

INVESTMENT DIGEST

AI IN PHARMA Q4 2021

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Investment Digest at a Glance

This Investment Digest is summarizing key players and observations in the private equity and venture capital ecosystem, focusing on the pharmaceutical artificial intelligence (AI), as well as the market behaviour of the top public companies. Here we have summarized information about key industry trends, 470 promising AI-driven biotech startups, and 50 leading biotech investors in this sector, outlining major investment rounds and relevant R&D partnerships illustrating the industry traction and readiness of institutional investors (big pharma/biotech) to potentially acquire most successful AI-vendors.

It is also found that the ongoing COVID-19 pandemic catalyzed further interest toward pharmaceutical AI technologies.

Investment digest highlights that 2021 has already shown a steady increase in a number of collaborations between Pharma industry and AI oriented companies in comparison with 2020. Thus, 2021 looks to be a year that confirmed a clear trend of increasing collaboration between Pharma and AI.

This Investment Digest comprises AI in Pharma companies, investors and pharma corporations across the globe.

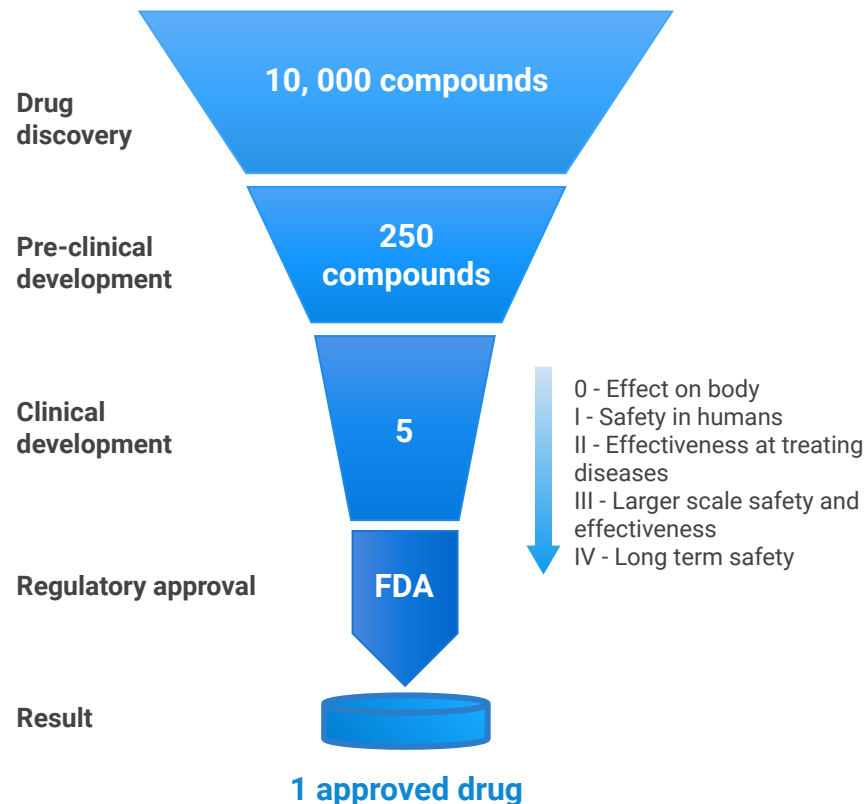
AI IN PHARMA SECTOR AT A GLANCE

It takes on average over 10 years to bring a new drug to market. As of 2014, according to Tufts Center for the Study of Drug Development (CSDD), the cost of developing a new prescription drug that gains market approval is approximately \$2.6B. This is 145% increase, correcting for inflation, comparing to the same report made in 2003.

The solution to this problem comes from three key strategies:

- evolution of business models towards more collaboration and pipeline diversification early
- implementation of AI as a universal shift towards data-centric drug discovery
- discovery of new therapeutic modalities (biologics, therapies etc.)

AI in Pharma sector stands out as one of the most rapidly growing and conceptually important. Summarizing industry observations over the last five years, we can observe a fundamental shift in the perception by top executives at leading pharmaceutical organizations about the need for advanced AI technologies. Since 2015, there has been an obvious perception shift from skepticism and cautious interest, to a realization of the strategic role AI has to play in the emerging “data-centric” model of innovation.

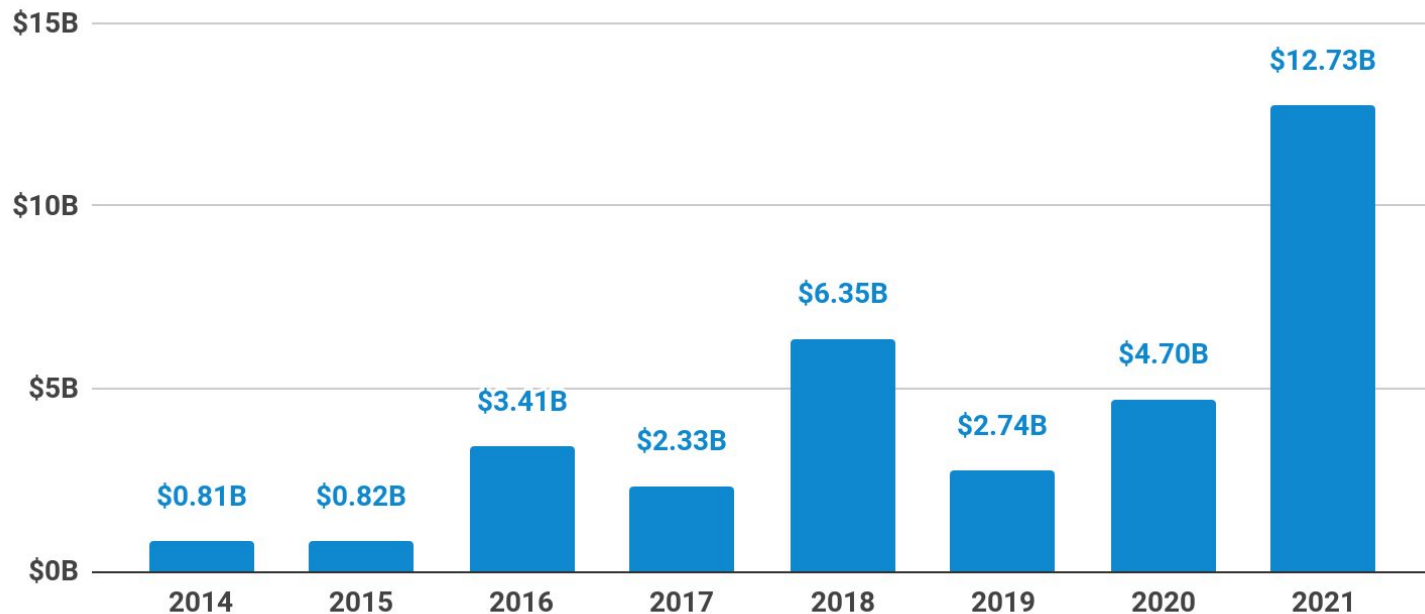


INVESTMENT LANDSCAPE

Overview

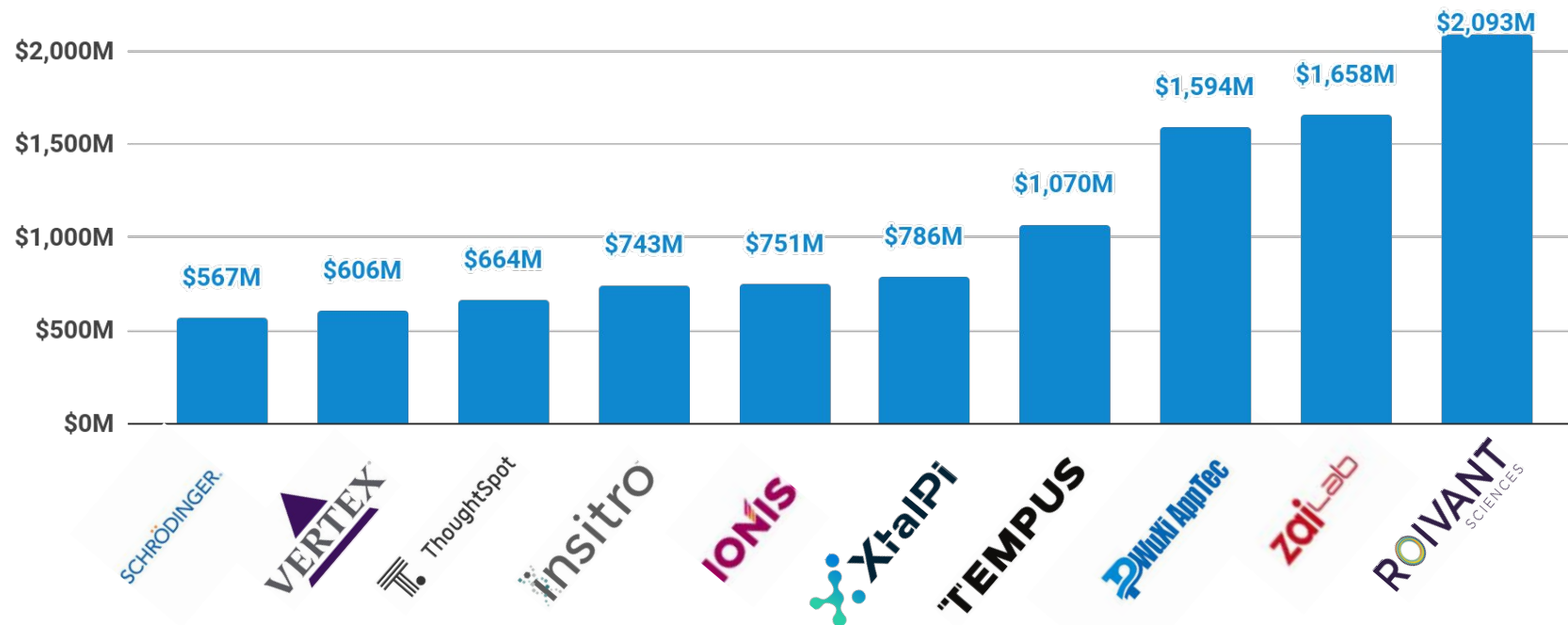


DYNAMICS OF INVESTMENTS IN AI IN PHARMA



There has been a substantial increase in the amount of capital invested in AI-driven pharma companies **since 2014**. During the last seven years, the annual amount of investments in **452** companies has increased by almost **16 times** (to **\$12.73B** in total as of December 2021). In 2020, the flow of investments increased by **40%** compared to the previous year. The estimated amount of investments in the AI in Pharma sub-sector of the Longevity industry is about to triple this year compared to 2020 which identifies strong investors' (foremost VCs) interest in this field regardless of risks.

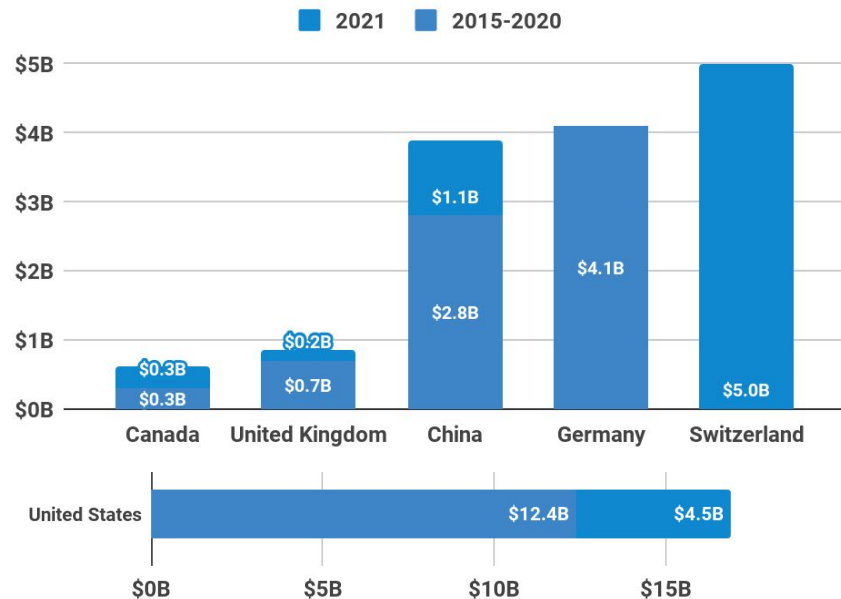
TOP 10 AI IN PHARMA COMPANIES BY TOTAL INVESTMENTS IN 2021



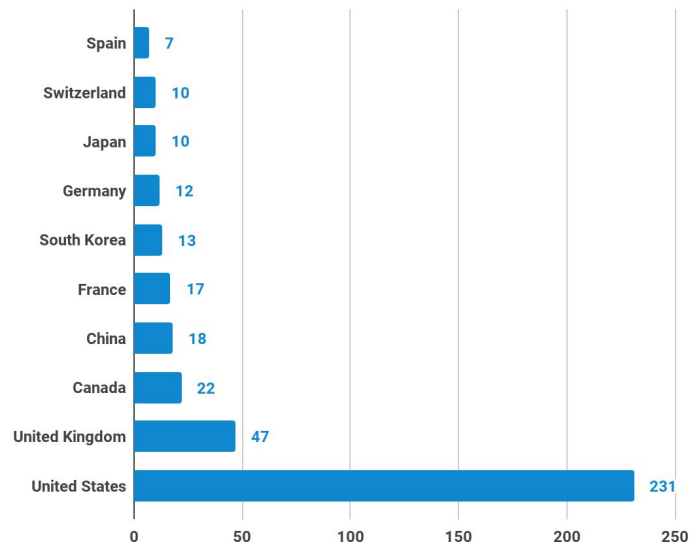
The chart shows the top 10 AI-driven drug discovery companies sorted by the **total funding** raised by the end of 2021. **Roivant Sciences**, a leader in artificial intelligence and precision medicine, is now at the top of the list. Having completed the business combination with **Montes Archimedes Acquisition Corp**, **Roivant Sciences** has the total funding raised to **\$2.09B**. Zai lab , chinese provider of transformative medicines could finance **\$0.8B** in capital market. Tempus, Insitro and ThoughtSpot are new companies due to late-stage mega-rounds during the 2021.

