top

HUMANOID ROBOTS – LEGS OR WHEELS?



EXAMPLE #2A: RESEARCH AND EARLY DISCOVERY (NO DATA)



Opportunity

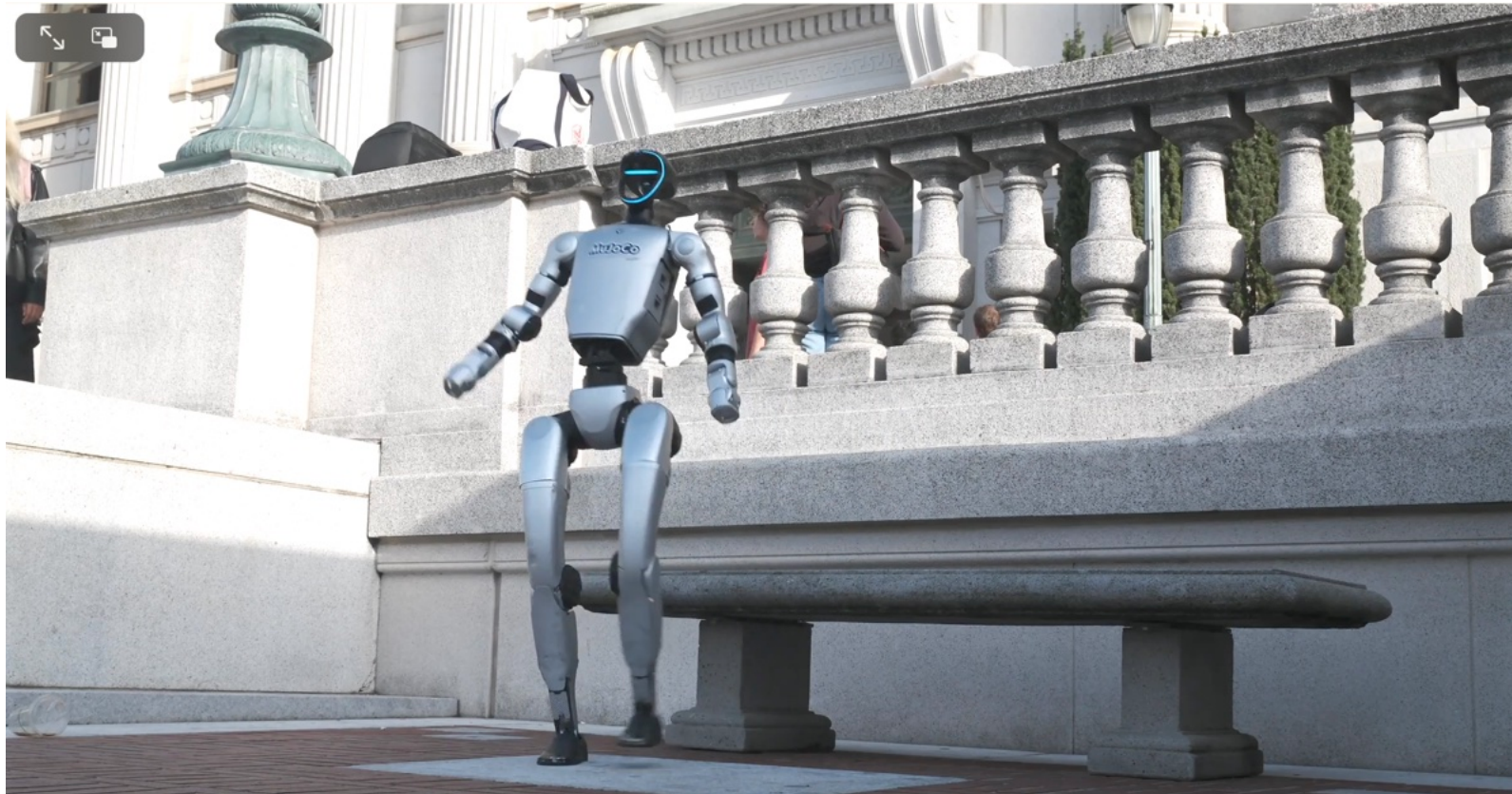
- Develop robots & humanoids to perform various tasks
- Could be stationary or moving
- Unlike LLMs (Large Language Models), no "easy" source of training material
- Use combination of videos and simulations, 3-D printed parts
- **Save \$thousands per robot**

