



Market Insight: Artificial Intelligence in Life Sciences

Highlights, Trends, Opportunities & Outlook

Reach the *Right Outcome*

www.outcomecapital.com

Table of Contents

Market Insight: Artificial Intelligence in Life Sciences

- 1 *Background*
- 2 *AI in BioPharma*
- 3 *AI in Medical Devices & Diagnostics*
- 4 *Market Dynamics & Outlook*

Artificial Intelligence Overview

Artificial Intelligence (“AI”) refers to a combination of computer hardware & software programmed to **simulate intelligence, solve problems, interpret data, and understand language**. AI development began in the 1950s as part of the “Dartmouth Project,” led by John McCarthy in Hanover, NH. McCarthy coined the term “artificial intelligence” as he sought to develop a machine that could think & process information as a human would. Early iterations of AI comprised algorithms used to process information but were limited by the inability to take in new information & learn from it. In the 1980s, inspired by the human brain network, AI developers sought to create artificial neural networks to efficiently control the flow of information within the model & process it in a way that imitates human cognition.

Modern AI works by utilizing algorithms to **identify patterns & statistical correlations**. The depth of these algorithms can vary drastically from simple linear regressions to complex deep-learning models. In recent years, nearly every industry has sought to implement AI to **improve data processing, streamline company efficiency & accelerate the speed at which humans complete tasks**. Additionally, new consumer-facing AI platforms, such as ChatGPT produced by OpenAI, have sparked worldwide debate on modern AI’s ethics, ramifications & capabilities. Despite this, the development of AI continues to accelerate & is exponentially becoming more integral to businesses as well as the rest of society.

While many reference artificial intelligence & machine learning (“ML”) synonymously, there are notable distinctions. AI refers to the **broader concept of machines built to simulate human intelligence**. Encompassed in this broad field lies ML, a subset of AI development that is focused on developing algorithms capable of learning from data inputs & using that information to produce better predictions & generate superior outputs.

AI In Life Sciences

AI IN BIOPHARMA

AI in biopharma offers time & cost-saving opportunities by improving drug discovery applications in the areas of target identification, molecular simulation, lead candidate optimization, clinical trials & data analysis.

AI IN MEDICAL DEVICES & DIAGNOSTICS

AI in medical devices & diagnostics has significant potential in the areas of remote monitoring, data analysis, diagnostic imaging & robotic surgery. AI enhances physicians' ability make appropriate treatment decisions based on data collection.

Artificial Intelligence Has Made Significant Inroads Across Life Sciences Industry From Diagnosis To Treatment



AI In BioPharma

AI Technologies Disrupting Drug Discovery & Development

AI In BioPharma | Highlights, Trends & Opportunities

BioPharma AI Market Segment Drivers

>\$1B

Drug Discovery AI Market Size (2022)



10-15 years required to bring new drug to market using traditional methods



\$1-\$2.5B average expected cost to develop new drug with lack of AI-enablement



~90% of drug candidates fail in clinical trials without AI

Impact



Increased use of AI for therapeutic development & preclinical cost reduction



Strong clinical data readouts for AI discoveries support >45% CAGR (2022-2027)



20-40% potential reduction in development costs with implementation of AI

High-Value Applications

Lead Optimization

Target Identification

Molecular Simulation

De Novo Drug Design

Drug Property Prediction

Lead Candidate Prioritization

Streamlined Development Timelines & Cost Reduction Implications Drive AI Adoption Across Pharma Leaders

Drug Discovery AI Market Insights

AI-Discovered Therapeutics In Pipelines

Pre-Clinical

>150

Developed by select leaders



Phase 1

12

Developed by select leaders



Phase 2

10

Developed by select leaders



Lead Indications



Oncology



Covid-19



Autoimmune



Diabetes



Genetics



Neurology

Adoption Challenges

- AI-based approaches require large amounts of data for training & data processing
- Poor data quality limits accuracy & reliability of results
- Results must still be interpreted by human researchers & validated by clinical trials
- AI algorithms requires constant evolution & improvements

Outsourced AI Services Addressing Drug Development Segments

AI In BioPharma | Highlights, Trends & Opportunities

AI-Based Service Providers Create Value Across Entire Biopharma Drug Discovery Pipeline

Drug Discovery



AI Support

- **Accelerate evaluation & optimization** in drug discovery by outsourcing pipeline to AI expertise
- Potential to **increase probability of success** with outside target validation & innovation
- **Maximize return on investment** by advancing with specific candidates that have undergone intensive screening processes

Clinical Trials



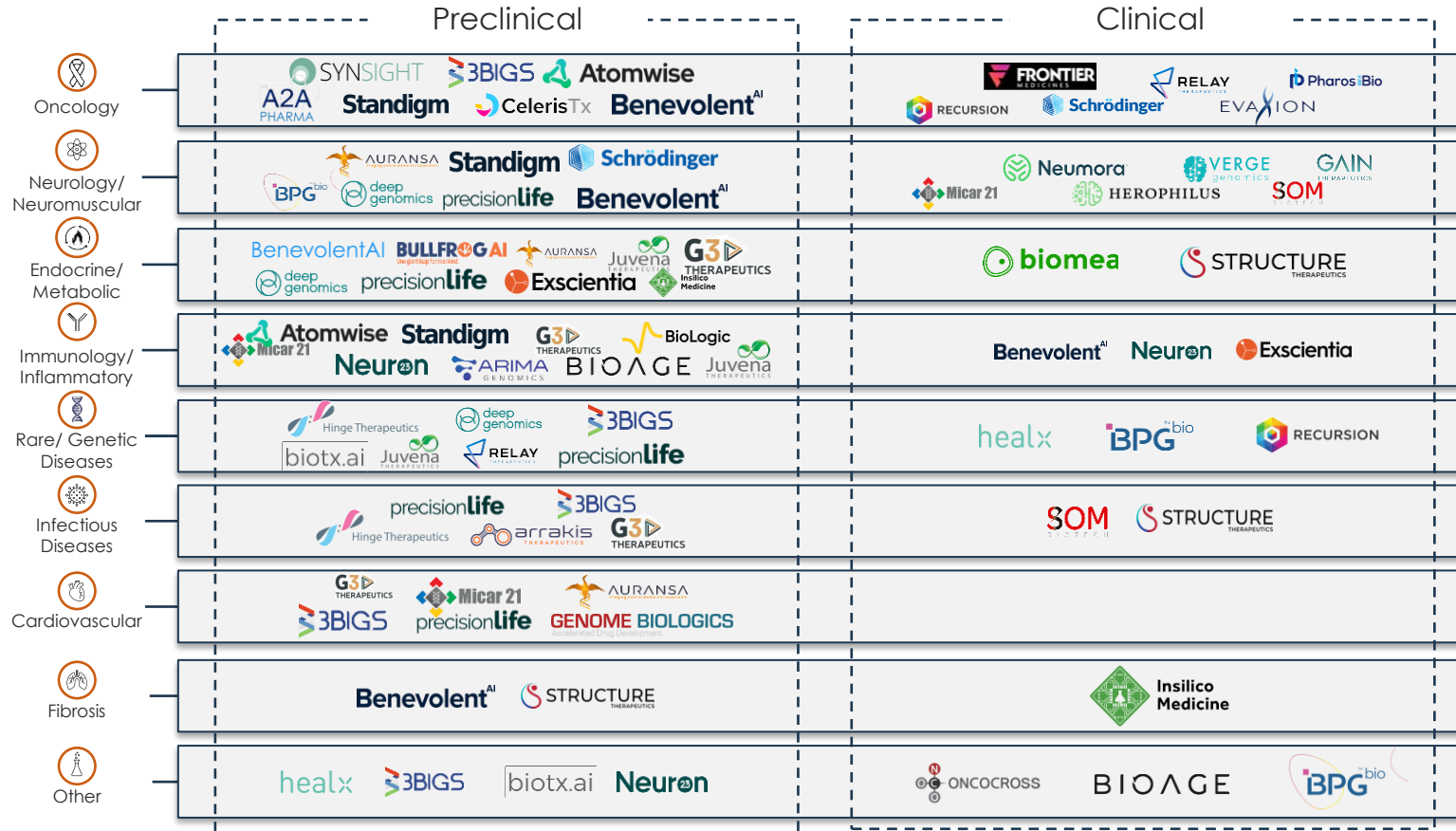
AI Support

- **Automates key clinical development** & commercialization processes
- **Boost efficiency and decrease historically extensive timelines** by programming patient recruitment & data management
- **Minimize risk** with streamlined productivity, improved data quality & advanced analytics