TOP 10 COUNTRIES IN AI IN PHARMA SECTOR IN 2021

Total Investments by Country

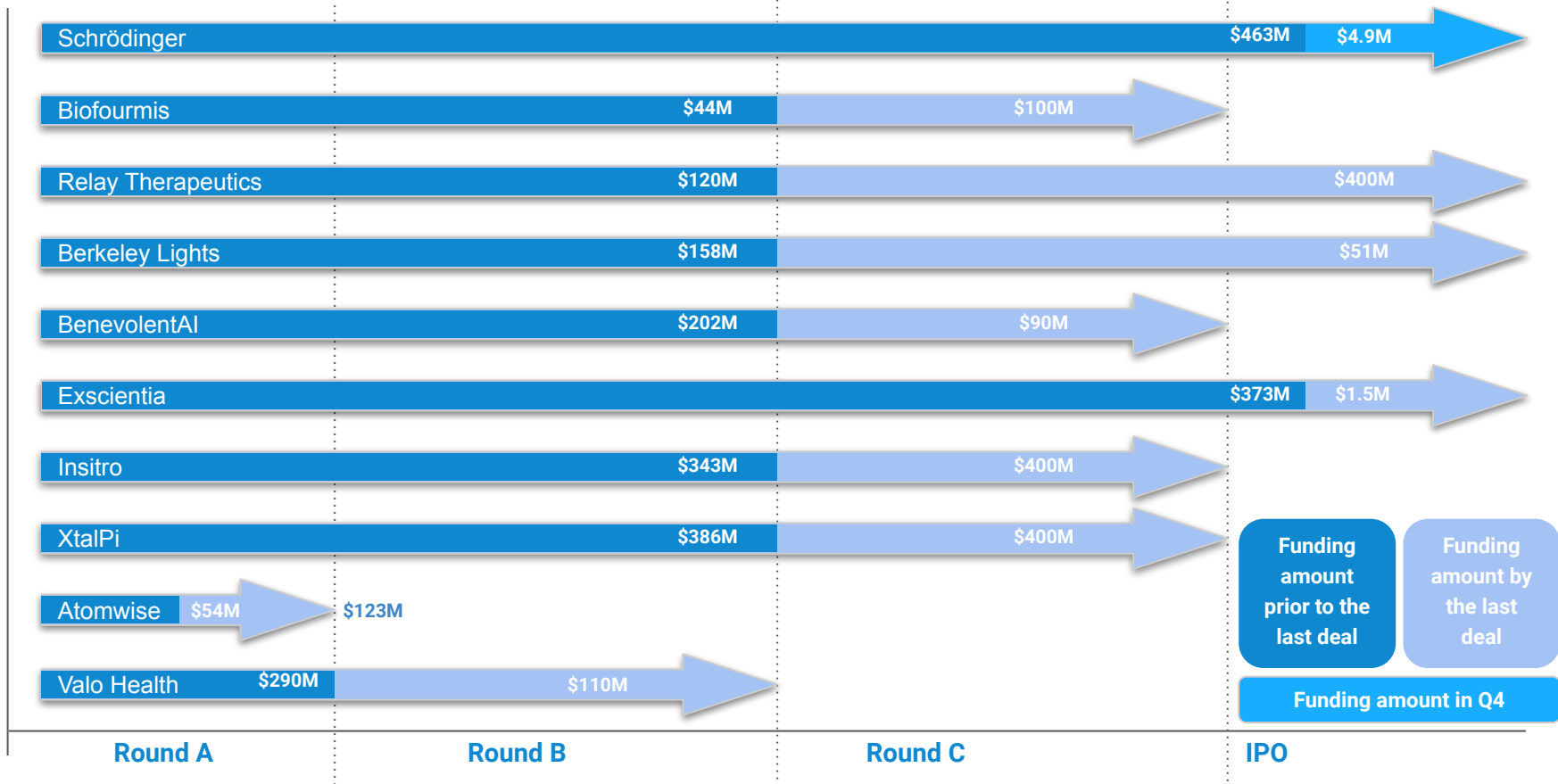


Number of Companies by Country

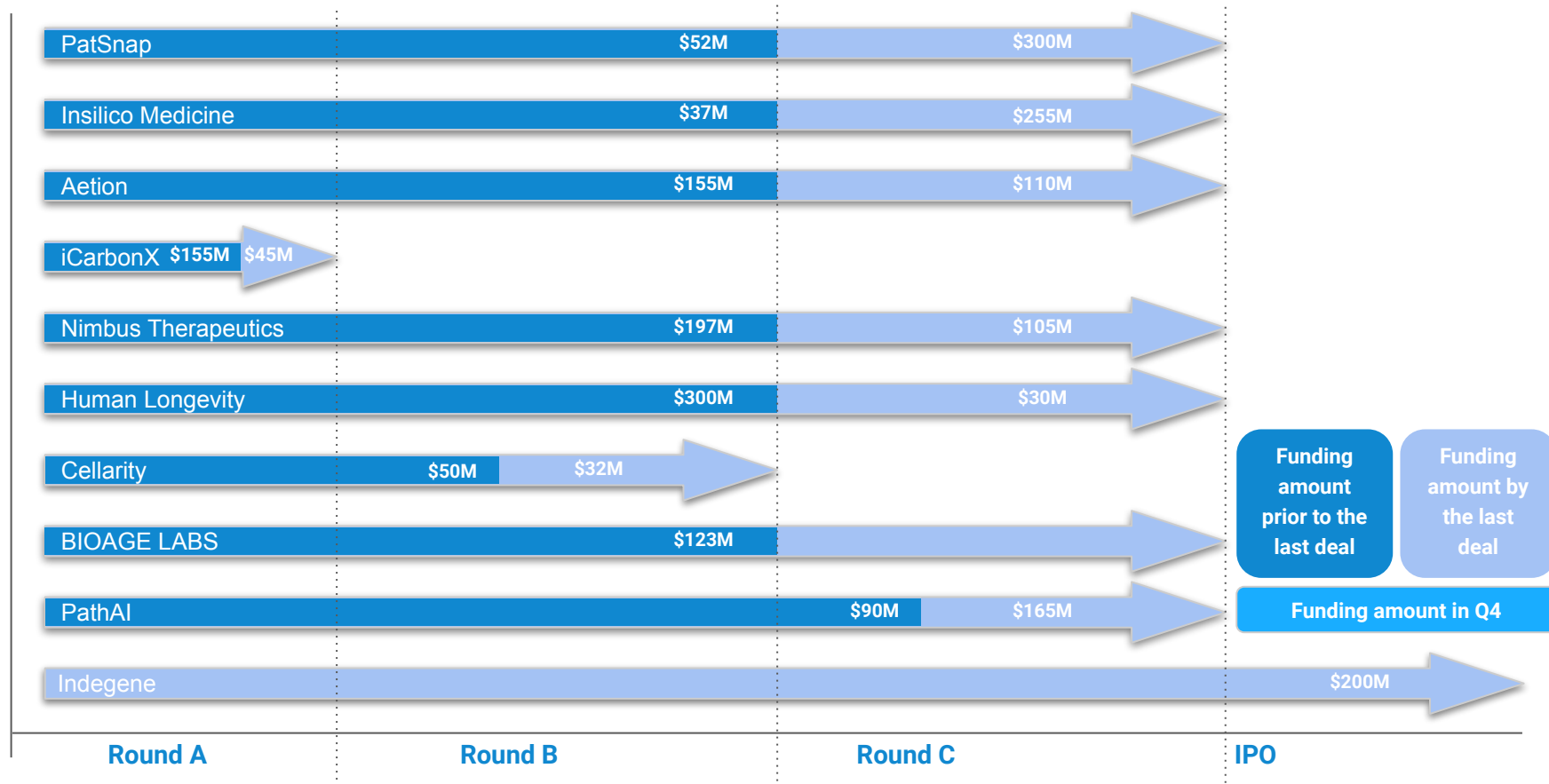


The left chart represents funding distribution of companies in **6 countries** with the most significant investment in AI for the Drug Discovery sub-sector. The USA is an unconditional leader with a total amount of investments of **\$12.4B** during **2015-2020**. Switzerland with **\$5B** holds the first place by amount of investments in AI in Pharma sector in 2021. The United States is the **second-most funded** state with total investments of **\$4.5B**. Germany, as a leader of previous years, has not showed any new funding in 2021. China-based companies continue to show steady growth in funding achieving more than **\$1B** in 2021.

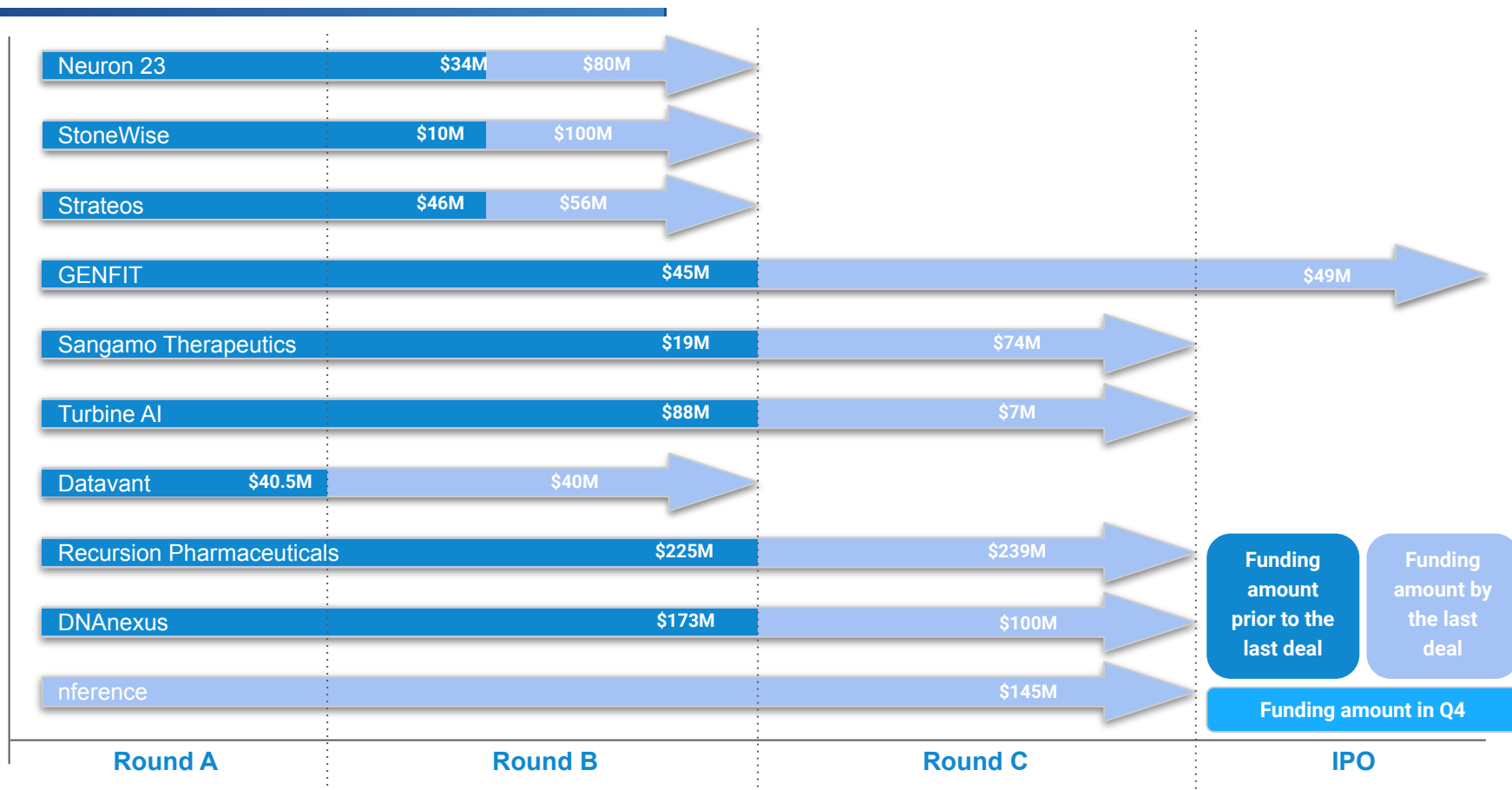
LEADING COMPANIES: AMOUNT AND STAGE OF FUNDING



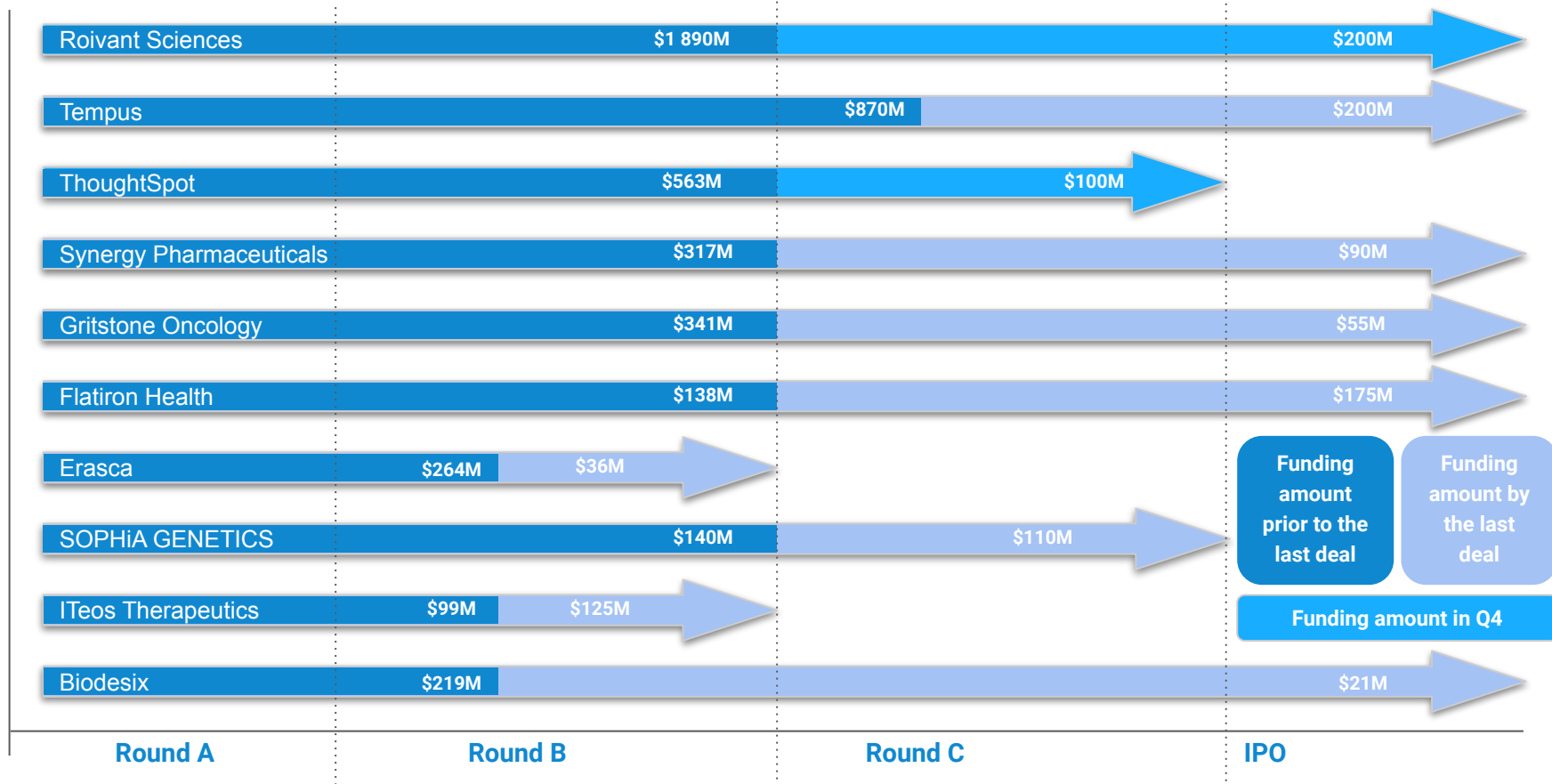
LEADING COMPANIES: AMOUNT AND STAGE OF FUNDING



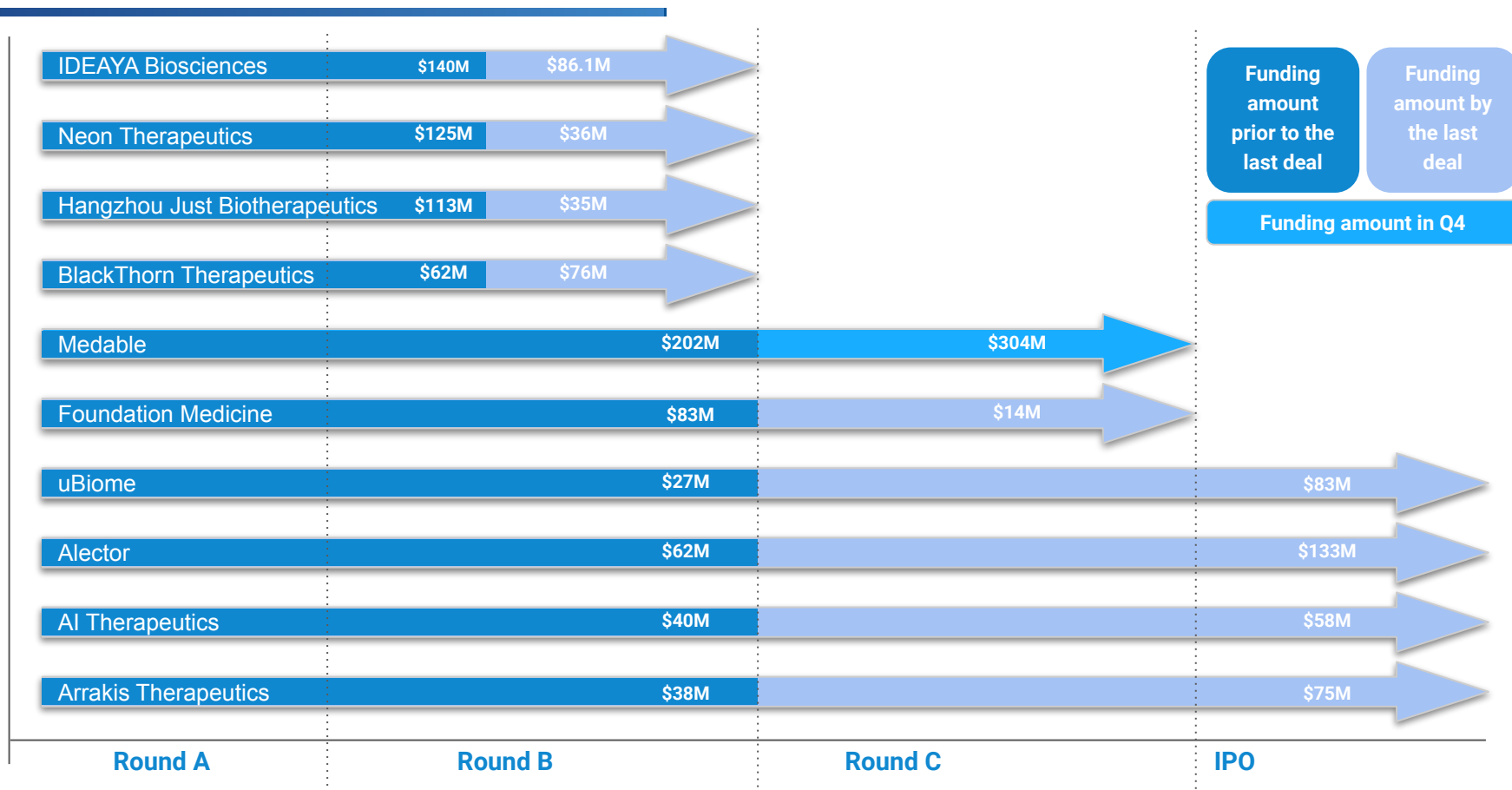
LEADING COMPANIES: AMOUNT AND STAGE OF FUNDING