Limitations

- Need to find/generate videos
- No agreement on best source of data
- Motors improving
- Hands still hard – "Tactile Turing Test"
- Legs or wheels, more effective?
- Multi-purpose vs. specialized uses

See: Samantha Kelly, *Bloomberg Businessweek*, "Do Humanoid Robots Really Need Legs?", June 12, 2026
Catherine Thorbecke, *Bloomberg*, "Humanoid Hands Are Physical AI's Anti-Hype Test", June 1, 2026

VIDEOMIMIC – WALKING AROUND UC BERKELEY



Source: <https://videomimic.github.io>

LACK OF DATA EVEN BIGGER CHALLENGE FOR ACTUAL HUMANS!

A Snapshot In Time...



...Doesn't Tell You Much!



37×10^{12}
Cells

2×10^4
Diseases

2×10^4
Genes

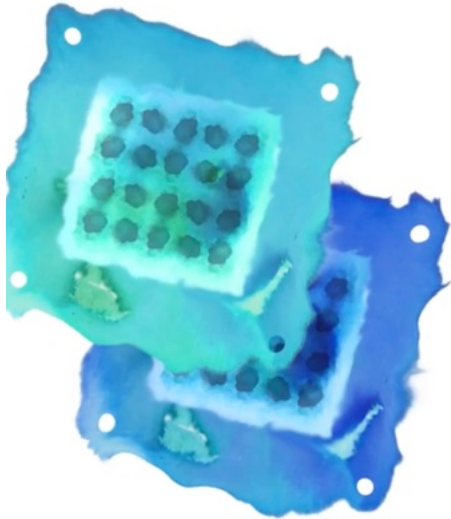
10^{19}
5x Gene
Combos

20^{32}
Antibodies

10^{60}
Molecules
(Small)

EXAMPLE #2B: RESEARCH AND EARLY DISCOVERY (NO DATA)

xaira



First principles for understanding—
Expanding the data universe

AI can't learn without the right data. Xaira's computational advances are underpinned by a robust data platform that can generate, integrate and learn from multidimensional data sets that span from molecular to human scales. Our team of experts in functional genomics and proteomics are pioneering new approaches to gain unprecedented insights from these data into the causal relationships behind disease.

- Xaira founded in 2014
- \$1 Billion “seed” funding (!!!!!)
- Luminary management team and BOD – 2 Nobel Prize winners
- **Wow:** Announced X-cell: perturbed cell-based virtual cell model on March 17th – 25.6 million cells from 7 research cell lines (3x larger than 6/17/25 model); uses predictive AI model
- **But:** 200 cell types, 30 – 40 trillion cells in an adult

Source: <https://www.xaira.com>

EXAMPLE #3: CLINICAL DEVELOPMENT/REGULATORY



Opportunity

- New Drug Application – around 500,000 pages
- Legislated timeline – 10 to 12 months for FDA review
- Chatbot named “Elsa” launched June 2, 2025 for FDA reviewer use; Elsa 4.0 update and HALO platform – May 6, 2026
- **Tasks that can take 2 – 3 days can be reduced to 6 minutes¹**