AI Service Providers Increasingly Prevalent In Drug Discovery & Clinical Trials Support Segments

Strong Internal Biotech Pipelines Developed By AI Platforms

AI In BioPharma | Highlights, Trends & Opportunities



Insights

- As biotech startups utilize AI to discover novel therapeutics & navigate through clinical trials, large biopharma companies have taken interest by investing, partnering & acquiring emerging leaders in the space
- The large pipeline of preclinical treatments are expected to move to clinical trials by the end of 2025, further driving interest in strategic exits

“ We will explore the efficacy for patients of AI-discovered and designed treatments in clinical trials, which is a true validation of our generative AI platform. We are eager to continue to advance this potentially first-in-class therapy forward to help patients in need and show the value of generative AI in drug discovery and development. ”

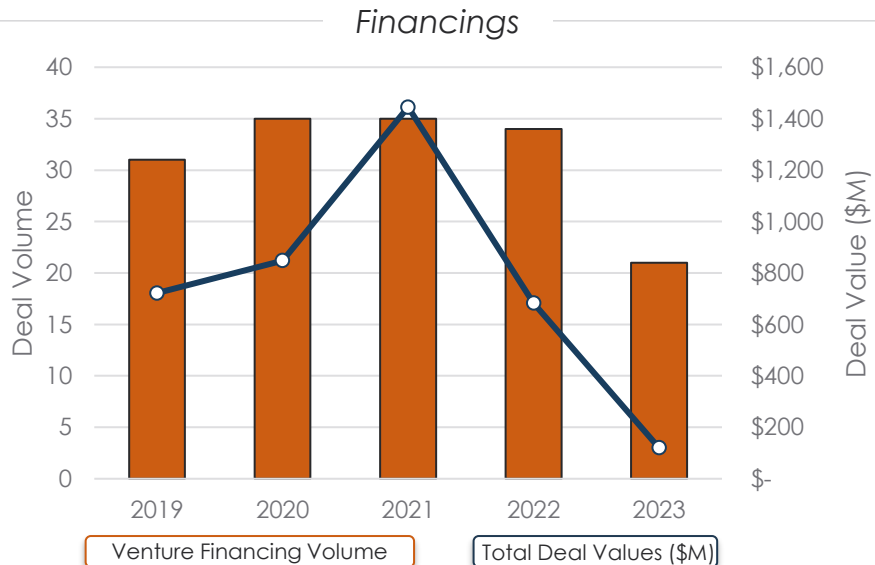
- Alex Zhavoronkov
Founder & CEO

Strong Focus On Improving Oncology, Neurology & Immunology Therapeutic Developments

AI Venture Financings Following Hype-And-Decline Trend

AI In BioPharma | Highlights, Trends & Opportunities

Biopharma AI Financing Market Dynamics



Biopharma AI Financing Market Dynamics

Overview

>\$3.8B

VC Investments in AI Biopharma 2019-2023

3%

Decline in Biotech AI VC Volume 2022

10%

Decline in AI VC Volume 2022

18%

Decline in Biotech VC Volume 2022

Investor Outlook

- Following initial hype surrounding AI technology, economic conditions are driving investors to focus on platforms with more developed technologies & greater profitability
- Many investors are waiting on the sidelines when evaluating AI drug discovery investments until more clinical evidence is released on AI-developed treatments
- Despite recent decline, investors continue to seek AI biotech opportunities over traditional biotech startups due to strong exits driven by strategic acquirers
- As AI technology continues to improve & the subsector continues to mature, capital deployment is beginning to transition away from VC toward partnerships / M&A

SoftBank Vision Fund

Select 2018-2023 Investments



andreesen horowitz

Select 2018-2023 Investments



Select Investors

Blackstone

Select 2018-2023 Investments



G/

Select 2018-2023 Investments



SEQUOIA

Select 2018-2023 Investments

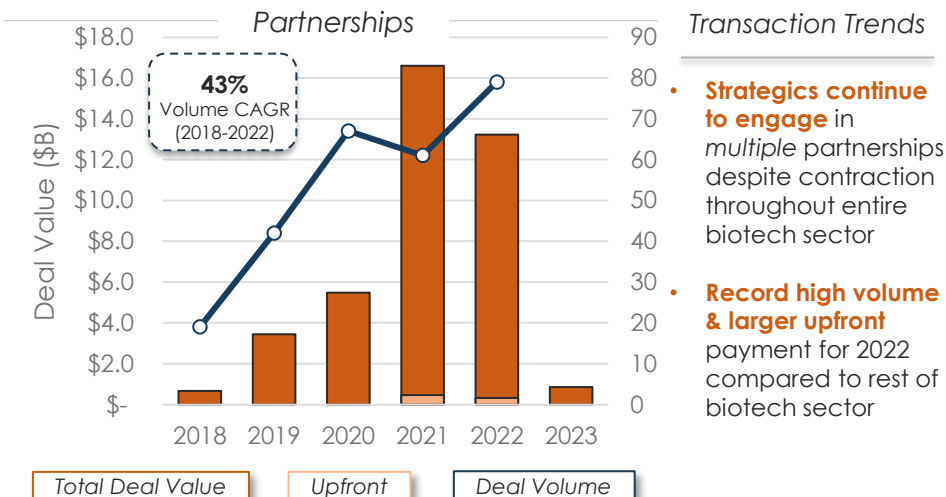


After >5 Years Of YoY Growth, Biotech AI VC Investment Volume & Deal Size Begins To Decline