LEADING COMPANIES: AMOUNT AND STAGE OF FUNDING



LEADING COMPANIES: AMOUNT AND STAGE OF FUNDING



BIGGEST DEALS 2021

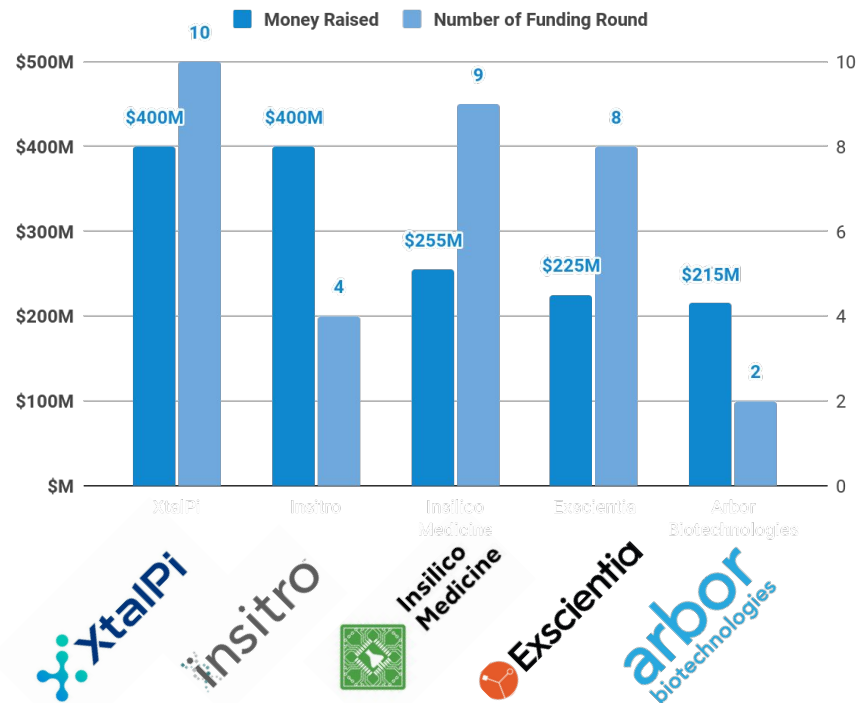
The total amount of VC funding in AI-biotech startups increased during Q4 of 2021 reaching a total of \$12.7B.

There is an increasing number of late-stage mega-rounds including hundreds of millions. The apparent trend is sector consolidation, where a number of AI-startups have achieved substantial leadership and grown in resources and technology. An important driver of growth for the sector is a substantial shift in Big Pharma's interest in AI technology, making AI an important integral part in the research and implementation areas.

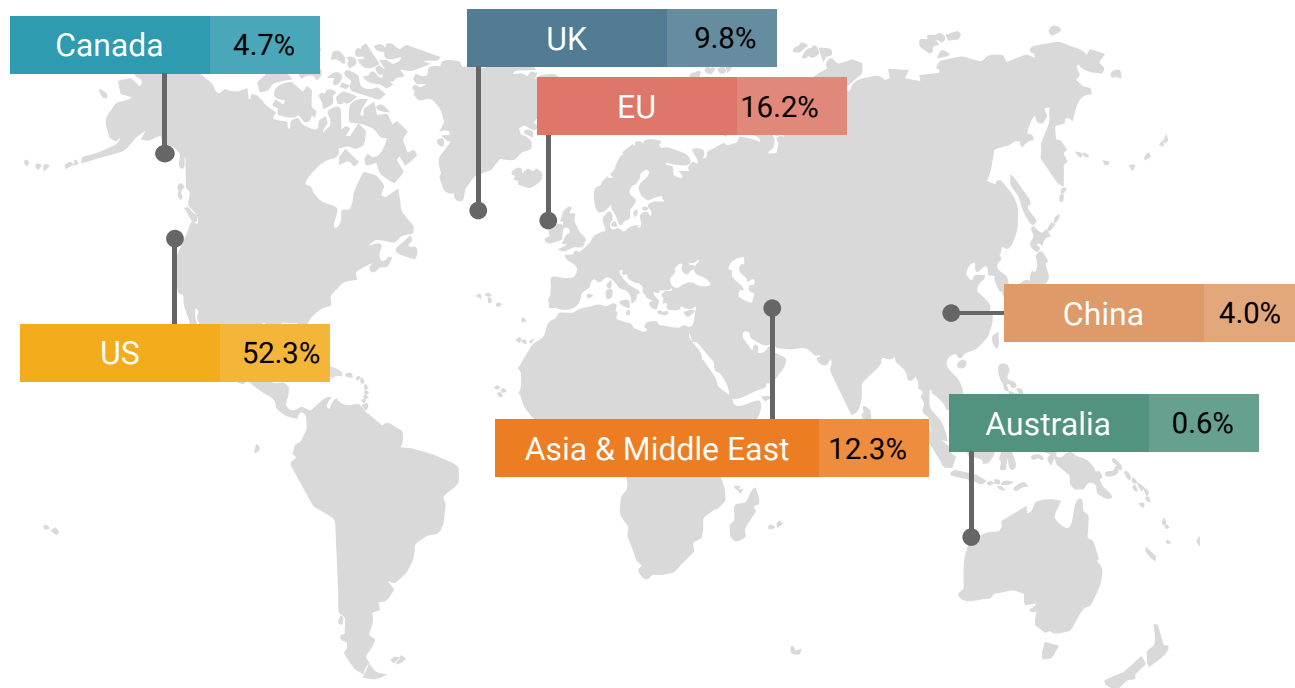
Top 5 highest fundings received the following companies:

1. **XtalPi** with \$400 million (Series D)
2. **Insitro** with \$400 million (Series C)
3. **Insilico Medicine** with \$255 million (Series C)
4. **Exscientia** with \$255 million (Series D)
5. **Arbor Biotechnologies** with \$215 million (Series B)

Biggest Funding in Q1-Q4 2021

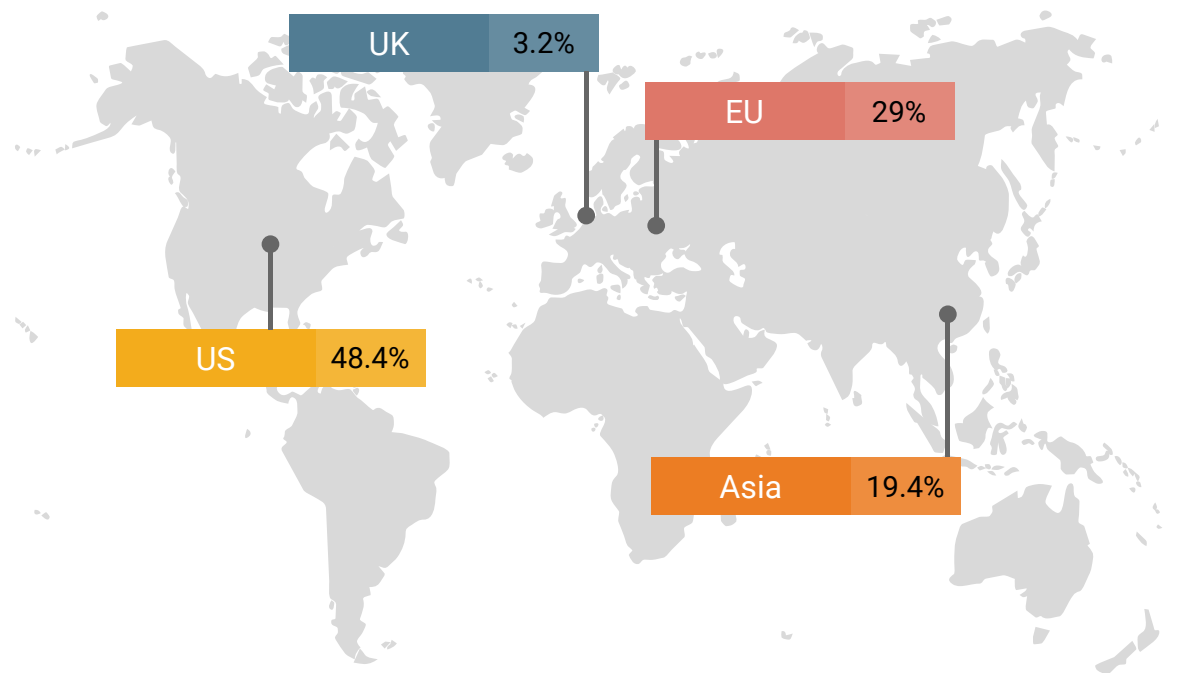


470 AI IN PHARMA COMPANIES: REGIONAL PROPORTION



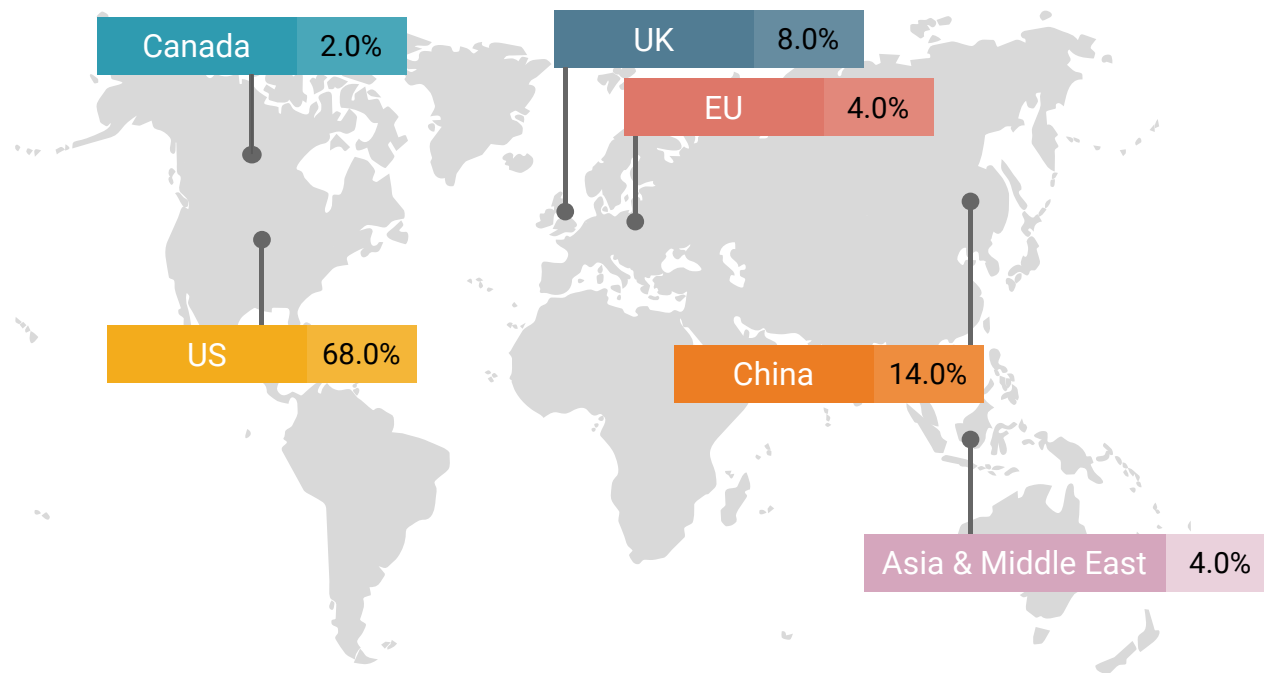
The US is still firmly in the lead in terms of its proportion of AI for Drug Discovery companies. Interestingly, Asia currently has the fourth-lowest proportion of AI for Drug Discovery companies. However, Asia-Pacific region has begun to aggressively increase its activity in the space in terms of investments into foreign companies (largely US-based companies), and we expect to see an increase in the number of AI for Drug Discovery Companies located in the Asia-Pacific region generally, and in China particularly.

30 PHARMA COMPANIES USING AI IN HEALTHCARE AND DRUG DISCOVERY



The industry is seeing an increasing level of regional diversification. Whereas historically the US has dominated the AI for Drug Discovery race in terms of the number of AI companies, the volume of investments and number of industry specialized conferences, from 2019 we are seeing an increased level of activity from the UK, Switzerland and China.

50 LEADING INVESTORS: REGIONAL PROPORTION



The United States continues to lead the rest of the world in terms of artificial intelligence for companies and funds that invest in Drug Discovery. This is reasonable, given that more than a half of the world's AI for Drug Discovery companies have their headquarters in USA. During 2021 we observe significant growth of the number of investors in Asia, mainly in China, Hong Kong and Singapore. The USA, the UK, Canada and EU remain to be leaders by the number of investors in AI in Pharma companies.

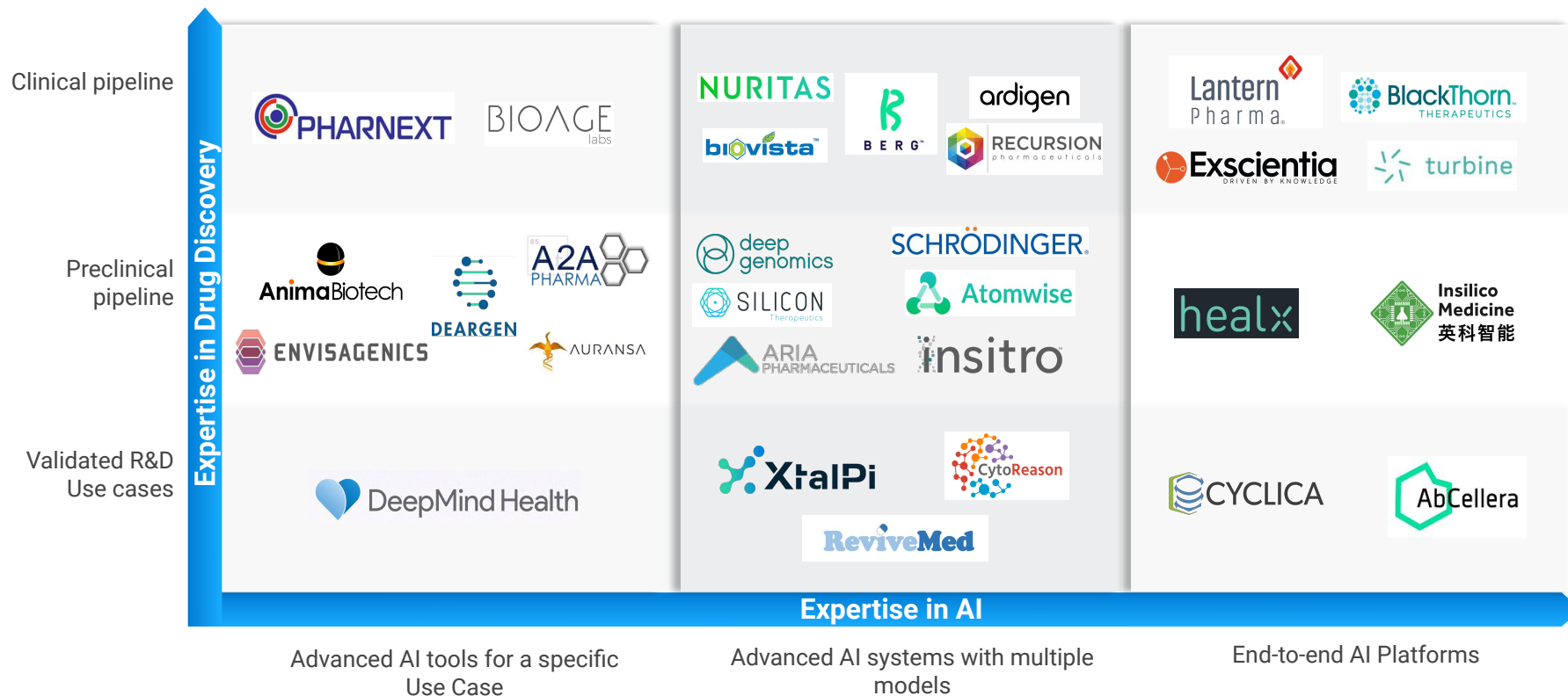
30 LEADING COMPANIES IN AI FOR DRUG DISCOVERY SECTOR

1	Aetion
2	Alector
3	Atomwise
4	Benevolent.AI
5	Berkeley Lights
6	Biodesix
7	Cellarity
8	Erasca
9	Exscientia
10	Flatiron Health
11	Gritstone Oncology
12	Human Longevity
13	iCarbonX
14	Indegene
15	Insilico Medicine