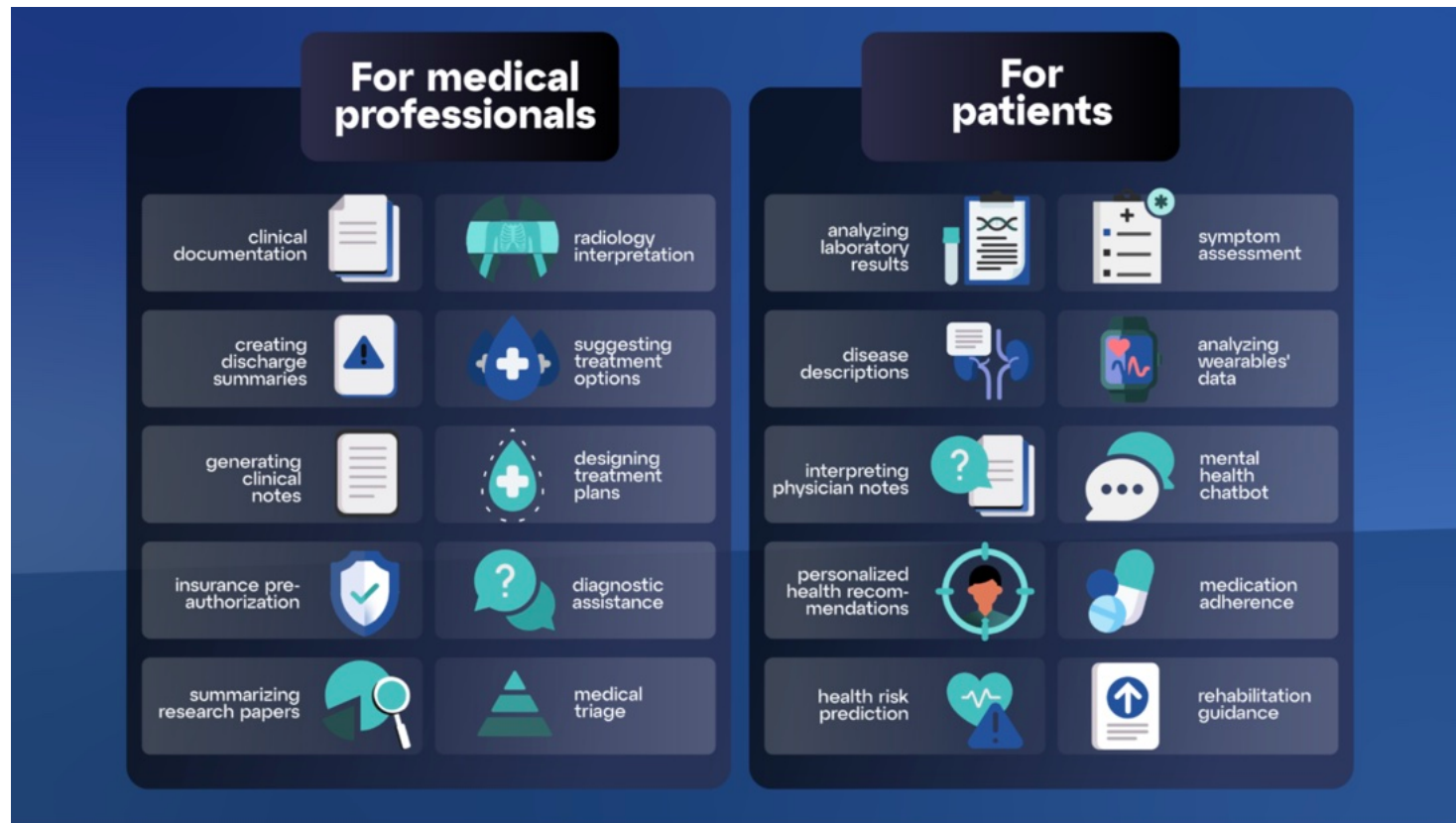
¹<https://www.nbcnews.com/health/health-news/fdas-ai-tool-medical-devices-struggles-simple-tasks-rcna210340>

²<https://www.formation.bio/technology>

Limitations

- FDA has a lot of data, but is it enough?
- Need to work into existing workflows
- Agent will need to be adopted to different types of reviews/data
- Based on Anthropic’s Claude – US Gov’t banning use; impact on Elsa unclear
- Need to keep in synch with industry (e.g. **Formation Bio²**)