Leading Biopharma Strategics Establishing Key AI Pacts

AI In BioPharma | Highlights, Trends & Opportunities

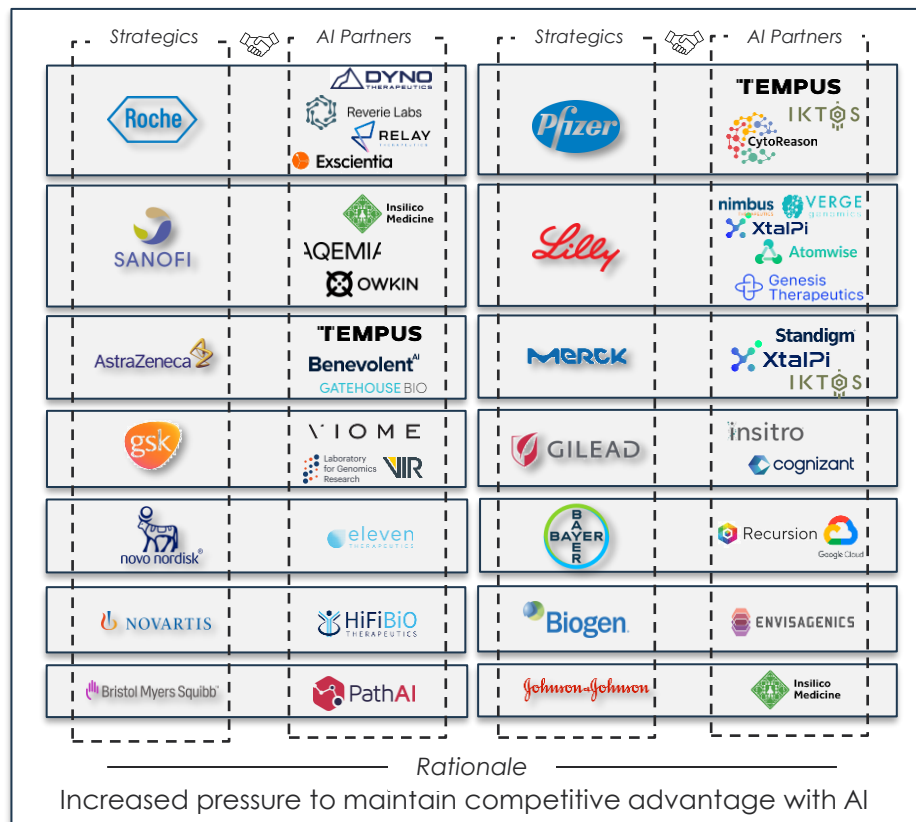
Biopharma AI Partnership Market Dynamics



Rationale

- Potential to optimize proprietary drug discovery pipelines while mitigating risk associated with uncertainty of technology drives strategics interest in pursuing partnerships as first-step before acquisition
- 2023 volatile market conditions push strategics with cash reserves & healthier financials to offer lower deal values for larger upfront payment
- Recent decline exacerbated by traditional biopharma needing time to reestablish new AI-incorporated workflows & waiting for clinical data readouts to evaluate success of technology

Major Biopharma Strategics Entered AI Partnerships

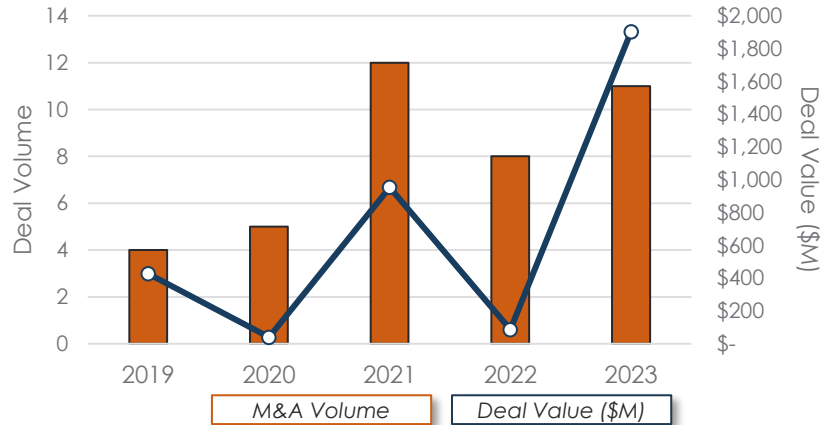


Partnerships On The Rise With Strategics Offering High Value, Success Driven Deals

Drug Discovery AI Platforms Are Prime M&A Targets

AI In BioPharma | Highlights, Trends & Opportunities

Biopharma AI M&A Market Dynamics



Insights

- Biopharma interest in AI rebounding in 2023 after 2022 M&A slump; steady growth in deal volume with 29% CAGR
- Average & median reported AI deal values in BioPharma higher than AI in Healthcare; AI deals volume on the rise
- Covid-19 intensified unconventional partnerships for biopharma resulting in major uptake in 2023 M&A after completion of successful partnerships

Select Acquirers



Biopharma AI M&A Market Insights

M&A Trends

\$4.0B

Total M&A Capital Deployed (Since 2019)

\$255M

Average Reported M&A Deal Size (Since 2019)

\$70M

Median M&A Deal Size (Since 2019)

29%

Deal Volume CAGR (2019-2022)

Leadership Insights

“ We'd like to understand how incredibly complex biological networks misfire or dysregulate in disease and identify the best points to intervene to restore health. AI is already transforming this field, and we are further building this technology to make discoveries we couldn't uncover with traditional methods. ”

— **Tommaso Biancalani**
Senior Principal Scientist
Genentech
A Member of the Roche Group

Strategic Rationale

- Advancements in AI capabilities & increased ease of integration drive strategic interest from biotech leaders seeking to improve proprietary drug discovery platforms
- Strategics adopting a “buy” approach for AI rather than building platforms in-house; maintaining core competencies while leveraging already-developed programs
- BioPharma pursuing M&A after undergoing major portfolio transformations post-pandemic to accelerate growth & boost efficiencies
- Publicly-traded biotech players experience ~3x increase in market cap with AI technology investments fuels M&A interest

Streamlined Development Timelines & Cost Reduction Implications Drive AI Adoption Across Biotech Leaders

High-Value Transactions Signify Demand Within BioPharma Vertical

AI In BioPharma | Highlights, Trends & Opportunities

Target	Buyer	Deal Size	Target Description	Strategic Insight
		\$100M	Leverages proprietary AI-powered molecular discovery pipeline to drive molecule & biological modality development for cosmetic related drug development	<ul style="list-style-type: none"> Revela a direct touchpoint with consumers Additional \$25M investment in laboratory space for clinical validation Expectation of 46-48% full year net revenue increase since acquisition
		\$683M	Leading global AI company with novel protein structure prediction platform to identify key residues & discover favored mutation combination from data-driven analysis to support drug discovery pipelines	<ul style="list-style-type: none"> Predicts acquisition will increase monthly throughput by 40x InstaDeep operating as an independent subsidiary generates third party business for external clients Adds >290 tech engineers & AI top talent to BioNTech R&D capabilities
 Subsidiary Nimbus Lakshmi, Inc		\$6B	AI-powered drug discovery platform formerly owned by Nimbus Therapeutics; the company primarily focuses on developing treatments for autoimmune diseases	<ul style="list-style-type: none"> Generated a total cash distribution of \$147.3M Positive topline results from Nimbus' phase 2 psoriasis study crucial component of successful transaction
		\$40M	Industry leader in AI-enabled deep learning that has built two highly-differentiated products in the digital chemistry space: MatchMaker™ & POEM™ used to predict pharmacology of small molecules	<ul style="list-style-type: none"> Immediate use of Cyclica's digital chemistry technology to predict protein-ligand interactions of >1M compounds within internal, non-partnered chemical library Investors maintained significant upside from all-stock transaction

Drug Discovery

Biotech Expand Capabilities By Acquiring AI Platforms With Drug Discovery Applicability