16	Insitro
17	ITEos Therapeutics
18	Nimbus Therapeutics
19	PathAI
20	PatSnap
21	Recursion Pharmaceuticals
22	Relay Therapeutics
23	Roivant Sciences
24	Schrödinger
25	SOPHiA GENETICS
26	Synergy Pharmaceuticals
27	Tempus
28	ThoughtSpot
29	Valo Health
30	XtalPi

COMPARISON OF TOP-30 LEADING AI FOR DRUG DISCOVERY COMPANIES

EXPERTISE IN DRUG DISCOVERY R&D / AI



50 LEADING INVESTORS

Overview



50 LEADING INVESTORS IN AI FOR DRUG DISCOVERY SECTOR

1	GV
2	Casdin Capital
3	DCVC
4	Y Combinator
5	Lux Capital
6	WuXi AppTec
7	Andreessen Horowitz
8	EASME - EU Executive Agency for SMEs
9	Lilly Asia Ventures
10	OS Fund
11	AME Cloud Ventures
12	ARCH Venture Partners
13	Felicis Ventures

14	Alexandria Venture Investments
15	Tencent
16	Third Rock Ventures
17	ZhenFund
18	Amadeus Capital Partners
19	Bill & Melinda Gates Foundation
20	Celgene
21	EDBI
22	F-Prime Capital
23	Foresite Capital
24	Founders Fund
25	Inovia Capital

50 LEADING INVESTORS IN AI FOR DRUG DISCOVERY SECTOR

26	New Enterprise Associates
27	Khosla Ventures
28	Perceptive Advisors
29	SoftBank Vision Fund
30	Sequoia Capital China
31	8VC
32	T. Rowe Price
33	6 Dimensions Capital
34	Amgen Ventures
35	Baidu Ventures
36	Baillie Gifford
37	General Catalyst
38	B Capital Group

39	Bristol-Myers Squibb
40	DCVC Bio
41	EPIC Ventures
42	GT Healthcare Capital Partners
43	Obvious Ventures
44	Lifeforce Capital
45	Novo Holdings
46	Octopus Ventures
47	OrbiMed
48	SOSV
49	Revolution
50	Two Sigma Ventures

TOP 50 AI IN PHARMA INVESTORS



San Francisco

8VC
San Francisco, California, US

Founders Fund
San Francisco, California, US

Foresite Capital
San Francisco, California, US

DCVC
San Francisco, California, US

Alexandria Venture
San Francisco, California, US

Obvious Ventures
San Francisco, California, US

Lifeforce Capital
San Francisco, California, US

DCVC Bio
San Francisco, California, US

Mountain View

Y Combinator
Mountain View, California, US

GV
Mountain View, California, US

Palo Alto

AME Cloud Ventures
Palo Alto, California, US

Alexandria Venture Investments
Pasadena, California, US

New York

OrbiMed
New York, New York, US

Bristol-Myers Squibb
New York, New York, US

Perceptive Advisors
New York, New York, US

Lux Capital
New York, New York, US

Two Sigma Ventures
New York, New York, US

Casdin Capital
New York, New York, US

Menlo Park

New Enterprise Associates
Menlo Park, California, US

Andreessen Horowitz
Menlo Park, California, US

Felicis Ventures
Menlo Park, California, US

Khosla Ventures
Menlo Park, California, US

Illinois

OS Fund
Park Ridge, Illinois, US

ARCH Venture Partners
Chicago, Illinois, US

Other States

Bill & Melinda Gates Foundation
Seattle, Washington, US

Lili Ventures
Indianapolis, Indiana, US

SOSV
Princeton, New Jersey, US

Celgene
Summit, New Jersey, US

T. Rowe Price
Baltimore, Maryland, US

Revolution
Washington, District of Columbia, US

EPIC Ventures
Salt Lake City, Utah, US

Massachusetts

General Catalyst
Cambridge, Massachusetts, US

SR One
Cambridge, Massachusetts, US

Third Rock Ventures
Boston, Massachusetts, US

F-Prime Capital
Cambridge, Massachusetts, US

Manhattan Beach

B Capital Group
Manhattan Beach, California, US



Inovia Capital
Montréal, Quebec, Canada



EASME
Brussels, Brussels
Hoofdstedelijk Gewest,
Belgium



Novo Holdings
Hellerup, Hovedstaden,
Denmark



EDBI
Singapore, Central Region



SoftBank Vision Fund
London, England, The UK

Amadeus Capital Partners
London, England, The UK



Beijing

ZhenFund
Beijing, China

Baidu Ventures
Beijing, China

Sequoia Capital China
Beijing, China

Shanghai











WuXi AppTec
Shanghai, China

Lilly Asia Ventures
Shanghai, China











6 Dimensions Capital
Shanghai, China

GT Healthcare Capital Partners
Central, Hong Kong Island,
Hong Kong











TOP 50 INVESTORS IN AI COMPANIES

INVESTORS		INVESTMENTS IN AI IN PHARMA	AI FOR DRUG DISCOVERY COMPANIES
Y Combinator		24	Verge Genomics, HistoWiz, Athelas, Strateos, Reverie Labs, Coral Genomics, Segmed, Atomwise, Menten AI, PostEra, Arpeggio Bio, Notable Labs, iLabService, CloudMedx, BrainKey, Cambridge Cancer Genomics
GV		30	Alector, Arrakis Therapeutics, BlackThorn Therapeutics, Celsius Therapeutics, DNAnexus, Gritstone Oncology, IDEAYA Biosciences, Insitro, Owkin, Relay Therapeutics, Schrödinger, ZappRx, Strateos, Flatiron Health.
EU Executive Agency for SMEs		10	CellPly, Quibim, Iris.ai, RAYLYTIC, TransCure bioServices, Cytos, Genome Biologics, Genialis, Acellera
SoftBank Vision Fund		11	Roivant Sciences, XtalPi, Deep Genomics, Exscientia, PatSnap, Insitro, Datavant, Biofourmis, Relay Therapeutics
Casdin Capital		13	Exscientia, Gritstone Oncology, Fabric Genomics, Clover Therapeutics, Arzeda, Relay Therapeutics, Alector, Celsius Therapeutics.
Alexandria Venture Investments		12	Immunai, Gritstone Oncology, Deep Genomics, IDEAYA Biosciences, GNS Healthcare, BlackThorn Therapeutics, Arrakis Therapeutics, Celsius Therapeutics
Andreessen Horowitz		13	Insitro, BigHat Biosciences, BIOAGE LABS, Genesis Therapeutics, Erasca, Aria Pharmaceuticals, Flatiron Health
8VC		10	Notable, Immunai, BigHat Biosciences, Coral Genomics, Unlearn.AI, ProteinQure
Khosla Ventures		13	ThoughtSpot, Deep Genomics, BIOAGE LABS, Atomwise, Menten AI, Arpeggio Bio
OrbiMed		10	XtalPi, Insilico Medicine, Zai Lab, Erasca, Alector, Eddingpharm (Cayman)











TOP 50 INVESTORS IN AI COMPANIES

INVESTORS		INVESTMENTS IN AI IN PHARMA	AI FOR DRUG DISCOVERY COMPANIES
SOSV		24	Synthace, Strados Labs, Mendel.ai, Gatehouse Bio, Pregenerate, A2A Pharmaceuticals
WuXi AppTec		9	Verge Genomics, Schrödinger, Engine Biosciences, Arrakis Therapeutics, WuXi AppTec
ZhenFund		9	Spring Discovery, HistoWiz, AccutarBio, Xbiome, Deep Intelligent Pharma
Perceptive Advisors		6	Saama, IDEAYA Biosciences, Neuron23, Relay Therapeutics, Alector
ARCH Venture Partners		15	Arbor Biotechnologies, Erasca, BlackThorn Therapeutics, Hangzhou Just Biotherapeutics (Just China), Lodo Therapeutics
DCVC		17	Frontier Medicines, Unlearn.AI, Auransa, X-37, HealthMode
Founders Fund		10	Datavant, Emerald Cloud Lab, Notable Labs, Roivant Sciences, DeepMind
General Catalyst		11	PathAI, Spring Discovery, ThoughtSpot, Athelas, Swoop
Bill & Melinda Gates Foundation		13	Evotec, Schrödinger, Novartis, Takeda
B Capital Group		5	Aetion, Atomwise, Insilico Medicine, Notable Labs










TOP 50 INVESTORS IN AI COMPANIES

INVESTORS		INVESTMENTS IN AI IN PHARMA	AI FOR DRUG DISCOVERY COMPANIES
F-Prime Capital		6	BenchSci, Insilico Medicine, Notable, Owkin
Tencent		7	Atomwise, iCarbonX, PatSnap, XtalPi
AME Cloud Ventures		15	Molecule.one, BigHat Biosciences, Auransa, Cambridge Cancer Genomics
Lux Capital		11	LabGenius, Recursion Pharmaceuticals, Strateos, Auransa
Sequoia Capital China		13	Yaoyanshe, Zai Lab, Deep Intelligent Pharma, Eddingpharm (Cayman)
T. Rowe Price		8	Genesis Therapeutics, Insitro, Tempus, Arbor Biotechnologies
Two Sigma Ventures		8	Exscientia, PathAI
Amgen Ventures		6	Action, Alektor, GNS Healthcare
6 Dimensions Capital		5	Engine Biosciences, IDEAYA Biosciences, iTeos Therapeutics
EDBI		6	Biofourmis, Engine Biosciences, Erasca

TOP 50 INVESTORS IN AI COMPANIES

INVESTORS		INVESTMENTS IN AI IN PHARMA	AI FOR DRUG DISCOVERY COMPANIES
Obvious Ventures		9	Inato, LabGenius, Medable
Octopus Ventures		6	Antidote.me, eTherapeutics
Revolution		6	Amplion, NeuScience
Bristol-Myers Squibb		5	Exscientia, PathAI
New Enterprise Associates		9	Vertex Pharmaceuticals, Tempus
DCVC Bio		6	Frontier Medicines, X-37s
Inovia Capital		6	Phenomic AI, ProteinQure
Felicis Ventures		15	LabGenius, ProteinQure
Lifeforce Capital		7	Clover Therapeutics, TARA Biosystems
Lilly Asia Ventures		8	Gritstone Oncology, Hangzhou Just Biotherapeutics (Just China)

TOP 50 INVESTORS IN AI COMPANIES

INVESTORS		INVESTMENTS IN AI IN PHARMA	AI FOR DRUG DISCOVERY COMPANIES
Third Rock Ventures		7	Celsius Therapeutics
Baidu Ventures		6	Engine Biosciences
Baillie Gifford		6	Tempus
GT Healthcare Capital Partners		6	GT Apeiron Therapeutics
Novo Holdings		8	Evotec
EPIC Ventures		6	Unlearn.AI
OS Fund		8	Aria Pharmaceuticals
Amadeus Capital Partners		8	Antidote.me
Celgene (BMS' subsidiary)		8	GNS Healthcare

AI FOR DRUG DISCOVERY MARKET TIMELINE

The First AI Approaches

- The first scalable AI approaches for Drug Discovery developed and several industry players with forward-thinking executives started launching pilot collaborations and making small investments.
- However, only few market players believed in the technology.

Criticism

- Because AI is still a young approach within the life sciences, many pilot projects failed, creating a lot of criticism towards the use of deep learning for Drug Discovery and Advanced R&D.
- Since then the race for the acquisition of the best AI startups began.

Market Cap Growth

- Capitalization of the industry was continuously growing.
- Many bets of early investors appeared to be justified.
- Over the next several years, we expect to see VC firms and subsidiary funds focused solely on the AI for Drug Discovery subsector, and funds that invest in a maximally-diverse number of AI for Drug Discovery companies.

Transition from Quantity to Quality

- Transitioning from the quantity of AI-related collaborations, investments, and M&As to qualitative gains — first practical validations of previously conducted research might be appearing during this year.
- Competition for the most successful pharma AI companies will increase drastically.

Intensive Competition

- Pretty much all big players in pharma industry are concerned with AI adoption, the tech has become a strategic priority, among other things.

Platform-based Drug Design

- Leading players of the pharmaceutical industry will be moving towards "platform-based drug design".
- Emergence of comprehensive R&D and business infrastructure that enables end-to-end AI-driven drug development.

2013-2015

2016-2017

2018

2019

2020-2021

2022-2023

AI IN PHARMA PUBLICLY TRADED COMPANIES

Overview



AI IN PHARMA PUBLICLY TRADED COMPANIES



USA



Berkeley Lights (BLI)



Predictive Oncology (POAI)



Biomea Fusion (BMEA)



Recursion Pharmaceuticals (RXRX)



BioXcel Therapeutics (BTAI)



Relay Therapeutics (RLAY)



Brickell Biotech Inc. (BBI)



Renalytix Plc (RNLX)



Eaton Vance Municipal (ETX)



Schrödinger (SDGR)



IDEAYA Biosciences (IDYA)



Simulations Plus (SLP)



Lantern Pharma (LTRN)



Vertex Pharmaceuticals (VRTX)



Denmark



Evaxion Biotech A/S (EVAX)



France



GENFIT (GNFT)



Japan



Astellas Pharma Inc. (4503)



Switzerland



SOPHiA GENETICS SA (SOPH)



The UK



C4X discovery (C4XD)



Exscientia plc (EXAI)



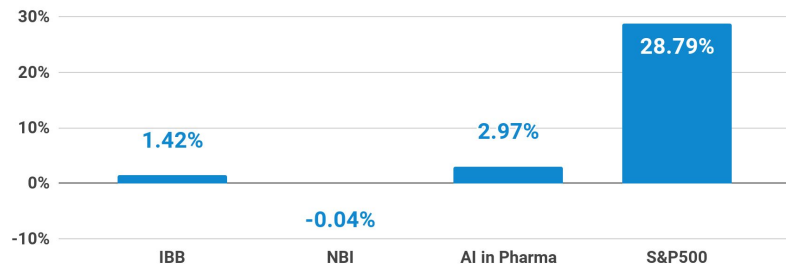
Roivant Sciences Ltd. (ROIV)

AI IN PHARMA PUBLICLY TRADED COMPANIES

Cumulative Capitalization of Publicly Traded AI-in-Pharma Companies, \$ Billion



Market Capitalization Growth During 2021

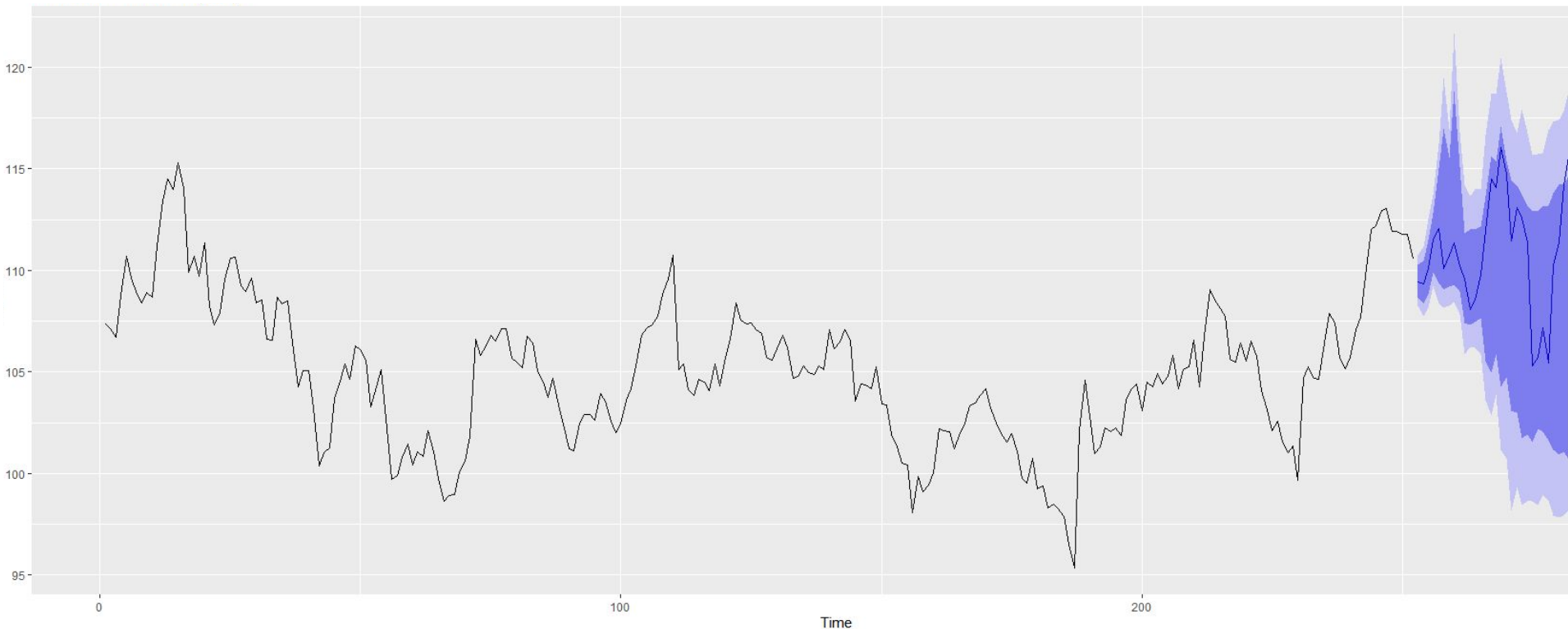


Despite the crisis and high volatility, AI-in-Pharma publicly traded companies present growth **reaching \$110B of cumulative capitalization as of December 31, 2021**. A huge leap in comparison with the capitalization presented in AI-in-Pharma Investment Digest Q3 2021 occurred after adding Vertex Pharmaceuticals and Astellas Pharma companies to the list. Two companies from our list have announced closing of IPO in Q4 2021: **Exscientia** and **Roivant Sciences**.