THERE ARE MANY POTENTIAL AI APPLICATIONS FOR HEALTHCARE PROFESSIONALS AND PATIENTS



Source: <https://medicalfuturist.com/top-artificial-intelligence-companies-in-healthcare/>

EXAMPLE #4: CLINICAL/COMMERCIAL

Opportunity

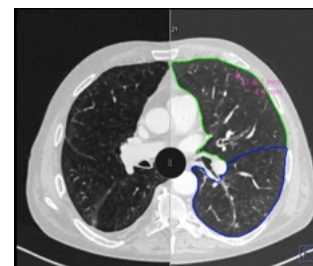


- AI reading of X-rays
- Not new – Sun Microsystems 1986
- Stanford 2018 – 100,000 X-rays database¹
- **Faster - > 100x improvement (280/minute AI vs. 2/minute doctor¹)**
- Better – 14 diseases: 10 as good, 3 worse, 1 better than radiologists¹
- Commercial products now (e.g. **Siemens²**)



Limitations

- Explainable AI (XAI) still evolving (at least 6 different techniques)³
- Output needs to match medical professionals' thought processes
- Need right combo of accuracy, clinical outcomes and explainability



¹<https://med.stanford.edu/news/all-news/2018/11/ai-outperformed-radiologists-in-screening-x-rays-for-certain-diseases.html#>

²<https://www.siemens-healthineers.com/en-us/digital-health-solutions/ai-rad-companion>; ³<https://doi.org/10.1016/j.ejrad.2024.111884>

EXAMPLE #5A: JACARANDA HEALTH (COMMERCIAL)



Jacaranda uses messaging to improve maternal care for mothers, train care-givers and leverages analytics/AI in multiple languages to improve quality of care

UlizaMama

Scaling Swahili-speaking AI to provide rapid, accurate support to mothers' queries

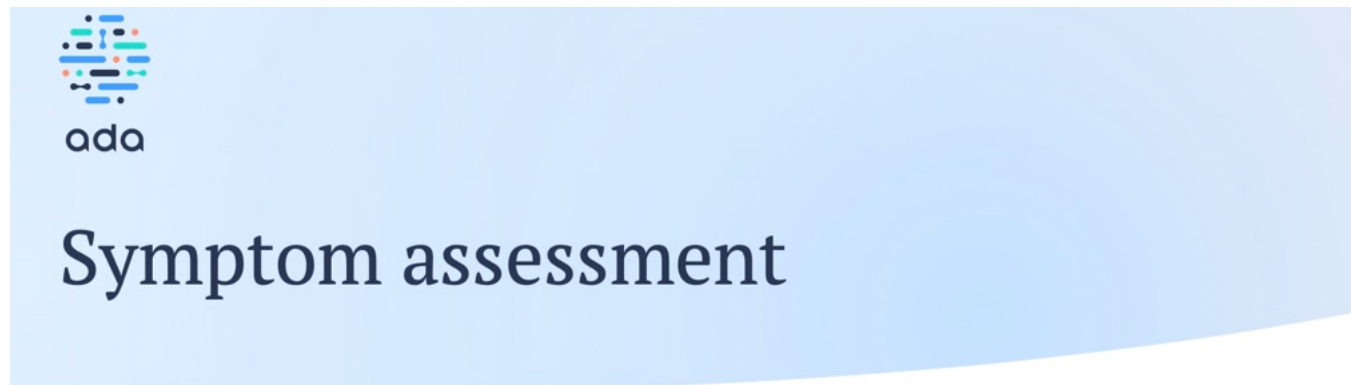
In early 2024, we launched an early prototype of a new, Swahili-speaking Large Language Model, UlizaMama. Since then, our tech team has finetuned the model to fluently and responsibly answer nuanced questions about pregnancy and motherhood in different variations of Swahili - the first of its kind.