Case Study: BioNTech Acquires InstaDeep for \$680M

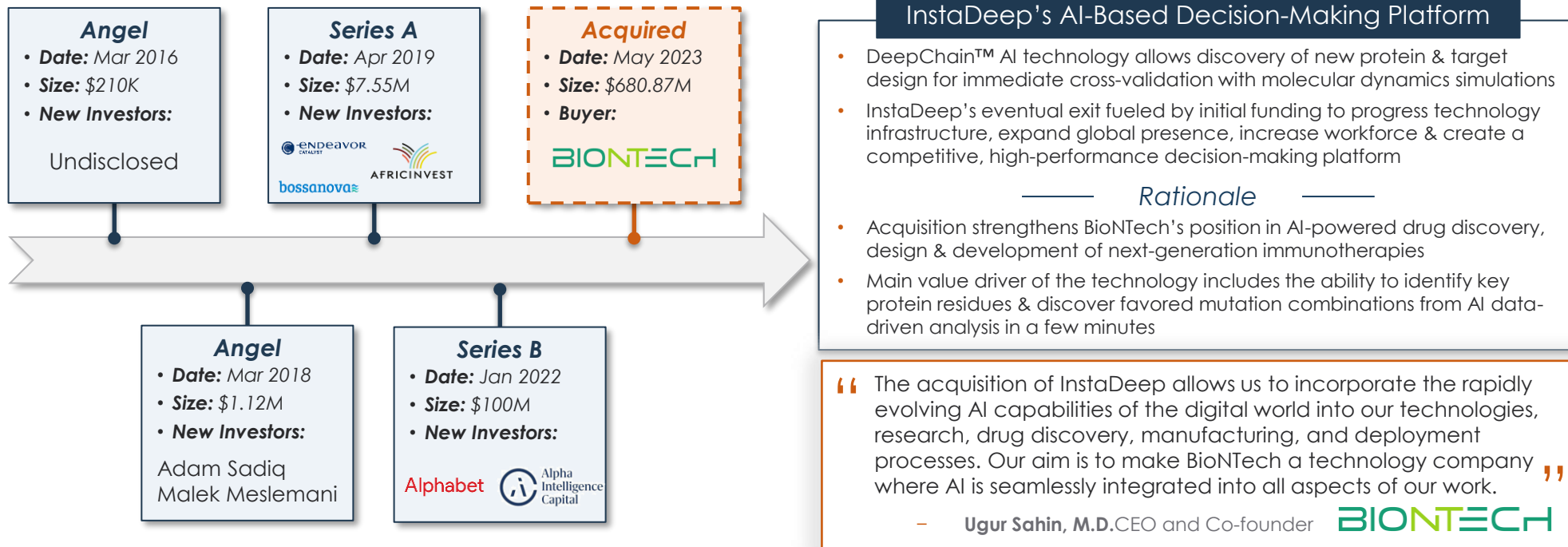
AI In BioPharma | Highlights, Trends & Opportunities



Founded: 2014

Total Raised: \$108.88M

Post Valuation: \$680.87M



Acquisition of InstaDeep Strengthens BioNTech's Position In AI-Powered Drug Discovery

Case Study: Schrodinger Raises \$202M In IPO

AI In BioPharma | Highlights, Trends & Opportunities



Founded: 1990

Total Raised: \$666.4M

Market Cap: \$2.65B

Series B

- **Date:** May 2010
- **Size:** \$10.0M
- **New Investors:**



Series D

- **Date:** Jun 2015
- **Size:** \$22.0M
- **New Investors:**
Undisclosed

IPO

- **Date:** Dec 2021
- **Size:** \$202.0M
- **Share Price:** \$17
- **Mkt. Cap:** \$1B

Series A

- **Date:** Mar 200
- **Size:** \$5.4M
- **New Investors:**
Undisclosed

Series C

- **Date:** Dec 2012
- **Size:** \$20.0M
- **New Investors:**

BILL & MELINDA GATES foundation

Series E

- **Date:** May 2019
- **Size:** \$110.0M
- **New Investors:**



2PO

- **Date:** Aug 2020
- **Size:** \$330.0M
- **Share Price:** \$66
- **Mkt. Cap:** \$4.7B

Schrodinger's AI-Powered Drug Discovery Platform

- Developer of artificial intelligence software platform harnessed by large pharmaceutical companies to streamline drug discovery
- Success of proprietary Maestro & Desmond software platforms generated significant credibility as a drug discovery partner for large biopharma strategics
- Reinvested early money to advance drug R&D activity & eventually prove their potential by locking numerous therapeutics into clinical trials prior to exiting

Rationale

- Public investment allowed Schrodinger to focus on building out new software & capturing additional growth opportunities through partnerships
- Launched five internal, wholly owned programs by leveraging computational platform & developing first-in-class therapeutics

“ This is an incredibly exciting and pivotal time for computationally driven drug discovery. The heightened interest in this field is undoubtedly driven by the promise that computers and in particular artificial intelligence can increase efficiency across the R&D continuum and deliver more drugs to patients faster. ”

Ramy Farid, CEO

Schrodinger AI-Powered Drug Discovery Platform Contributes To \$2.65B Market Cap

Case Study: Recursion Acquires Cyclica's AI Platform For \$40M

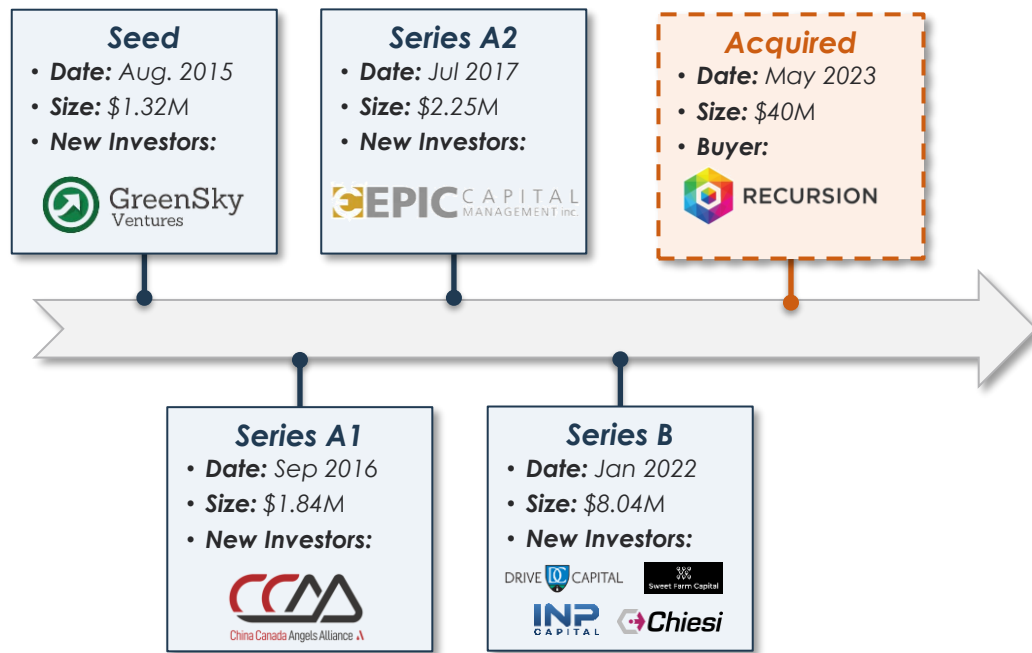
AI In BioPharma | Highlights, Trends & Opportunities



Founded: 2011

Total Raised: \$22.6M

Post Valuation: \$40M



Cyclica's Differentiated AI Platform

- AI-enabled drug discovery company focused on identifying novel protein drug targets with a concentration in oncology & CNS therapies
- Early funding rounds supported creation of unique proteome-wide drug discovery platform & propelled early commercial strategies that created multiple revenue pipelines across numerous therapeutic areas

Rationale

- Integration of Cyclica's AI platforms into Recursion's proprietary data universe creates one of the largest fit-for-purpose biological & chemical datasets in the drug discovery space
- Investors maintained significant upside on an all-stock transaction from a major biopharmaceutical company

“The strategic acquisitions of Cyclica and Valence add industry-leading capabilities in digital chemistry, as well as machine-learning and artificial intelligence, which combined with our large-scale automated wet-laboratories and supercomputing capabilities, enables us to deploy what I believe is the most complete, technology-enabled drug discovery solution in the biopharma industry.”