The largest companies by market capitalization are **Recursion, Exscientia and Relay Therapeutics**.

It's essential to measure the performance of publicly traded AI in Pharma companies via comparison with major market benchmarks such as IBB, NBI and S&P 500. The cumulative market capitalization dynamics of AI in Pharma corporations outperformed YTD NASDAQ Biotechnology Index (NBI) and iShares Biotechnology ETF (IBB). However, S&P 500 gained solid 28.79% which placed it at the first place.

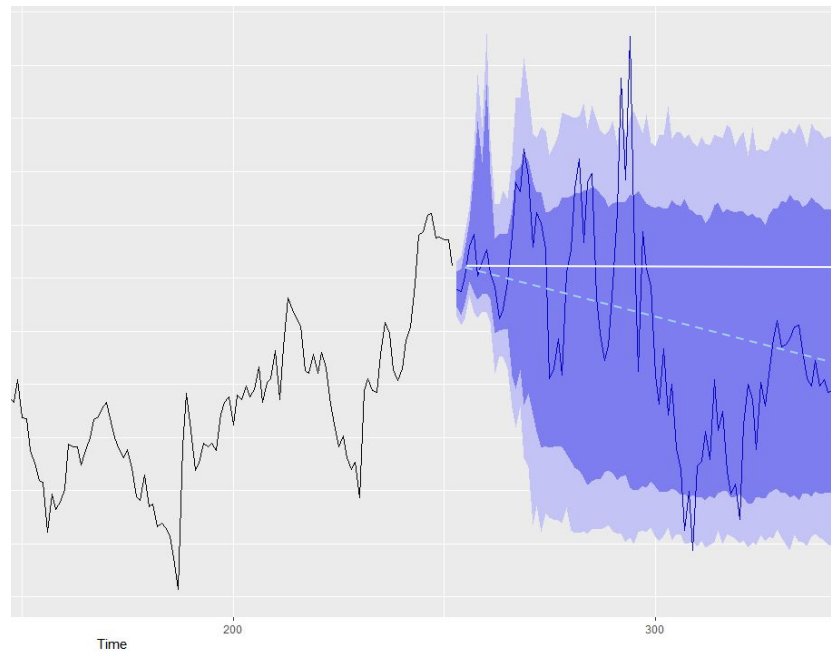
NEURAL NETWORKS ASSESSMENT / 30 DAYS



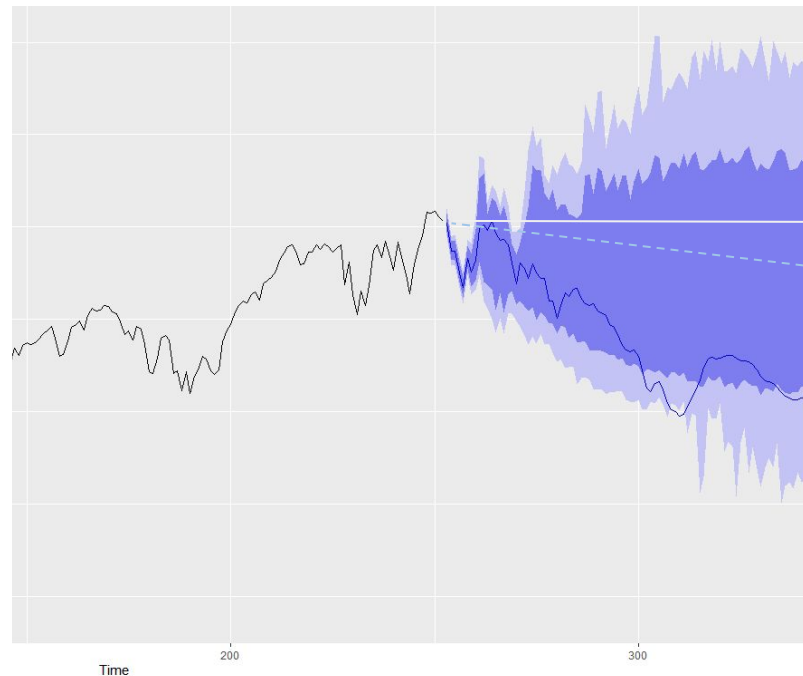
The graph above shows 30-days forecast (as of 08 - Jan - 2022) of the AI in Pharma focused companies' Index. As can be seen by the intervals obtained, the Index has a bear market tendency.

NEURAL NETWORKS ASSESSMENT / 90 DAYS

NN-based AI in Pharma focused companies' Index 90-days forecast

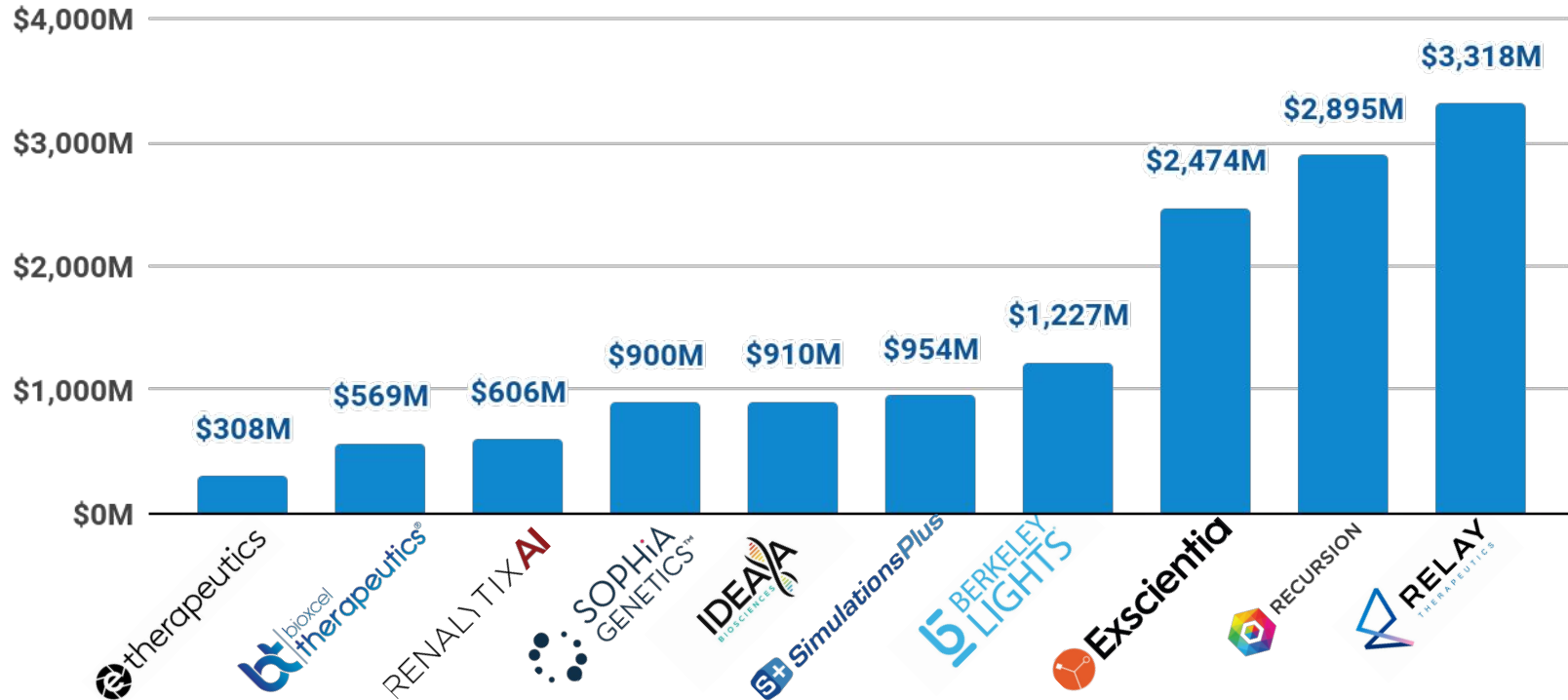


NN-based S&P 500 Index 90-days forecast



Comparing two graphs above indicating the AI in Pharma focused companies' Index (left) and S&P500 Index (right), we can see that S&P500 Index has narrower intervals. It can be observed that the trendline of SP&500 Index is better angled, implying higher returns / lower losses. This, in turn, defines AI in Pharma focused companies' Index as an instrument more appropriate for seasoned investors.

TOP 10 AI-DRIVEN PUBLICLY TRADED PHARMA COMPANIES BY MARKET CAPITALIZATION IN 2021



The chart presents the **Top-10 AI-driven drug discovery** public companies arranged by market capitalization as of end of December 2021. **Relay Therapeutics**, the developer of an allosteric drug-discovery platform intended to apply computational techniques to protein motion holds the first place with **\$3.3B** of market capitalization.

FUNDAMENTAL ANALYSIS OF AI IN PHARMA PUBLIC COMPANIES



- Compared to its peers, EVAXION has the lowest market capitalization and Enterprise Value making Evaxion cash burden is less than its peers.
- Evaxion market capitalization is continuously increasing due to the expectation of advancing clinical trials.
- As of June 2021, Evaxion's cash position of \$18.8M is expected to be sufficient to fund key clinical programs into 2022.



- Due to the U.S. Food and Drug Administration (FDA) having cleared the company's Investigational New Drug application to begin a Phase I trial of BMF-219, Biome draws attention from investors.
- The company has expanded team and in-house research capabilities to support long-term growth and clinical and preclinical development plans.
- As of June 30, 2021, the Company had cash, cash equivalents, restricted cash, and investments of \$203M.
- The clinical developments of the company should enhance its financial positions.



- Compared to its peers, Recursion Pharma is the one that has a huge revenue growth with 120% in 2021 (LTM). The 74% revenue growth in 2020 makes the company's market position even better.
- One of the reasons that the company wasn't able to reach positive EBITDA is that the company expanded the total number of research and development programs from 37 to 48 as well as its operations to Canada.
- As of June 30, 2021, Recursion's cash and cash equivalents were \$632.7M.

FUNDAMENTAL ANALYSIS OF AI IN PHARMA PUBLIC COMPANIES



- Berkeley's revenue grew to \$77.8M for 2021(LTM), representing a 21% growth.
- Berkeley Lights continues to expect full year 2021 revenue to be in the range of \$90M to \$100M, representing 40% to 56% growth over the full year of 2020.
- Berkeley kept gross margin above 65% in the last 3 year.
- On the contrary of revenue growth, we saw that Berkeley's market capitalization is decreasing significantly with -57%. The main reason for the decrease in market cap is that the company gave guidance for 2021 in the range of growth between 40% and 56% over the prior year. From investors point of view BLI's growth is about to stumble.



- Relay has acquired ZebiAI in April 2021 which affected \$134.9M in expenses.
- Despite the acquisition, the company is projected to reach 50% of the gross margin in 2021, continuing its great performance from 2020, when the margin reached 100%.
- As institutional investors increased their shares in Relay, company's market capitalization increased 3% in 2021 (LTM).
- As of June 30, 2021, cash, cash equivalents and investments totaled approximately \$671.2M.
- The Company expects its current cash and cash equivalents will be sufficient to fund its current operating plan into 2024.

FUNDAMENTAL ANALYSIS OF AI IN PHARMA PUBLIC COMPANIES

The logo for Schrödinger, featuring the word "SCHRÖDINGER" in a blue, sans-serif font. Above the "O" and "D" are two small orange dots.

- Total Revenue is \$120M in 2021 (LTM), expected an increase of over 12% compared to 2020.
- Gross profit is expected to reach over \$62M in 2021 with a gross margin over 62%.
- The company's expenses are projected to scale due the development of its internal drug discovery programs. Operating expenses reached \$42.3M in Q2-2021, compared to \$30.7M in Q2-2020.
- Although Schrödinger is expected to maintain its revenue growth rate, it's definitely expected to grow faster than the wider industry.

The logo for SOPHiA GENETICS, featuring a stylized graphic of seven black dots of varying sizes arranged in a circular pattern to the left of the text "SOPHiA GENETICS™". The "i" in SOPHiA has a red dot.

- The company's total revenue for the second quarter of 2021 was \$10.2M compared to \$5.9M for the second quarter of 2020, representing a 72% increase. This increase was primarily driven by new customers onboarding onto the platform. Another reason is the usage rates improvement across existing customers.
- SOPHiA Genetics full year revenue for 2021 expects to be greater than \$39M, representing growth of over 37% compared to the prior year period.
- The decline in gross margin was primarily attributable to increased computational and storage-related costs and negative FX movement. However, the company kept its margin above 60% in the 3 years.

The logo for ERASCA, featuring the word "ERASCA" in a bold, blue, sans-serif font. A small "TM" trademark symbol is to the right of the "A". A green horizontal line is positioned below the "A".

- The company has successfully closed its \$345M upsized IPO in July 2021.
- A few reasons that the company has a \$2.3B market capitalization:
 1. Nominated ERAS-3490 Development Candidate;
 2. Dosed First Patient in HERKULES-1 Study;
 3. Dosed First Patient in FLAGSHIP-1 Study;
 4. Executive Leadership Team.

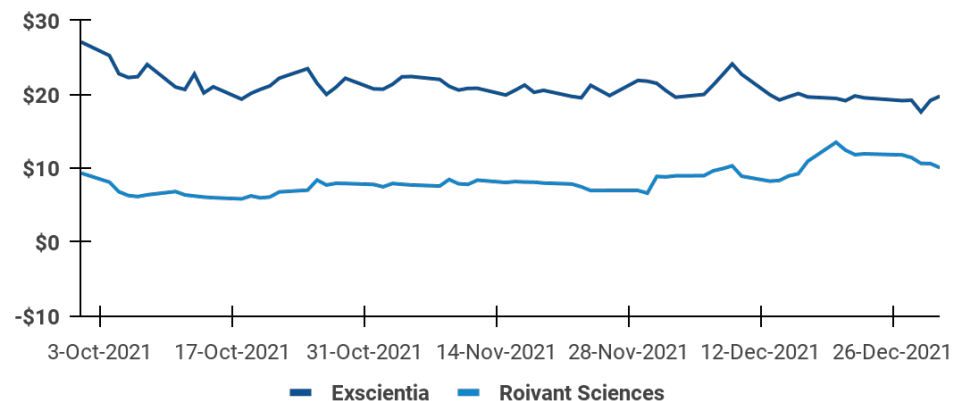
AI IN PHARMA IPOs IN Q4 2021

In Q4 2021 2 new public companies have successfully closed their IPOs. As for now, they are showing either a slight decline (Exscientia) or insignificant growth (Roivant Sciences), which is typical for new pharmaceutical companies, especially with the negative net income. All IPOs took place in the USA.

Roivant Sciences received **\$611M** from **SPAC deal** and **\$200M** through a **private round** from investors including Fidelity Management & Research Company, SoftBank.

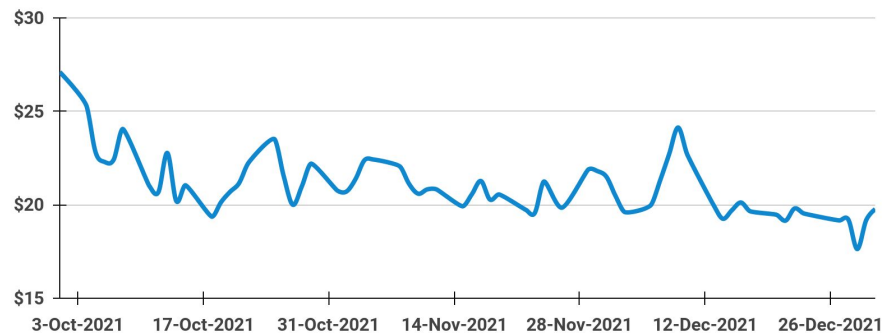
Exscientia announced initial public offering on the US Nasdaq, and the IPO swelled from initially forecast \$304M to just over **\$350M**. Added to that, Exscientia has just completed a **\$160M private placement** that ran concurrently with the IPO, backed by SoftBank and the Bill & Melinda Gates Foundation, that swelled its cash reserves by more than half a billion dollars.