UlizaMama makes decisions about each case based on a mothers' message, and other information she shares (p7). Engagement on PROMPTS has increased fourfold in one year: we receive ~12,000+ questions daily. The model provides accurate responds to 70% of these messages, allowing our clinical helpdesk agents to prioritize direct support to high priority cases (eg. bleeding during pregnancy).



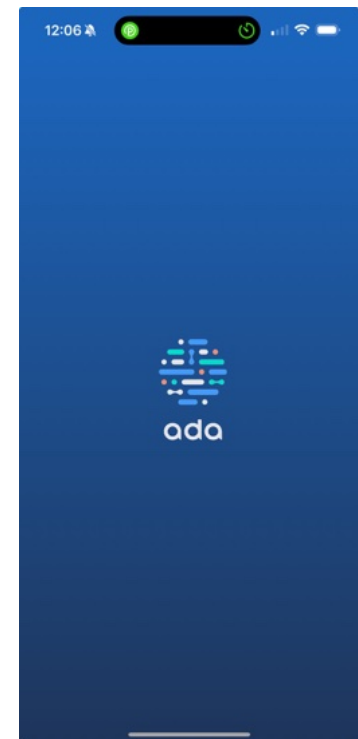
EXAMPLE #5B: ADA (COMMERCIAL)

German company with symptom assessment tool – 15 million users; 140+ countries; English, German, Spanish, Portuguese, Swahili, Romanian, and French



Hi, I'm Ada. Let's take a few minutes to answer questions about your symptoms. Then I'll help you decide what to do next.

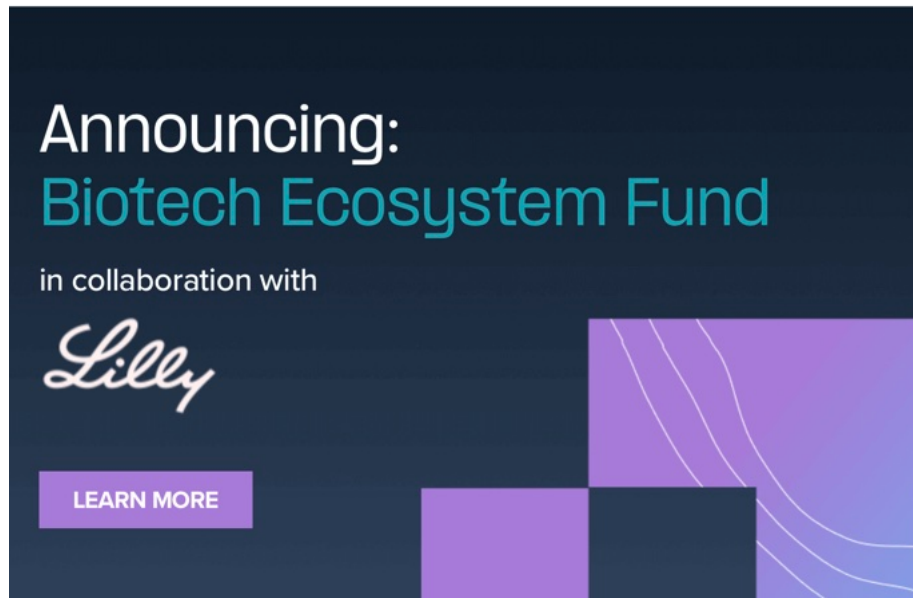
Continue



Source: <https://ada.com/symptom-assessment-ai/>

EXAMPLE #6: AI BRINGS NEW INVESTORS TO LIFE SCIENCES

Themes in Bio+Health



Opportunity

- Traditional Tech VCs crossing over – a16z, Sequoia, Kleiner Perkins
- Deep pockets – a16z + Lilly = \$500M