— Chris Gibson CEO and Co-founder



Acquisition of Cyclica Establishes Recursion As End-to-End Drug Discovery Industry Leader

Supportive Clinical Data Increases Investment Opportunity

AI In BioPharma | Highlights, Trends & Opportunities



VC Interest Remains Despite Recent Market Performance

Difficult To Raise Capital Through VC Without Established Clinical Data

- AI-focused venture groups are expected to continue investing modestly through Q4'23
- Global venture & PE leaders are demonstrating investment **interest in AI technology amongst market volatility**
- Investors looking to **mitigate risk** by deploying capital in companies with supportive **clinical data**
- Under challenging economic headwinds, **VC financing is more difficult to obtain**; opportunity for CEOs to focus on M&A / partnerships

Rise In Partnerships With Upfront Cash But Overall Lower Deal Value

Partnerships First Logical Step For Immediate Access To Technology

- Leading strategics seek partnering opportunities to **re-enforce pipelines & expand market share**
- Partnerships present opportunity for biopharma players to **de-risk technology & collaborate on features** before moving toward M&A
- Successful strategic alliances continue to **progress toward acquisition** opportunities
- As clinical trials for AI-discovered therapeutics progress with successful readouts, **partnerships could rebound** to 2022 levels

Acceleration In Strategic Acquisitions Of AI Drug Discovery Platforms

Integration Of Novel AI Platforms Drives Value Of Strategic Acquirers

- AI assets in **later stages with clinically supported data** driving market consolidation
- Acquisitions present opportunity to **reposition business & bolster proprietary pipelines** under current capital market conditions
- Ability to capture maximum potential of AI-capabilities through **full integration into standard research process**
- Next-generation AI **advancements** require acquisition of **both AI platform & expert personnel**

Active Partnering & M&A Driven By Reduced VC Funding & Integration Potential Across The Development Process



AI In Medical Devices & Diagnostics

AI Versatility Enhances Care Quality Across Healthcare

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities

Medical Device & Diagnostic AI Market Dynamics

\$16B

AI Healthcare Market
(2023)

39%

CAGR
(2023-2027)

\$200B

AI Healthcare Market
(2030)

Healthcare AI Innovation Trends



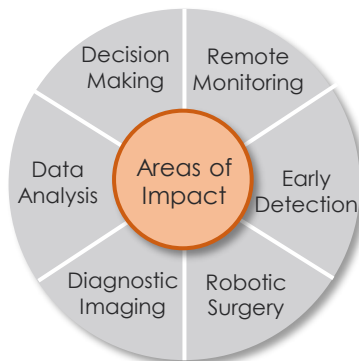
>500 medical AI algorithms approved by FDA



75% of FDA-cleared AI medical applications in radiology



280% increase of FDA approved AI-medical devices since 2018



What the experts are saying

“ You’re seeing AI used all over the place. You see it used in our diagnostic business where we have these two-week Holter monitors. Your heart beats 100,000 times a day and you have thousands of patients that you’re monitoring. And you can’t hire 8,000 people in Gillette stadium to read all these EKGs. So you leverage AI algorithms to actually read the EKGs for you, and they flag the ones to look at for the human inspection. ”

— **Mike Mahoney, CEO** 

Medical Device & Diagnostics AI Market Drivers

- **Robotic Process & Procedure Automation:** Alleviates overwhelming paperwork load on clinicians with AI technology completing routine tasks & supporting procedures
- **Improve Diagnostic Accuracy:** AI algorithms can be trained to identify unique patterns, guide decision-making, perform risk assessments & improve accuracy of results
- **Focus On Cost Reduction:** Pressure to combat staggering healthcare costs by harnessing AI capabilities to optimize workflows & enhance operational efficiencies
- **Increase Data Collection & Complexities:** Demand for AI technologies in healthcare rising to manage & analyze large amounts of data
- **Remote Disease Management:** AI-enabled real-time patient monitoring

Strategic Rationale

- Healthcare industry slow to implement technology & update technical infrastructure; additional burden for already over-worked clinicians
- Lack of updated regulatory FDA governance & ethical practices established to handle privacy regarding data used to train AI models
- Data used to train AI systems can be unstructured, incomplete & sometimes skewed by previous biases in medicine
- Limited acceptance from healthcare professionals due to concerns of AI-tools over analyzing & lacking process transparencies

Growing Demand For Reduced Healthcare Costs Drives AI Market Growth

Leading Innovators In AI-Enabled Medical Devices & Diagnostics

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities

Early Detection



Clinical Objective

Harness AI to uncover genetic causes, investigate biomarkers, & identify novel molecular targets

Diagnostics



Clinical Objective

Leveraging AI to deliver accurate diagnostics & treatment plans through automated image analysis

Treatment



Clinical Objective

AI-assisted remote monitoring & surgical devices for increased precision & diagnostic accuracy

Insights

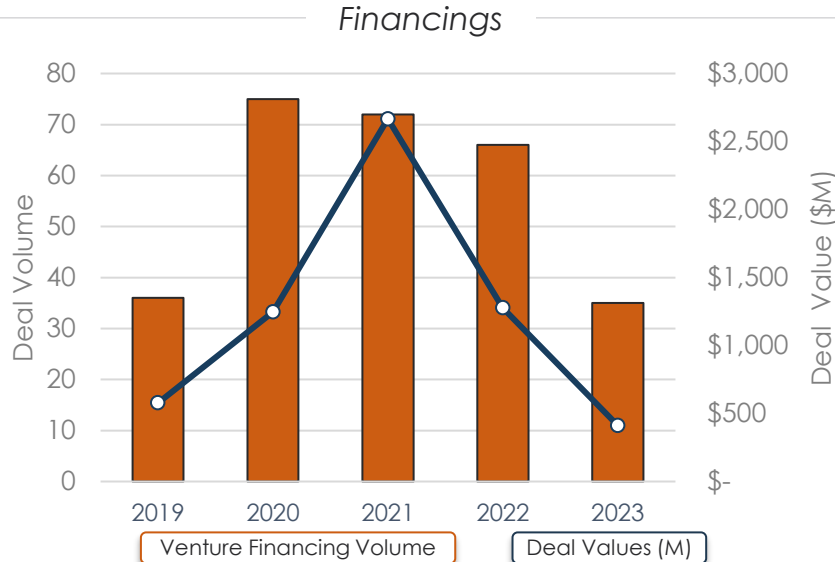
- AI-powered technology incorporated along **entire patient journey**, from screening to diagnosis to treatment
- Majority of leading innovators invested in harnessing the power of AI to **advance imaging diagnostic capabilities**
- **Ultimate clinical objective** across all sectors is to **improve patient outcomes**

Major Revolution & Concentration In AI-Powered Medical Device & Diagnostics Technologies