Share Price Change 2021



Name	Country	Funding Amount, \$M	IPO Date	Capitalization, \$B	Valuation at IPO, \$B	IPO Share Price, \$	Current Share Price, \$	EV/EBITDA	Net Income, \$M
Exscientia	UK	350	01.10.21	2.2	2.9	22	20.61	-64.70	-35
Roivant Sciences	USA	611	01.10.21	6.0	7.3	9.35	9.51	N/A	-1.060

Stock Price, USD



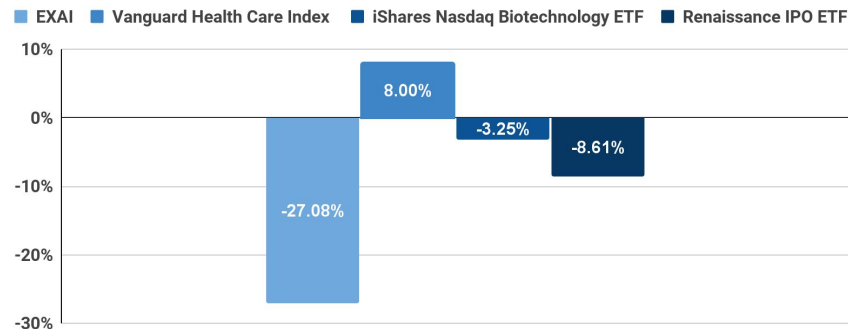
EXAI brought the first drug developed entirely by AI into clinical trials last year and has received a tremendous amount of interest in recent months. In fact, EXAI leveraged this success into two back-to-back VC rounds. EXAI just raised \$109M in its Series C round back in March. And it followed that up with a \$225M Series D round in April – less than two months later.

Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return *	Actual Monthly Return*	Growth after IPO	Capitalization, \$B
-0.50%	5.60%	-5.13%	-4.39%	-27.08%	2.47

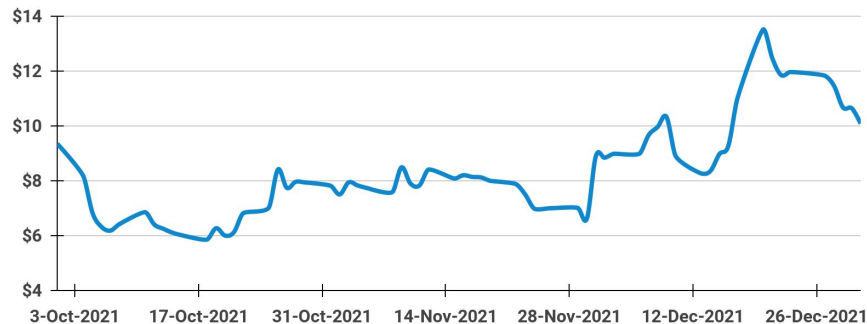
Founded in 2012, Exscientia was the first company to automate drug design and have an AI-Designed molecule enter clinical trials. As a full stack AI drug discovery company, Exscientia focuses on implementing AI design as well as precision data generation.

Estimation of monthly return by FF5F model in November showed that EXAI is overpriced by market and its monthly return reduces during December.

The graph below depicts a comparative performance of EXAI and 3 ETFs in Q4 2021 (starting from 01.10.2021).



Stock Price, USD



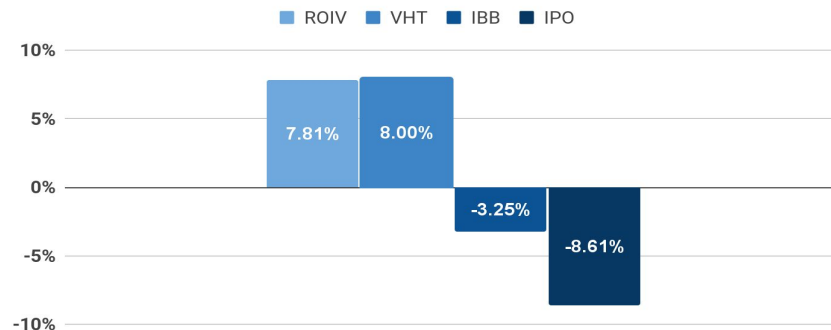
ROIV awaits potential approval by the U.S. Food and Drug Administration (FDA) for Dermavant's tapinarof in treating plaque psoriasis. Dermavant is also evaluating the experimental drug in a phase 3 study for treating atopic dermatitis. Roivant could soon have more positive catalysts. The FDA approval decision on tapinarof as a treatment for plaque psoriasis is expected in Q2-2022.

Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return*	Actual Monthly Return	Growth after IPO	Capitalization, \$B
0.12%	7.90%	15.47%	-10.37%	7.81%	6.09

Founded in 2014, Roivant Sciences develops transformative medicines faster by building technologies and developing talent in creative ways, leveraging the Roivant platform to launch "Vants" - nimble and focused biopharmaceutical and health technology companies.

Based on estimation ROIV underpriced so after decline in Nov, stock price start increasing on the last month of 2021.

The graph below depicts a comparative performance of ROIV and 3 ETFs in Q4 2021 (starting from 01.10.2021): Vanguard Health Care Index Fund ETF (VHT), iShares Nasdaq Biotechnology ETF (IBB), Renaissance IPO ETF (IPO).



TOP AI IN PHARMA BULL MARKET COMPANIES IN 2021

C4X Discovery, e-Therapeutics and Ideaya Bio. constitute the group of promising companies selected for analysis. These companies already attracted investors' attention. Furthermore, these companies' research is already making headway with their decent multi-target pipelines of novel therapeutics to address unmet medical needs. The companies are expected to translate their proprietary insights and technical solutions into effective therapeutics.

Currently, the companies have a strong partnership agreements with reputable pharma companies and thus receive high expectations from investors.

Share Price Return (%) 2021



Name	Country	Funding Amount, \$M	IPO Date	Capitalization, \$M	Valuation at IPO, \$M	IPO Share Price, \$	Current Share Price, \$	EV/EBITDA	Net Income, \$M
C4X Discovery	UK	6.7	31.10.2014	140	N/A	N/A	58.90	-20.76	-5.2
e-Therapeutics	UK	98.5	07.12.2007	297	N/A	N/A	57.61	-60.92	-5.5
Ideaya Biosciences	USA	226	23.05.2019	778	194	10.00	22.31	-16.37	-36.6



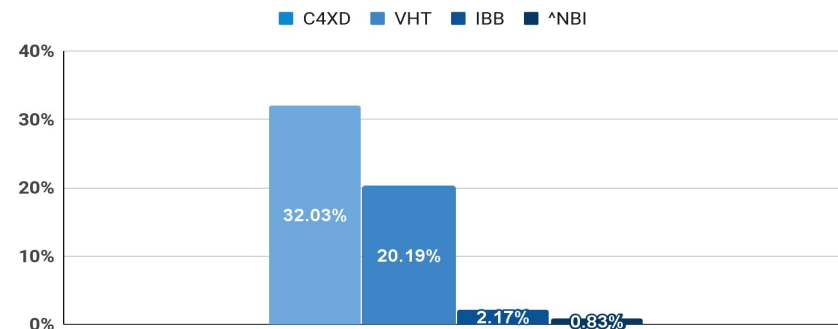
C4X Discovery is a drug discovery and development company that uses cutting-edge technology to design and create drug candidates. C4X was spun out of the University of Manchester in July 2007. Their proprietary patented software, Conformetrix, allows scientists to view accurately the dynamic 3D shape of potential drug candidates.

According to the estimation, this stock is overpriced so in the future high potentially the price will not increase sharply anymore but it still continue growing gradually.

The graph below depicts a comparative performance of C4XD and 3 ETFs in 2021 (starting from January): Vanguard Health Care Index Fund ETF (VHT), iShares Nasdaq Biotechnology ETF (IBB), NASDAQ Biotechnology (^NBI).

C4X has a state-of-the-art suite of proprietary technologies across the Drug Discovery process and accesses further innovative capabilities and expertise through its growing network of partners. The company is actively advancing its diverse pre-clinical discovery portfolio which is focused on inflammation, neurodegeneration and oncology.

Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	Growth after IPO	Capitalization, \$B
0.11%	2.91%	29.68%	50.43%	277.57%	0.10





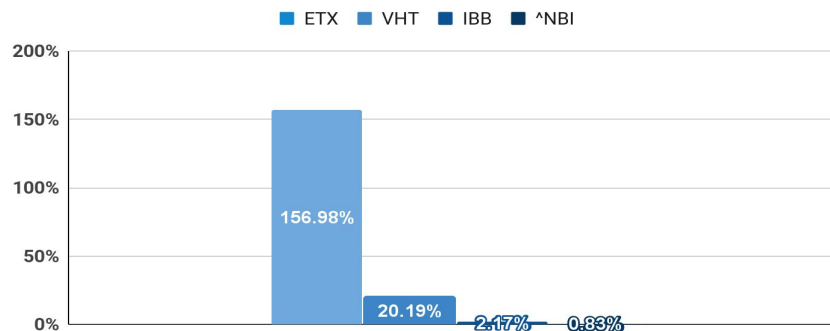
In the last twelve months e-therapeutics insiders were buying shares, but not selling. Furthermore, the CEO Ahmad Mortazavi made the biggest insider purchase with £100k in the LTM. When multiple insiders are buying like they did in the case of e-therapeutics, that would send out a positive message to the company's shareholders.

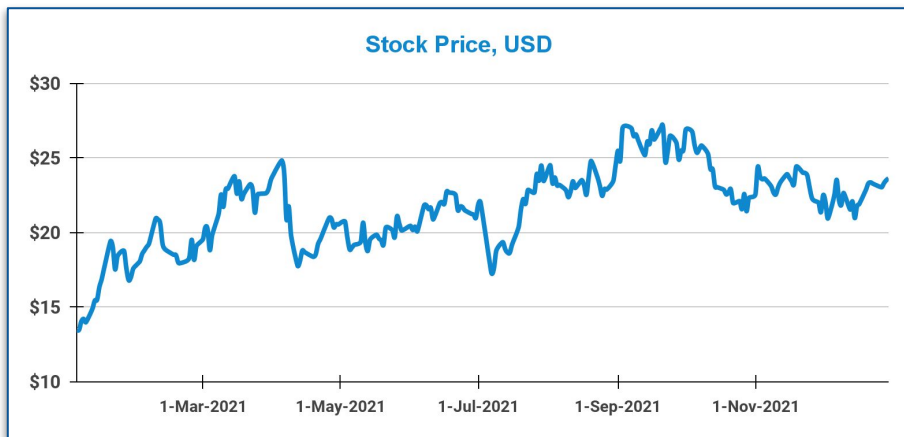
Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	Growth after IPO	Capitalization, \$B
0.38%	3.92%	20.73%	2.2%	-35.94%	0.22

e-therapeutics is an Oxford, UK-based company with a powerful computer-based approach to drug discovery, founded on its industry-leading expertise in network biology to fully capture disease complexity. The company combines network science, machine learning, artificial intelligence, statistics and big data.

Based on prediction, ETX underpriced by market, due to difference between actual and estimated return in NOV(18%), it seems stock price will increase in 2022.

The graph below depicts a comparative performance of ETX and 3 ETFs in 2021 (starting from January): Vanguard Health Care Index Fund ETF (VHT), iShares Nasdaq Biotechnology ETF (IBB), NASDAQ Biotechnology (^NBI).





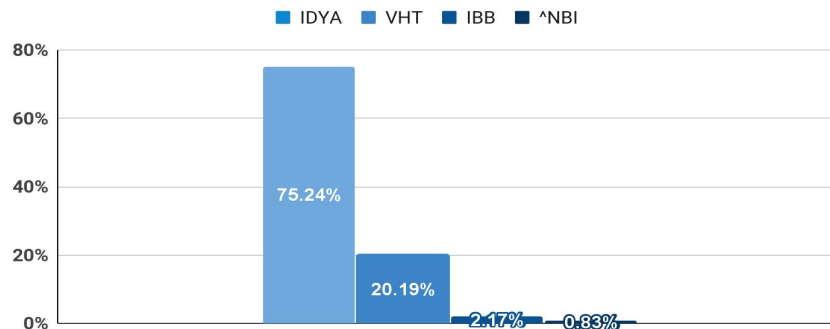
IDEAYA's share price has soared 104% since strategic partnership and collaboration with GlaxoSmithKline and Pfizer. The Company also has strong balance sheet of \$325M with capital efficient model is anticipated to fund planned operations into 2024, supporting clinical data milestones across multiple programs.

Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	Growth after IPO	Capitalization, \$B
0.22%	3.93%	1.45%	6.7%	111.26%	0.66

IDEAYA Biosciences engages in the research and development of oncology-focused precision medicine. The firm focuses on the targeted therapeutics for patients selected using molecular diagnostics. Its product candidate, IDE196, is a protein kinase C inhibitor for genetically-defined cancers having GNAQ or GNA11 gene mutations.

According to estimated monthly return, IDYA is overpriced and the trend of stock price growth will be slower.

The graph below depicts a comparative performance of IDYA and 3 ETFs in 2021 (starting from January): Vanguard Health Care Index Fund ETF (VHT), iShares Nasdaq Biotechnology ETF (IBB), NASDAQ Biotechnology (^NBI).



TOP AI IN PHARMA BEAR MARKET COMPANIES IN 2021

Schrödinger, **Berkeley Lights** and **Relay Therapeutics** constitute the group of promising companies selected for analysis. They are new to the market (their IPOs were closed in 2020). Therefore, their future might change significantly. Moreover, they have decent multi-target pipelines of novel therapeutics to address unmet medical needs. The companies are expected to translate their proprietary insights and technical solutions into effective therapeutics.

Currently, the companies have a firm market position and thus receive high expectations from investors.

Share Price Return (%) 2021



Name	Country	Funding Amount, \$M	IPO Date	Capitalization, \$M	Valuation at IPO, \$M	IPO Share Price, \$	Current Share Price, \$	EV/EBITDA	Net Income, \$M
Schrödinger	USA	562.3	02.05.2020	3905	819	17.00	54.68	-67.90	-41.960
Berkeley Lights	USA	208.5	17.07.2020	1684	1355.2	19.00	19.56	-23.26	-54.318
Relay Therapeutics	USA	520.0	16.07.2020	3166	1736	20.00	31.53	-20.88	-236.384



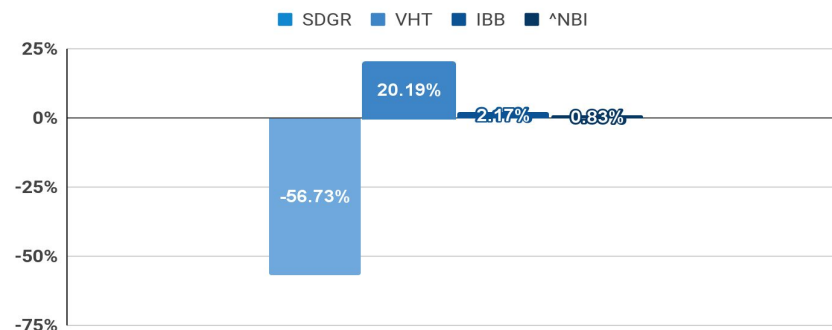
Schrödinger share fell after Q3 sales of \$29M due to missing consensus of \$31M. Schrödinger managed to reduce its cash burn by 64% over the last twelve months; revenue is up by 24% over the same period which is a good sign.

Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	Growth after IPO	Capitalization, \$B
-0.34%	4.12%	-10.21%	-31.03%	20.08%	2.16

Schrödinger's industry-leading computational platform facilitates the research efforts of biopharmaceutical and industrial companies, academic institutions, and government laboratories worldwide. Schrödinger also has wholly-owned and collaborative drug discovery programs in a broad range of therapeutic areas.

According to estimated rate of return, the downward trend in stock prices will continue but will be slower.

The graph below depicts a comparative performance of SDGR and 3 ETFs in 2021 (starting from January): Vanguard Health Care Index Fund ETF (VHT), iShares Nasdaq Biotechnology ETF (IBB), NASDAQ Biotechnology (^NBI).





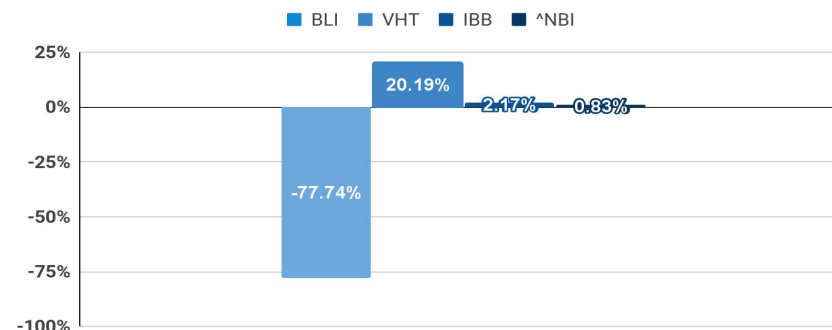
During 2021, Berkeley Lights signed \$115M worth of new contracts with clients. Additionally, it managed to boost its recurring revenue by over 35% year over year. Berkeley Lights is looking for a new chief executive which potentially may lead company's future growth.

Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	Growth after IPO	Capitalization, \$B
-0.60%	4.30%	10.26%	-17.24%	-71.58%	0.62

Berkeley Lights is a leading Digital Cell Biology company focused on enabling and accelerating the rapid development and commercialization of biotherapeutics and other cell-based products for the customers. The Berkeley Lights Platform captures deep phenotypic, functional and genotypic information for thousands of single cells in parallel.

Considering the result of monthly return estimation, BLI is highly underpriced and it has potential of fast growth.

The graph below depicts a comparative performance of BLI and 3 ETFs in 2021 (starting from January): Vanguard Health Care Index Fund ETF (VHT), iShares Nasdaq Biotechnology ETF (IBB), NASDAQ Biotechnology (^NBI).





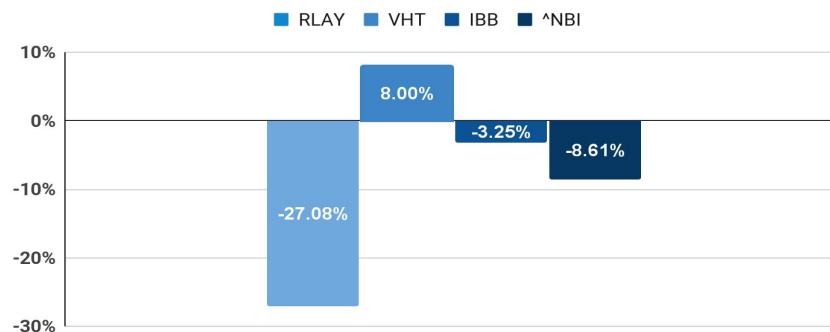
Investors are highly encouraged by Relay's interim clinical trial data that suggest the company's new approach to drug development can produce a new blockbuster cancer treatment. RELAY completed a secondary share offering on Oct. 12 that would add around \$400M to the company's cash cushion. This is probably enough to fuel operations through a pivotal study with RLY-5008.

Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	Growth after IPO	Capitalization, \$B
-0.10%	4.12%	3.23%	-14.29%	-10.21%	2.93

Relay Therapeutics is a company focused on precision oncology and rare genetic diseases. Their proprietary Dynamo platform puts protein motion, at the heart of the drug discovery process. It uses advanced machine learning to identify potential novel target binding sites and to predict and design potentially the most effective molecules.

Due to difference between real and predicted monthly return, RELAY is underpriced and stock price will start increasing.

The graph below depicts a comparative performance of RELAY and 3 ETFs in 2021 (starting from January): Vanguard Health Care Index Fund ETF (VHT), iShares Nasdaq Biotechnology ETF (IBB), NASDAQ Biotechnology (^NBI).



AI IN PHARMA CORPORATIONS FINANCIALS

Company	Capitalization, \$M	Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	IBB Beta	S&P 500 Beta	Total Funding Amount, \$M	Operating Margin	EV/EBIT DA	Net Income, \$M	AI in Pharma corporations tend to be more volatile than average publicly traded company.. For most of the corporations, daily returns are positive and abnormal compared to the market. More volatile stocks are usually characterized by higher betas (both calculated for IBB index and for S&P 500). AI in Pharma segment is definitely a segment of growth stocks with the investors focused on the prospects of the companies rather than on the dividends.
Gritstone Oncology	444.23	1.33%	20.11%	-0.15%	-4.30%	2.96	4.83	396	-156.07%	-8.67	-72.48	
Lantern Pharma	78.65	-0.29%	4.46%	1.54%	-11.29%	1.28	1.48	68.70	0.00%	-1.39	-11.79	
Alector	1487	0.36%	6.15%	5.45%	-10.87%	1.46	1.50	194.50	-17.25%	-39	-32.90	
Relay Therapeutics	3055	0.01%	4.33%	3.23%	-14.29%	1.19	1.27	520.00	-145.96%	-20.24	-261.14	
Schrödinger	2247	-0.24%	4.04%	-10.21%	-31.03%	1.91	2.12	567.20	-84.55%	-20.46	-80.82	Large
Sensyne Health	171.89	-0.13%	2.64%	0.72%	-5.32%	0.24	0.36	37.25	-294.50%	-5.15	-27.52	Medium
Berkeley Lights	759.09	-0.52%	4.32%	10.26%	-17.44%	1.43	1.41	272.60	-77.20%	-18.37	-66.12	Low

AI IN PHARMA CORPORATIONS FINANCIALS

Company	Capitalization, \$M	Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	IBB Beta	S&P 500 Beta	Total Funding Amount, \$M	Operating Margin	EV/EBIT DA	Net Income, \$M
Biodesix	143.25	-0.45%	5.53%	-8.19%	-13.74%	1.29	1.43	239.70	-40.95%	-4.17	-34.41
C4X discovery	101.839	0.16%	3.06%	29.68%	50.43%	0.03	0.17	6.70	-104.45%	-15.33	-3.844
Cotinga Pharmaceuticals	10.993	0.69%	5.31%	-37.27%	-98%	1.45	-0.05	6.64	0.00%	-0.17	-2.538
DeepMatter Group	3.12	-0.43%	4.51%	-1.75%	-6%	-0.01	0.31	N/A	-216.97%	-3.13	-2.621
eTherapeutics	293.13	0.52%	4.01%	20.73%	2.2%	0.28	0.90	98.50	-640.16%	-42.38	-4.122
GenFit	232.72	0.12%	4.35%	-14.32%	-5.10%	0.46	-0.11	93.69	-1048.54%	-3.71	-39.152
Biomea Fusion	216.093	-0.39%	4.79%	-2.79%	6.96%	0.53	0.32	56.00	0.00%	-2.70	-30.355

Market capitalization of some AI in Pharma corporations (such as Schrödinger) exceeds **\$6B** whereas other companies are priced in the range of dozens of millions of dollars - the difference in the valuation is immense. There is no strong correlation between operating margin or net income and market capitalization - the valuation of the corporations still being unprofitable can exceed billion of dollars. Selling shares to investors allows them to maintain their cash burn ratios on an acceptable levels.

Large

Medium

Low

AI IN PHARMA CORPORATIONS FINANCIALS

Company	Capitalization, \$M	Mean Daily Return	Volatility of Daily Returns	Estimated Monthly Return	Actual Monthly Return	IBB Beta	S&P 500 Beta	Total Funding Amount, \$M	Operating Margin	EV/EBIT DA	Net Income, \$M
BioXcel Therapeutics	555.129	-0.24%	4.47%	-3.75%	-28.00%	1.44	1.30	N/A	0.00%	-3.54	-101.892
Evolutionary Genomics	4.411	0.54%	16.38%	17.32%	26.76%	-0.45	-0.06	1.5	0.00%	-4.16	-3.837
IDEAYA Biosciences	756.857	0.31%	3.94%	1.45%	6.7%	1.32	1.13	226.10	-104.58%	-16.37	-36.685
ITeos Therapeutics	1485	0.25%	4.66%	23.33%	26.13%	1.05	0.81	249.74	15.70%	13.29	14.745
Recursion Pharmaceuticals	2714	-0.19%	5.78%	-1.16%	-6.29%	1.70	1.47	465.38	-1381.13%	-19.32	-147.312
Sangamo Therapeutics	948.34	-0.20%	3.36%	7.98%	-2.42%	1.33	1.43	93.20	-172.21%	-4.33	-181.394
Renalytix AI	555.043	0.11%	4.80%	1.66%	-23.80	0.74	1.05	62.73	-1971.62%	-12.23	-33.895
Evaxion Biotech	101.36	-0.06%	8.84%	-32.80%	-36.88%	0.90	0.96	17.00	0.00	-4.29	-20.431

Market capitalization growth of AI-driven Pharma corporations exceeds that of the entire market and general BioTech Industry indices represented as S&P 500 index and IBB, respectively. The difference is that compared to the general market, the AI-driven pharma market segment is more volatile. The distribution of the returns in the segment of AI-driven pharma companies is right-skewed, which differentiates it from the vast majority of stock indices and segments.

Large
Medium
Low

TOP PUBLICLY TRADED COMPANIES RELATED TO AI-IN-PHARMA

Overview

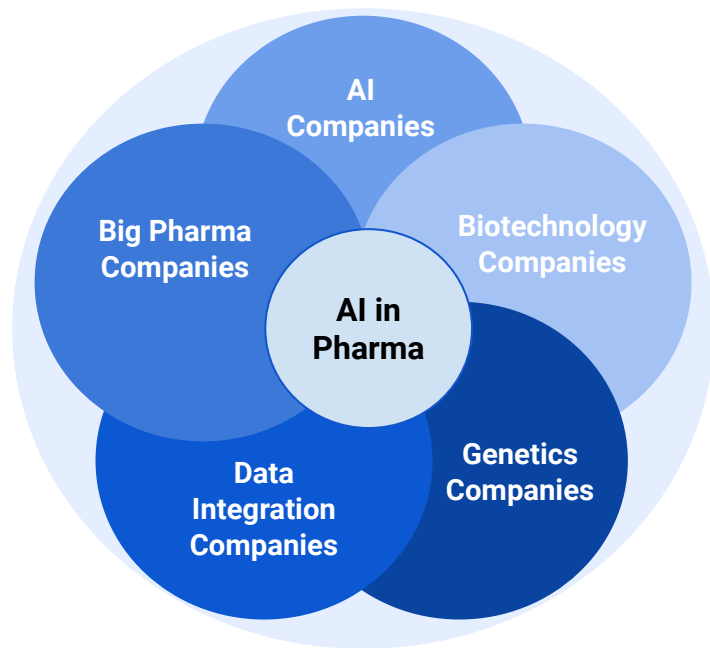


COMPANIES RELATED TO AI-IN-PHARMA

AI in Pharma sector is an integral part of the contemporary pharmaceutical industry. AI-in-Pharma sector, defined broadly, is not limited to AI companies, but includes also pharma, tech, chemistry corporations, and CROs that are engaged in collaborations with AI startups, including but not limited to: Mergers & Acquisitions, scientific researches, partnerships, and so on. Hence the companies chosen are better to be described as AI-related or AI-aiming than AI-based solely.

The number of new partnerships between pharma companies and AI companies is ever increasing across the whole industry. On the one hand, AI-focused companies may spend a few years developing all software and tools which pharma companies don't have. On the other hand, large companies, mainly public ones, have solid understanding of their science, extensive experience in the industry and regulatory field, and they are ready to share the risk.

In this chapter we introduce the list of top corporations related to AI-Pharma that were selected based on the analysis of their R&D, financials, and collaborations with the most promising and advanced AI-in-Pharma startups.



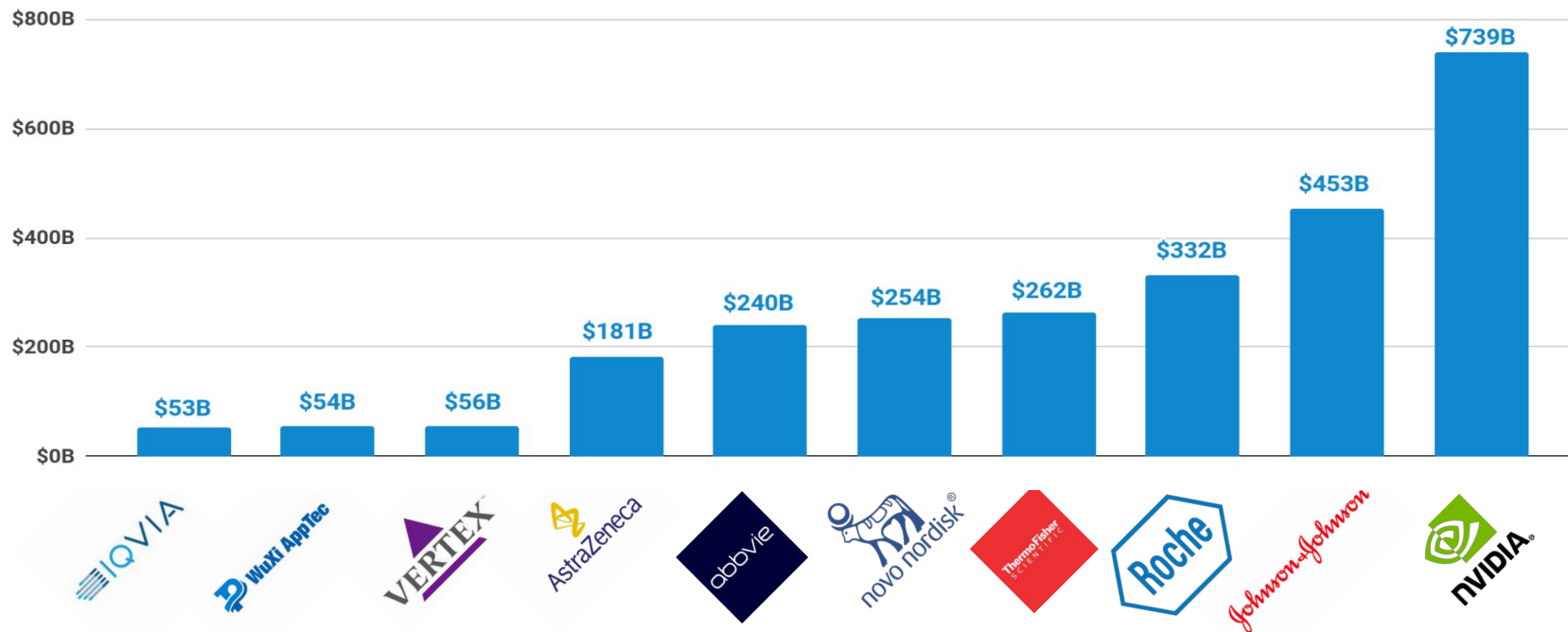
PUBLICLY TRADED COMPANIES RELATED TO AI-PHARMA



Driven to some extent by the COVID-19 pandemic, publicly traded companies related to AI-Pharma demonstrated significant growth, **reaching \$4.94T** industry capitalization as of the end of 2021. Investors' interest is being shifted towards industries of this nature.

We see significant potential for **Artificial Intelligence** in the Pharmaceutical Industry. The **Expected Compound Annual Growth Rate** for this market is projected to be **around 40% over the next 3 years**. The Biotechnology Industry is poised to witness a quantum leap soon, mainly because of the impact of Artificial Intelligence on biomedicine R&D. Many transactions are being announced, including Parexel's **acquisition for \$8.5B**, that indicates growing awareness of the disruptive potential in this sector for ones having the right means for participation. COVID-19 will continue to push valuations and M&A activity in the sector.

TOP 10 PUBLICLY TRADED AI-PHARMA RELATED COMPANIES BY MARKET CAPITALIZATION IN Q4 2021



The chart represents the top-10 public companies that ended up in our portfolios according to their market capitalization. **Johnson and Johnson, Roche Holdings and NVIDIA** top our list, accounting **58.08%** of the capitalization of all companies included. Despite the performance decline that Vertex Pharmaceuticals have had in the past year, it still ended up at our top. During the last year and a half period of pandemic, AstraZeneca has being raised the capitalization by more than **11 times**, reaching **\$181B**.

INVESTMENT GROUPS WITH PUBLICLY TRADED COMPANIES RELATED TO AI-PHARMA

- | | |
|---------------------------------------|----------------------------|
| 1. Pharmaceutical Product Development | 16. Almirall |
| 2. ICON | 17. Evotec |
| 3. Charles River Laboratories | 18. Nuance Communications |
| 4. Medpace Holdings | 19. Ipsen |
| 5. IQVIA | 20. Renalytix AI |
| 6. WuXi Apptech | 21. JOINN Laboratories |
| 7. Syngene International | 22. C4X Discovery Holdings |
| 8. Agilent | 23. Vertex Pharmaceuticals |
| 9. Thermo Fisher Scientific | 24. Schrödinger |
| 10. Abbvie | 25. Berkeley Lights |
| 11. Johnson and Johnson | 26. Relay Therapeutics |
| 12. Roche Holding | 27. BioXcel Therapeutics |
| 13. Novo Nordisk | 28. Lantern Pharma |
| 14. AstraZeneca | 29. DeepMatter Group |
| 15. NVIDIA | |

After a process of fundamental and technical analysis, DPI analytics created a list of 29 companies that are of great investment interest. These companies could be structured in thematic investment groups, based on the products they provide, their overall history, market share and other parameters. A brief overview of some companies, as well as the rationale for their inclusion in our list, could be found on the ongoing pages.



TOP PUBLICLY TRADED COMPANIES RELATED TO AI-PHARMA

Roche Holding (RHHBY) — Roche Holding AG offers pharmaceutical products for treating anemia, cancer, cardiovascular, central nervous system, dermatology, hepatitis B and C, HIV/AIDS, inflammatory, autoimmune and other diseases. The company widely implements data-driven solutions, for example Roche has acquired Viewics, Inc. Viewics focuses on business analytics for laboratories, taking data from a variety of sources and extracting it to make faster data-driven decisions in operating processes in the labs.