Limitations

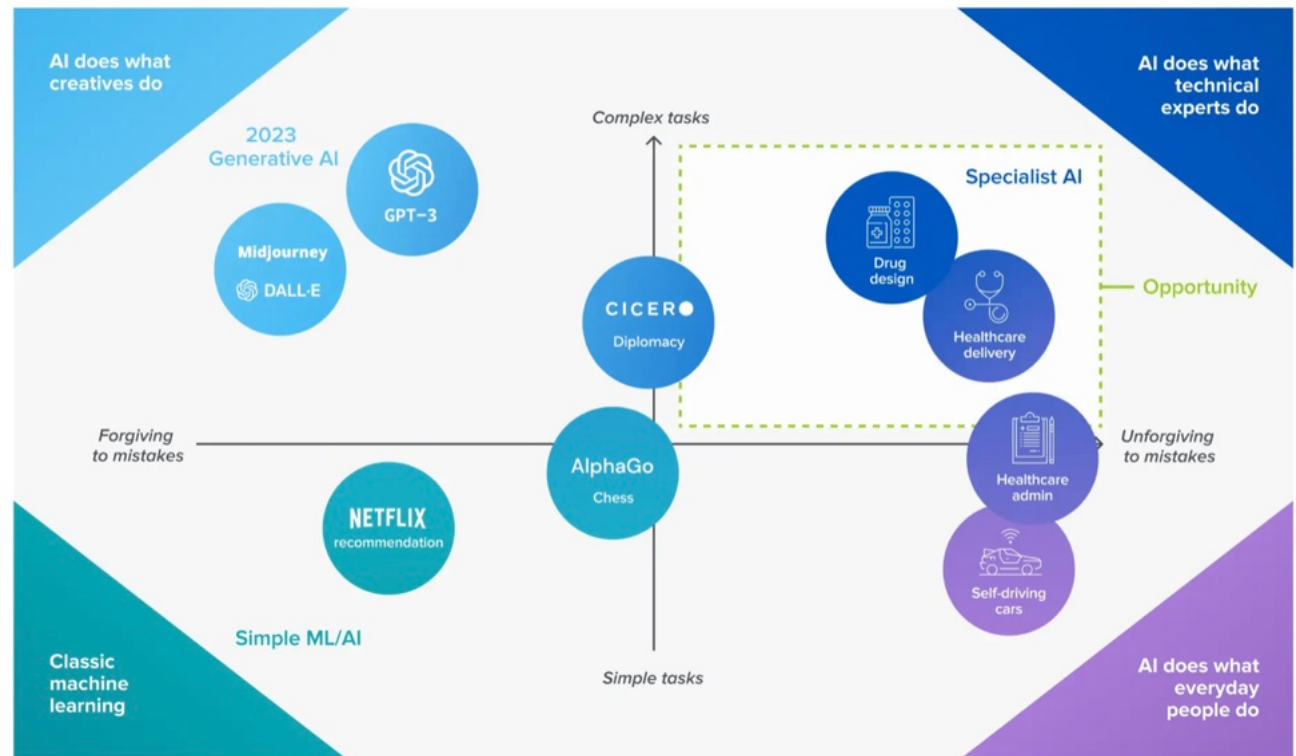
- Still long, expensive timelines
- Employees don't work for "free"

THE IMPACT OF AI ON LIFE SCIENCES WILL BE TREMENDOUS...