Medical AI Financing Trends In-Line With Broader Sector

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities

Medical Device & Diagnostic AI Financing Market Dynamics



Medical Device & Diagnostics AI Financing Market Trends

Overview

>\$6.2B

VC Investments AI Medical Devices & Diagnostics 2019-2023

8%

Decline in AI Medical Devices & Diagnostics VC Volume 2022

9%

Decline in Medical Devices & Diagnostics VC Volume 2022

10%

Decline in AI VC Volume 2022

Investor Outlook

- VC funding decline in AI medical devices & diagnostics driven by macroeconomic factors affecting broader sector as well as recent shift towards partnerships / M&A as the space continues to mature
- Despite recent VC caution in early-stage healthcare investments, investors are showing strong relative interest in AI relative to other early-stage investments
- While historical AI investment within medical devices & diagnostics has been focused primarily on healthcare IT & patient monitoring, investor interest in the space is shifting towards diagnostics and imaging technologies

GENERAL CATALYST

Select 2018-2023 Investments



KKR

Select 2018-2023 Investments



Select Investors

BOLD CAPITAL PARTNERS

Select 2018-2023 Investments



INSIGHT

PARTNERS

Select 2018-2023 Investments



breyercapital

Select 2018-2023 Investments

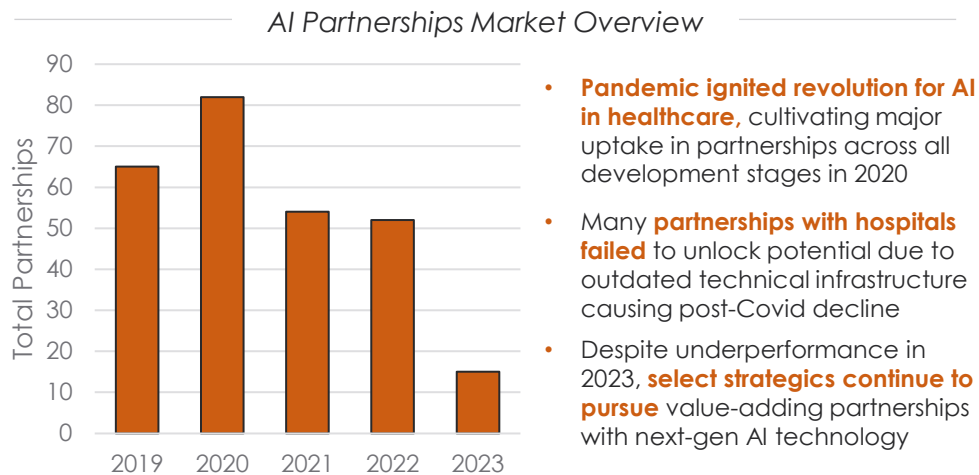


AI Continues To Drive Substantial Investment Interest Despite 2023 Underperformance

Failure To Generate Value From AI Results In Partnership Decline

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities

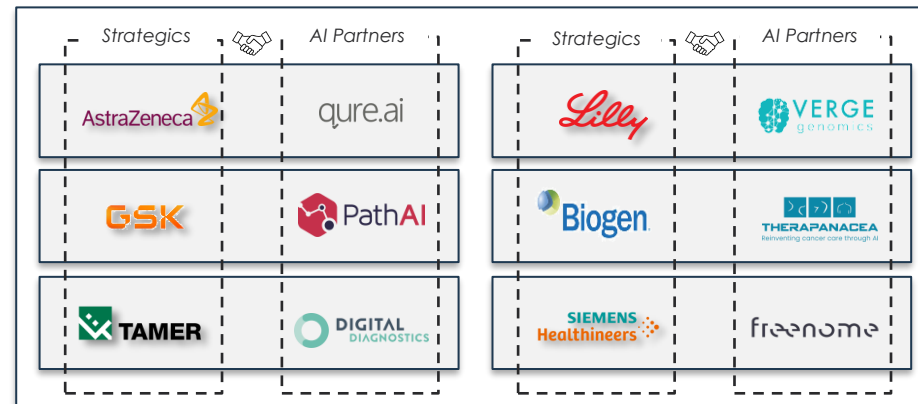
Medical Device & Diagnostic AI Partnership Market Dynamics



Select Strategics



Medical Device & Diagnostic AI Partnership Market Trends



Strategic Rationale

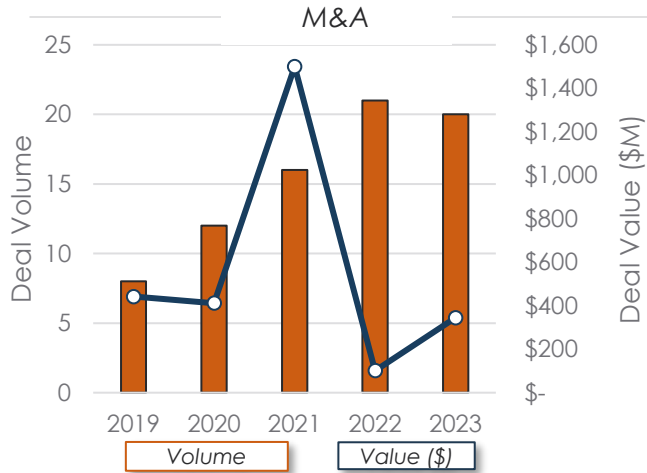
- Partnerships create opportunity for emerging players to evolve & refine their algorithms while simultaneously allowing leading innovators time to assess technological capabilities
- Success in healthcare integration limited by outdated digital foundations, uncooperative with HIPAA compliance & already over-burdened healthcare workers
- The underperformance & failure to scale AI investments from 2021 caused post-pandemic market shift away from partnerships; leading innovators awaiting next-generation advancements with improved proficiencies
- Possibility of increasing efficiencies & curbing costs with next-generation healthcare AI that can be easily incorporated drives strategic interest in 2023, especially amongst diagnostic imaging & disease detection

After Major Uptake in 2021, Partnerships In Steady Decline Due To AI Underperformance

Strategics Interest In Adopting AI Drives Deal Volume Records

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities

Medical Device & Diagnostic AI M&A Dynamics



Overview

- **Steady increase** of M&A activity since 2019 with 38% growth
- M&A deals completed by **strategic** MedTech & Diagnostic leaders
- Outlier transaction results in **abnormal values** for 2021
- Recent deal values aligning with **historical trends** before astronomical 2021 levels

Medical Device & Diagnostics AI M&A Market Trends

M&A Market Insights

\$5.1B

Total Capital Deployed (2019-2023)

\$151M

Average Deal Size (2019-2023)

\$50M

Median Deal Size (2019-2023)

38%

Deal Volume CAGR (2019-2022)

Key Indications

- Cancer Detection
- Genetic Screening
- Cardiology Monitoring
- Surgical Advancements
- Biomarker Identification

Strategic Rationale

- Although the broader MedTech & Diagnostic sector M&A activity has declined since 2021, strategics continue to adopt & invest in AI-related healthcare technology
- Strategic interest driven by post-Covid pressure in healthcare to maximize productivity, lower treatment costs & improve diagnostic capabilities
- Significantly more relaxed FDA approval processes for MedTech & Diagnostics AI-related technologies (through 510k clearance) compared to pharmaceuticals mitigates strategics risk & accelerates path to commercialization

Select Acquirers



Medical Device & Diagnostics M&A Sets New Volume Record Since 2019

High-Value Transactions Signify Demand In Specific Verticals

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities

Diagnostic Imaging

Target	Acquirer	Deal Size	Target Description	Strategic Insight
		\$80M	Diagnostic company specializing in spatial biology & AI-driven analysis of tissue biopsies for cancer identification through TissueCypher Barrett's Esophagus Test	<ul style="list-style-type: none"> Clinically validated AI-platform drove value creation for Cernostics strategic exit 2,218 TissueCypher tests sold in 2022 contributed to \$137M revenue for Castle
		\$100M	Developer of specialized AI-based ultrasounds image examination software to assist with cardiac imaging acquisition	<ul style="list-style-type: none"> Diagnostic imaging accounts for 41% of Philips revenue for 2022 Acquisition accelerated the distribution of AI-based ultrasound technology world-wide

Medical Devices

		\$187M	Focused on transformation of spinal surgery through AI & predictive modeling to provide patient specific implants	<ul style="list-style-type: none"> Medtronic saw 40% growth in spine & cranial technology segment in year after M&A Medtronic offers first AI-driven spinal surgery
		\$80M	Company that develops AI-driven endoscopy technology to help better detect early stage colorectal & esophageal cancer	<ul style="list-style-type: none"> Synergies enabling commercialization of highly valuable endoscopy-focused software tools Olympus endoscopy division expected 4% growth rate for 2024

Remote Monitoring

		\$1.2B	Digital health solutions & remote cardiac monitoring service company powered by deep learning & AI	<ul style="list-style-type: none"> Expand Boston Scientific's AI-rhythm management diagnostics portfolio Acquisition propels Boston Scientific to generate ~5% growth for 2024
		\$33M	Digital medicine & therapeutics startup that uses AI-enabled measurements for patient monitoring	<ul style="list-style-type: none"> Acquisition bolsters MindMed's real-time patient monitoring applications MindMed intends to eventually harness the technology as a platform to launch medicines to patients in scalable manner

Strategics Continue To Invest In Clinically-Backed, AI-Powered Medical & Diagnostic Technology

Case Study: Medtronic Acquired Medicrea for \$202M

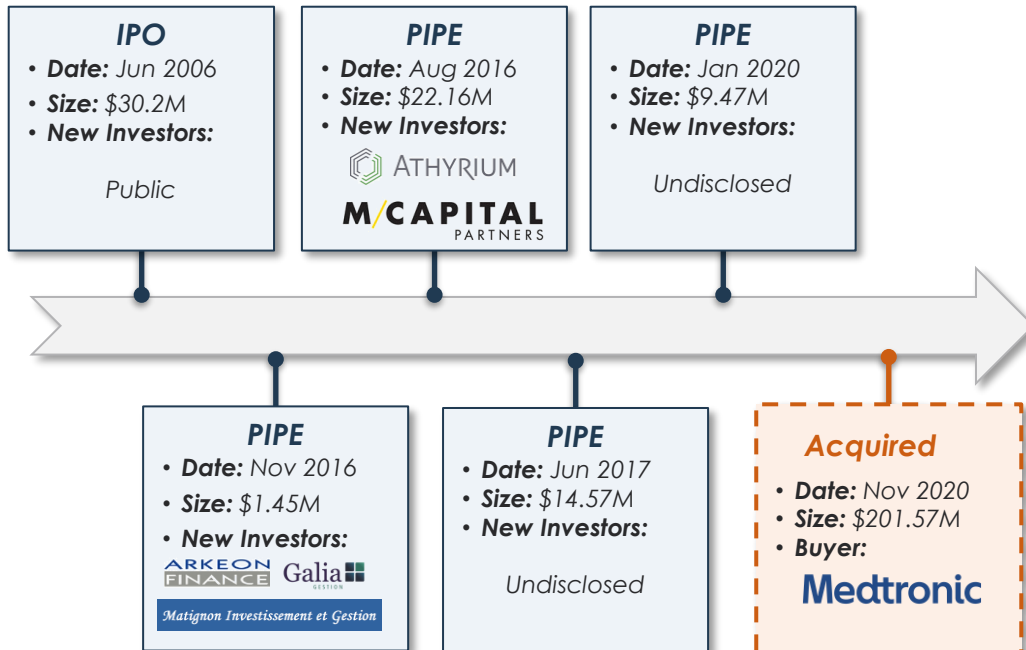
AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities



Founded: 1990

Total Raised: \$62.78M

Post Valuation: \$201.57M



Medicrea's AI-Powered Custom Surgical Solutions

- Medicrea's technology, UNiD® ASI, utilizes AI to develop patient-specific spinal implants, plan surgeries & analyze patient data
- Prior to the acquisition in 2019, the number of minimally invasive spinal surgery cases performed with UNiD® ASI grew by 413%

Rationale

- With the acquisition of Medicrea, Medtronic can leverage its proprietary AI platform to bolster its existing product portfolio & provide customized solutions to patients
- At closing, Medtronic was the first company to offer integrated, AI-powered spine solutions, surgical planning & robotic assisted surgery capabilities

“ Medtronic's innovative portfolio of spine implants, robotics, navigation, and 3D imaging technology with Medicrea's capabilities and solutions in data analytics, artificial intelligence and personalized implants, would enhance Medtronic's fully-integrated procedural solution for surgical planning and delivery.

— Jacob Paul, Senior VP **Medtronic** ”

Medicrea Acquisition Provides Medtronic With First-Mover Advantage In AI-powered Spinal Solutions

Case Study: Castle Biosciences Acquires Cernostics

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities

cernostics

A New View of Cancer Diagnostics

Founded: 2008

Total Raised: \$16.23

Market Cap: \$80.73M

Series A

- **Date:** May 2010
- **Size:** \$2.71M
- **New Investors:**



Series AA

- **Date:** Jun 2015
- **Size:** \$1.96
- **New Investors:**



Series A1

- **Date:** Mar 2018
- **Size:** \$2.5M
- **New Investors:**



M&A

- **Date:** Dec 2021
- **Size:** \$80.73
- **Buyer:**



TissueCypher® Barrett's Esophagus AI-based Assay

- Cernostics specializes in spatial biology & AI-driven image analysis of tissue biopsies to detect high-grade dysplasia (HGD) and/or esophageal cancer in patients with Barrett's Esophagus (BE)
- TissueCypher® platform is the first precision medicine test to predict HGD & BE utilizing a unique intelligence-driven image analysis
- Early funding rounds propelled Cernostics to intensify clinical & market development ultimately enhancing value drivers for strategic exit

Rationale

- Acquisition aligns with Castle Bioscience's mission to provide personalized, accurate diagnostics through advanced technologies & innovative diagnostic tests
- Synergistic with Castle Bioscience's Barrett's Esophagus diagnostic portfolio

“Acquiring the TissueCypher platform is aligned with our commitment to utilizing innovative technology to provide clinically actionable information that guides disease management and improves patient outcomes. The TissueCypher Barrett's Esophagus Assay addresses an unmet need in patients with Barrett's esophagus.”