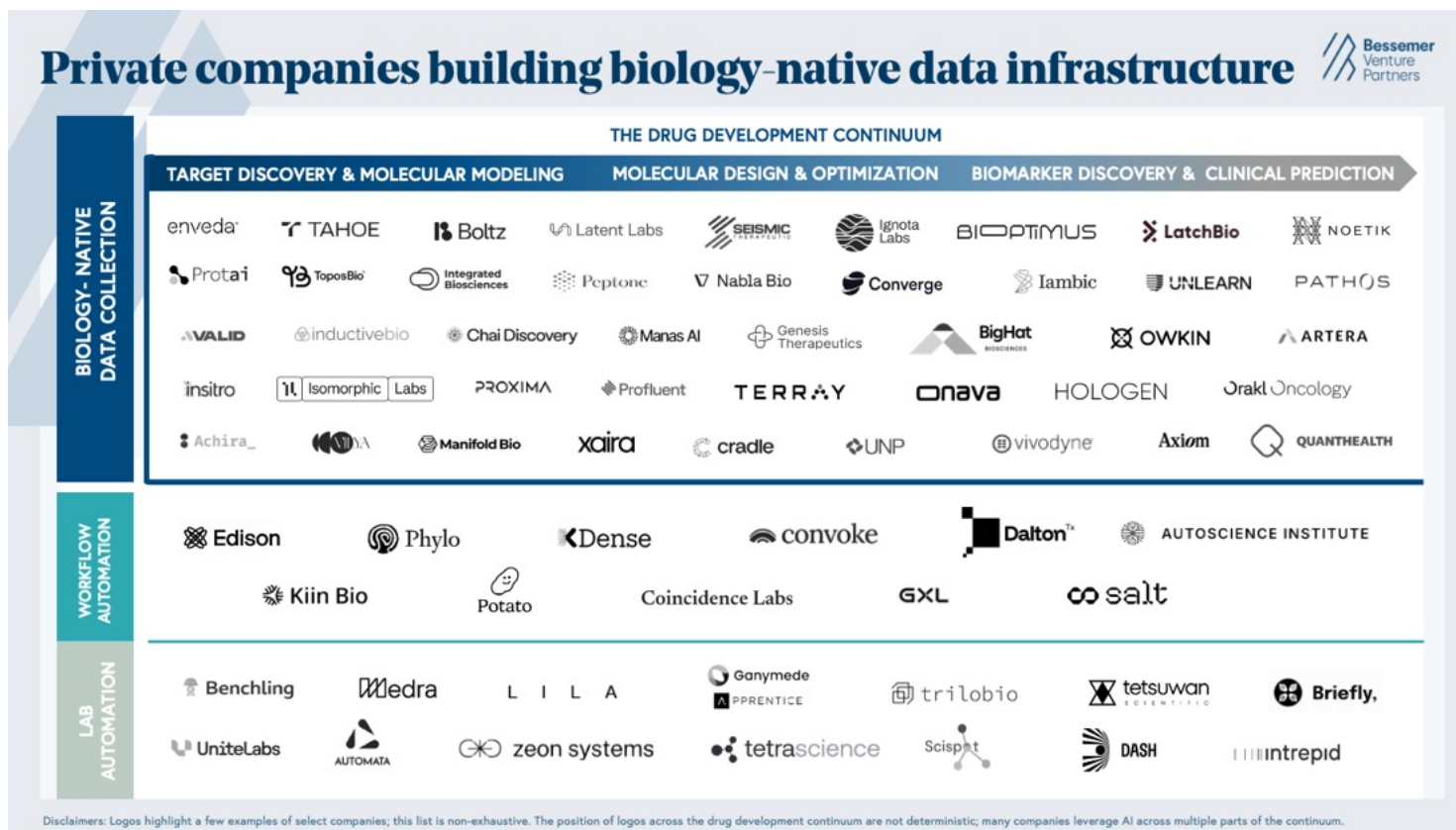
- Early wins (e.g. chatbots, existing data)
- Computing power will get even better (e.g. imaging, protein structure)
- Data-lacking applications will take time (e.g. protein interaction, cell behavior, robotics)

AI Opportunity Map

ai6z Bio + Health



...AND THERE ARE MANY STARTUPS PURSUING LIFE SCIENCE AI.



Source: https://www.bvp.com/atlas/building-biology-native-data-infrastructure-for-the-ai-era#page_top

CAN AI SAVE THE LIFE SCIENCES BUSINESS?



FINAL TIP: NEVER CYCLE ALONE!

Vrsic was a challenging climb...



...done with two friends!