— Derek Maetzold, President & CEO



Angel

- **Date:** Sep 2008
- **Size:** \$0.35M
- **New Investors:**

Barry Sheer
Michel Nederlof

Series B

- **Date:** July 2013
- **Size:** \$1.42M
- **New Investors:**



Series BB

- **Date:** Aug 2016
- **Size:** \$1.3M
- **New Investors:**



Series B1

- **Date:** Aug 2021
- **Size:** \$5.98M
- **New Investors:**

Undisclosed

Castle Biosciences Adds AI-Based Assay To Barrett's Esophagus Diagnostic Portfolio

Case Study: Tempus Raises >\$1B In Series A-G VC Rounds

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities

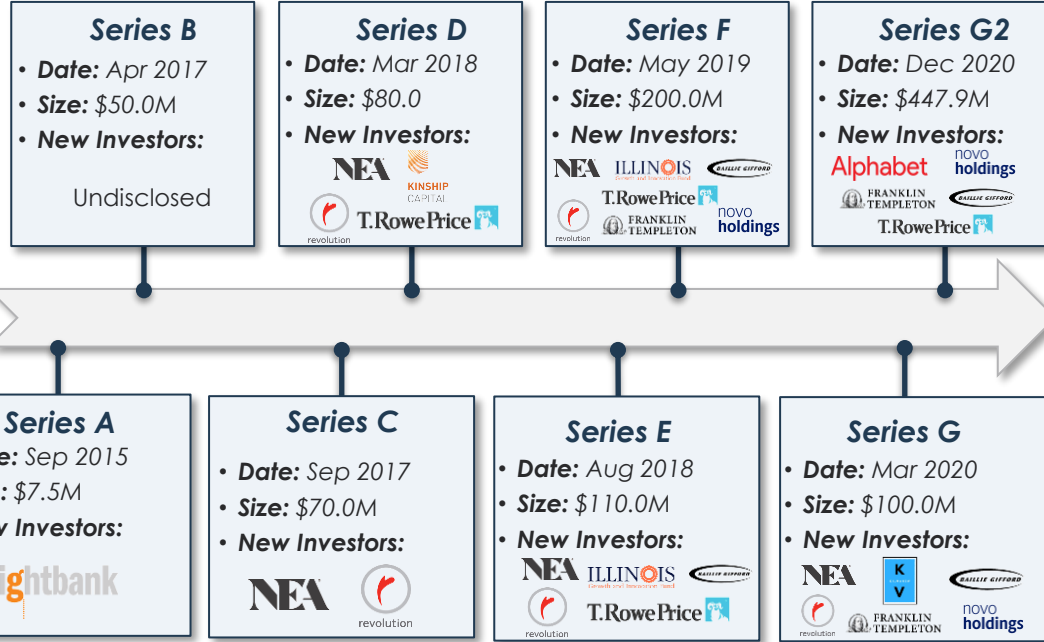
"TEMPUS

Founded: 2015

Total Raised: \$1.43B

Post Valuation: \$10.25B

Tempus's AI Service Platform



- Medical technology platform utilizing AI in diagnostics, patient management & data analysis
- Founded with a focus on Oncology, Tempus' platform has expanded to support neuropsychiatry, cardiology, infectious diseases & radiology
- Competitive advantage stems from its vast clinical & genomic database, allowing the company to train its AI model more effectively than its competitors; driving significant interest from Tempus' VC investors
- Early VC rounds funded R&D for proprietary AI platform by developing an extensive database that would be used to train the software
- Later VC rounds used to expand into new treatment areas & fund strategic acquisitions including Arterys, cloud-based AI diagnostic imaging platform, & AKESOgen, a genomics CRO

“Never before has the need to bring the power and promise of technology to healthcare been more acute than it is today. As a leader in this space, we are very much aware of our responsibility and the power of this moment in time; one in which we now possess the technological capability to use artificial intelligence to eradicate disease and help people live longer and healthier lives.”

– Eric Lefkofsky, Founder & CEO

"TEMPUS

Tempus's AI Platform & Database In High Demand From Biotech & Diagnostics Companies Focused On Oncology

M&A Provides Viable Exit Strategy For Medical Device/Diagnostics

AI In Medical Devices & Diagnostics | Highlights, Trends & Opportunities



Investors Cautious But Continue To Invest In Healthcare AI

Investors Hesitant Due To Low Exit Values & Economic Uncertainty

- AI-focused funds expected to **limit investments** in the space through EOY 2023
- VC/PE groups with historical AI investment activity will **continue to pursue AI-powered technology that aligns with portfolio** despite market volatility
- Market uncertainties could result in **increased cash reserves**
- "There's **a lot of dry powder** sitting on the sidelines **waiting for valuations to normalize.**" – Keith Figlioli, Managing Partner

LRVHEALTH
Insightful Capital

Strategics Continue To Engage In Partnerships To Mitigate Financial Risk

AI-Based Partnerships Face Steep Headwinds After "Covid Cliff"

- Outdated healthcare systems & technology implementation **hurdles will reduce efficacy of AI**
- **Value-adding partnerships will continue to transition to M&A** as transaction dynamics continue to shift
- Most **attractive partners** for AI start-ups are strategics with **ability to quickly & efficiently integrate AI technology**
- Healthcare service providers seeking licensing opportunities with emerging AI leaders will need to **first implement infrastructure capable of servicing the technology**

Acceleration In Strategic Acquisitions Of AI Drug Discovery Platforms

Adoption Of AI-technologies Driven By Need For Healthcare Reform

- Strategics seeking **innovative AI-based technologies** that will **improve patient care & lower healthcare costs**
- Contraction in VC funding & partnerships push **cash-flush strategics to undergo portfolio alignments & pursue inorganic growth**
- **Lower barriers to FDA approval** for MedTech & Diagnostics AI technologies **mitigates transaction risk**
- AI technology related to **imaging diagnostics in strong position to exit**

Medical Device & Diagnostic AI Maintains Robust M&A Growth Amongst Decline In Funding & Partnerships

Late-Stage AI Technologies Viewed As High-Value Targets

Market Insight: Artificial Intelligence in Life Sciences



Macroeconomic Conditions Remain Promising For Life Sciences AI Exits

- Maturing AI segment supports increased consolidation for formation of AI platforms as well as integration of established platforms into workstreams
- Despite market uncertainty, partnership & M&A opportunities emerge for later/commercial-stage AI targets
- Strategics identify platform technologies with broad applicability & top-tier talent as key acquisition drivers



Current Investor Sentiment Hindering Early-Stage Fundraising Efforts

- Broader economic headwinds & fear of recession limited investment activity in novel technologies with limited clinical validation
- Investors seeking targets with robust clinical data, established commercial traction & ARR >\$1M
- Slowed investment activity creating stockpile of dry powder; likely to be catalyst for increased capital deployment in near-term



Plethora of Exit Scenarios Enable Succession Of Transactions For Compounded Value

- Existing market conditions & sector dynamics create favorable M&A environment for AI technologies
- Potential to fully integrate AI platforms into existing technologies & workstreams defines value as acquisition target
- Later-stage financing for clinically-validated AI assets likely to accelerate as investors look to deploy capital to drive commercial adoption & prepare for a near-term exit

Multiple Strategic Options Available For AI Developers In Life Sciences Segments

Outcome Capital Overview

Market Insight: Artificial Intelligence in Life Sciences

Outcome Capital is a **highly-specialized life sciences & healthcare-dedicated** investment banking & strategic advisory firm adopting a unique **market-driven, strategy-led** approach to value enhancement. Our team consists of industry veterans with broad **entrepreneurial, strategic & operational expertise with deep scientific, clinical & financial expertise.**

Industry Expertise

Pharma		Biotech	Digital Health		HCIT
Diagnostics		MedTech	Services		RPM
Tools		CRO/CDMO	Payers		Telemedicine

Strategically Focused Transactions



AI in Life Sciences Market Insight Team



Oded Ben-Joseph, PhD, MBA

Managing Partner

Oben-joseph@outcomecapital.com



Thomas Busby, MBA

Senior Vice President

Tbusby@outcomecapital.com



Nicholas Frame, PhD

Vice President

Nframe@outcomecapital.com



Elena Bonetti

Senior Analyst

Ebonetti@outcomecapital.com



Roisin O'Brien, PhD

Analyst

Robrien@outcomecapital.com



Curtis Landry

Research Analyst

CLandry@outcomecapital.com



20 Custom House St.
Ste 1200
Boston, MA 02110
(617) 431-2278

Reach the *Right Outcome*