Novo Nordisk (NVO) — Novo Nordisk is a healthcare company, engages in the research, development, manufacture, and marketing of pharmaceutical products worldwide. It operates in two segments, Diabetes and Obesity care, and Biopharm. Novo Nordisk actively implements different AI in Pharma solutions, its foundation awards DKK 138 million under its new data science and artificial intelligence initiative.



Astrazeneca (AZN) — Astrazeneca discovers, develops, manufactures, and commercializes prescription medicines in the areas of oncology, cardiovascular, renal and metabolism, respiratory, infection, neuroscience, and gastroenterology worldwide. Astrazeneca uses advancing genomics research with AI and big data, AI is already being embedded across companies R&D both for research and experiment optimization.



AbbVie (ABBV) — AbbVie is one of the so-called Big Pharma companies. The company uses AI not only for direct development but also for its own enhancement: Abbelish Machine Translation and AbbVie Search are built for accelerating and scaling the work of the company's researchers, reducing the time it takes to discover and deliver transformative medicines and therapies for patients.



TOP PUBLICLY TRADED COMPANIES RELATED TO AI-PHARMA

Berkeley Lights (BLI) — Berkeley Lights is a leading Digital Cell Biology company focused on enabling and accelerating the rapid development and commercialization of biotherapeutics and other cell-based products for the customers. Besides 2 unique optofluidics system, Berkeley Lights is known for antibody discovery and cell lines development that definitely requires the usage of AI-powered algorithms and technical solutions.



DeepMatter Group (DMTR) — DeepMatter Group Plc operates as a big data and analysis company. It offers DigitalGlassware platform to deliver applications resulting in optimized chemicals, materials, and formulations in various areas, such as pharmaceutical research, fine chemicals, scientific publications, and teaching. The company develops and commercialises cheminformatics software to handle, store, and retrieve chemical structures and reactions for application in pharma; and tools for the production of synthesis planning and reaction prediction solutions, as well as engages in the automatic extraction of scientific information from text and images.



Pharmaceutical Product Development (PPD) — Pharmaceutical Product Development is another big CRO company. PPD ended up in our portfolio for a great reason, collaborating with Happy Life Tech for AI support, the company aims to create Data Science-driven Clinical Research Solutions in China to enhance global drug development.



Charles River Laboratories (CRL) — Charles River Laboratories is a well-known Contract Research Organization (CRO) specializing in research and drug development. CRL uses the AtomNet™ platform, which is a deep convolutional neural network created for structure-based drug discovery. The company also works with the Valence Discovery Platform for Hit-to-Lead acceleration and optimization and provides all research services considering these platforms.



TOP PUBLICLY TRADED COMPANIES RELATED TO AI-PHARMA

Agilent (A) – Agilent is one of the biggest Biotech companies providing technical solutions for the pharmaceutical industry. Lots of company' technical solutions already have built-in or support different type of AI algorithms. Also, Agilent and Visiopharm co-promote advanced digital Precision Pathology Solutions.



Thermo Fisher Scientific (TMO) – Thermo Fisher is another, even bigger, Biotech company that is specializing in technical solutions, providing also a wide range of other services. “The connected Lab” is a good example of AI-enhanced services providing by the company, creating solutions for enhanced in-Lab performance via AI-based info-gathering and analysis. AI-based processing tools are now also available in Thermo Scientific Amira-Avizo Software and PerGeos Software.



Johnson and Johnson (JNJ) – Johnson and Johnson is considered to be among the top-3 biggest pharmaceutical companies in the world, therefore not only implementation but also investing in AI in Pharma is provided by the company. In 2020, J&J announced an investment in Datavant Holdings, which is working to help healthcare organizations unite data across institutions to enhance medical research and patient care. Another JJI partner, Aetion Inc., analyzes electronic medical records, insurance claims, patient registries and lab results to generate healthcare-related decisions.

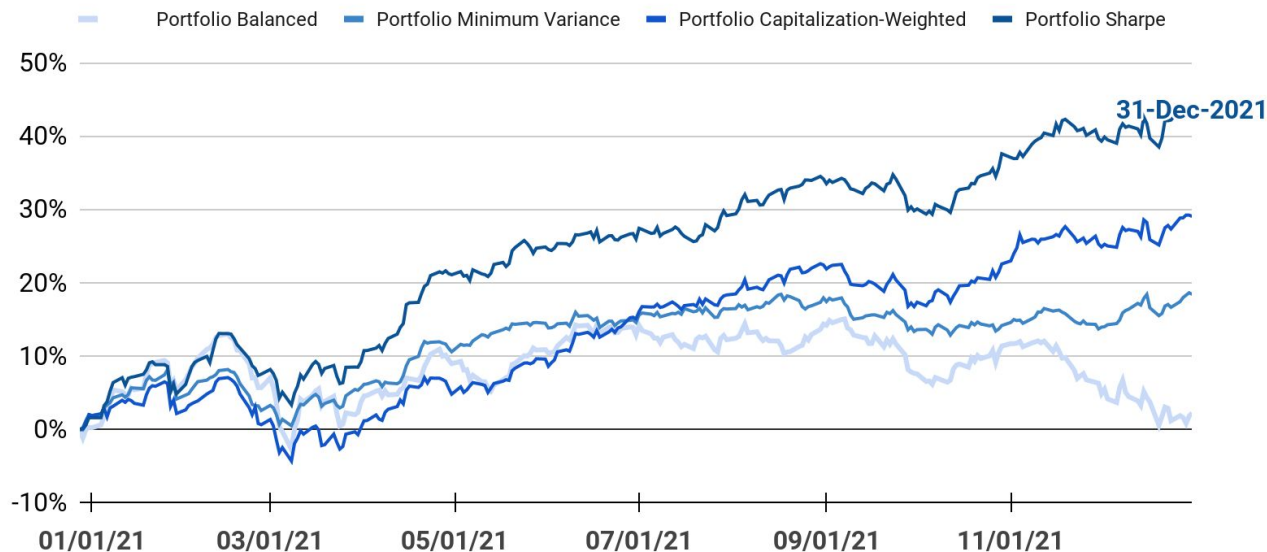


Almirall (ALM) – Almirall is a leading skin-health focused global pharmaceutical company, that has some recent collaborations with Iktos for the creation of generative modelling AI technology for quick identification of molecules with multiple bioactivity and drug-like criteria.



PERFORMANCE OF OPTIMIZED PORTFOLIOS

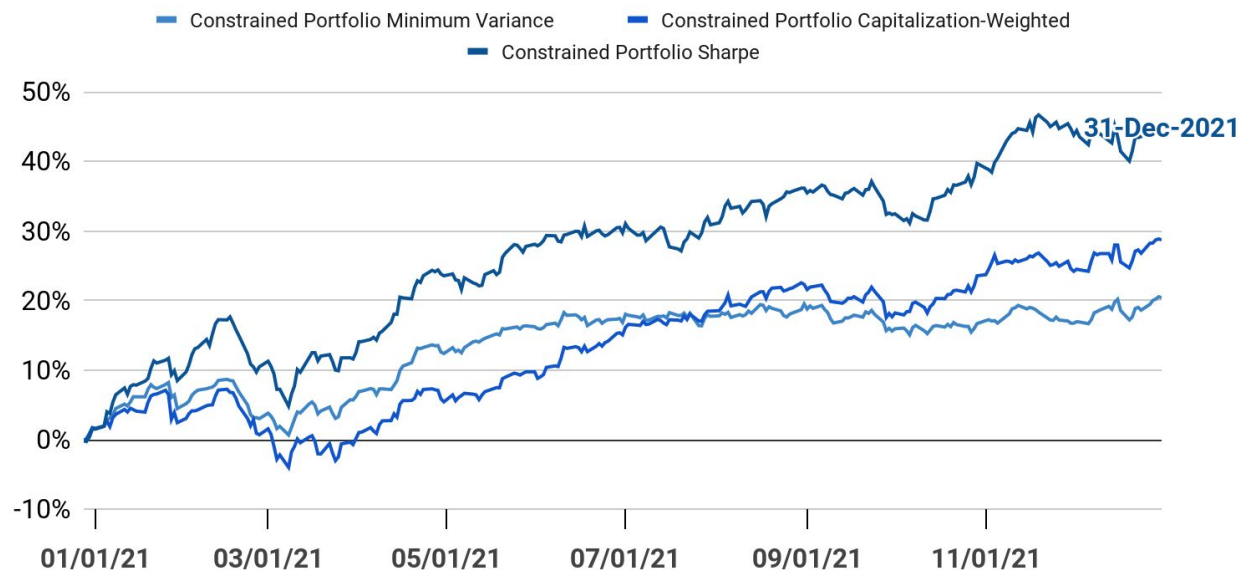
InvestTech Advanced Solutions' analytics used four different strategies during the creation of portfolios: Equally Weighted (Balanced), Minimum Variance, Capitalization-Weighted, Sharpe Ratio-based.



As a result of our analysis, 50000 portfolios were simulated where obtained optimized ones. Sharpe Portfolio showed the best performance.

PERFORMANCE OF OPTIMIZED CONSTRAINED PORTFOLIOS

On the other hand, it is recommended to implement conservative constrained portfolios where company's weight is not exceeding 10% and more than 0.5%



In this scenario Constrained Portfolio Sharpe brought the highest income. Constrained portfolio may be suitable for more conservative investors because it is less risky (but its performance may vary).

PERFORMANCE MATRIX

This is a brief performance matrix of all our portfolios with different investment strategies.
The darker colour indicates the better performance and vice versa:

Return max mean	Equally Weighted (Balanced)	Minimum Variance	Capitalization- Weighted	Sharpe
Portfolio	15.03% 8.54%	18.60% 11.98%	29.21% 13.30%	43.79% 24.30%
Constrained Portfolio		20.56% 13.52%	28.86% 13.47%	46.69% 26.91%

CONCLUSIONS

1. The **AI in Pharma sector** have been experienced **significant growth** over the past year. This could be clearly seen by the overall dynamics of the chosen companies.
2. Despite common misconception, **AI in Pharma includes not only SaaS-specialized companies**, but Big Pharma, as well as top-CRO companies should be included in this list among other newcomers.
3. Due to the market's significant growth, **all portfolios shows remarkable results, indicating valid investment opportunities**. At the same time such opportunities, **i.e. possibilities, shouldn't be replaced with certainty**.
4. Best performance is shown by Sharpe ratio-based portfolios, our Market Cap portfolios have outperformed all Balanced-based portfolios showing higher investment expediency.
5. There are plenty of companies that should be considered as promising ones, **which shows both market dynamics and investment expediency**.
6. The overall performance of different investment waging strategies shows that all types of investors, both risk averse and risk-seeking, will find enough opportunities for themselves.

BIG PHARMA'S FOCUS ON AI

Overview



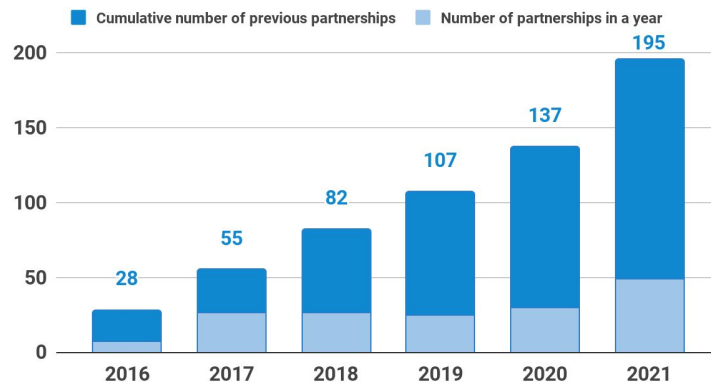
A GROWING NUMBER OF COLLABORATIONS INVOLVING AI FOR DRUG DISCOVERY

Summarizing industry observations over the last 5 years, we can observe a change in perception of top executives at leading pharmaceutical organizations about the need of advanced AI technologies. Since 2015, there has been an obvious shift in the perception from skepticism and cautious interest, all the way to a realization of a strategic role AI has to play in the emerging “data-centric” model of innovation. This change in perception was underpinned by a number of factors:

- a wave of proof-of-concept studies and research breakthroughs in a wide range of AI application use cases
- a number of commercial successes and successfully reached milestones, involving AI as a central element of research
- substantial advances in democratizing AI technology, where machine and deep learning algorithms become available to non-AI experts
- decent increase in the overall understanding of AI “mechanics”, due to increasing efforts in the education and professional development with a focus on AI-driven tools and approaches

Pharmaceutical companies start competing for AI-expertise, talent, and partnerships. In this report, we summarize some of the most high-profile such collaborations, involving top-20 pharma giants. We can see a clear uprising trend in the number of collaborations, focused on AI-drug design, and other aspects of data mining and analytics.

Increasing Number of Partnerships Between Pharma And AI Companies Over The Last 6 Years



The rising interest of leading pharma and contract research organizations towards AI-driven biotech startups is a major driver for the area to become more attractive for investors, since the industry is becoming well-suited for successful exit strategies in future.

AI AND PHARMA COLLABORATIONS IN 2021

JAN

Merck and **Philips** partner to advance personalized fertility treatment through remote patient monitoring, cloud-based platform services and mobile, AI-enabled ultrasound diagnostics to support improved access to care and better outcomes in fertility treatment.

FEB

Roche Italia has joined forces with **PatchAI** to launch a virtual platform for cancer patients.

MAR

Pfizer entered into deal with **Iktos** to leverage Iktos' AI-driven de novo design software for small-molecule programs.

APR

AstraZeneca teamed up with **NVIDIA** and the **University of Florida** on new artificial intelligence research projects aimed at boosting drug discovery and patient care.

Ariana Pharma, a spin-off of the Institut Pasteur specializing in the development of drugs based on artificial intelligence (AI), announced on April 29, 2021 a collaboration with **Sanofi**.

MAY

Bristol Myers Squibb entered into \$1.2B discovery pact with **Exscientia**. Exscientia has found a drug candidate that modulates the immune system by targeting an enzyme that has in the past been hard to target because of potency and selectivity.

JUN

GlaxoSmithKline (GSK) announced an 18-months collaborative research agreement with **Progentec**, a leader in diagnostic and digital technologies for the proactive management of autoimmune diseases, to evaluate novel measurement and management tools for systemic lupus erythematosus.

Insilico Medicine entered into a collaboration with **Teva Branded Pharmaceutical Products R&D Inc.** to utilize Insilico's generative machine learning technology and proprietary PandaOmics Drug Discovery Platform.

AI AND PHARMA COLLABORATIONS IN 2021

JUL

Sosei Heptares and **InveniAI** entered into a multi-target AI-powered and GPCR-focused drug discovery collaboration.

AUG

Insilico Medicine and **Westlake Pharma** announced a strategic partnership to jointly develop innovative small-molecule drugs for COVID-19. The cooperation will be based on the anti-COVID-19 drug R&D project by Westlake Pharma, which aims to develop broad-spectrum small molecule inhibitor drugs for key enzymes of coronavirus and has achieved positive results in the preliminary stage.

Insilico Medicine and **Usynova** announced reaching strategic cooperation in advancing the development of novel therapies.

Antengene Corporation and **MindRank AI** announced a long-term strategic partnership on the joint development of first-in-class small-molecule oncology drugs.

SEPT

Israeli startup **CytoReason** has made its entry into Japan upon signing a collaboration with **Summit Pharmaceuticals International**, the drug research and development arm of Sumitomo Corporation.

OCT

EQRx and **Absci Corporation** announced a discovery collaboration that would will leverage Absci's Drug Creation™ technology for discovery and development activities, along with EQRx's clinical development expertise and commercial capabilities

Caris Life Sciences and **ESSA Pharma Inc.** announced a Precision Development program to support ESSA's ongoing clinical development of EPI-7386, a first-in-class N-terminal domain androgen receptor inhibitor.

Merck KGaA intended to tap **CytoReason**'s machine learning platform to profile immuno-oncology drug.

AI AND PHARMA COLLABORATIONS IN 2021

OCT

Four leading pharmaceutical companies (**AstraZeneca Pharmaceuticals**, **Pfizer**, **Merck**, and **Teva Pharmaceuticals**) partnered with **Amazon Web Services** and **Israel Biotech Fund** to launch AION Labs, an innovative space that will allow drug developers to harness artificial intelligence technologies and computational science to solve therapeutic challenges.

PathAI, maker of AI-enabled pathology products, partnered with pharma and diagnostics giant **Roche**. The collaboration began with distributing PathAI's research-use-only algorithms through the cloud version of Roche's uPath enterprise software, with a focus on immuno-oncology for the treatment of multiple types of cancers.

NOV

C2i Genomics announced an agreement with **NuProbe Global** to scale its AI-powered cancer intelligence program throughout China and the U.S. to enable more accurate cancer screening and monitoring and to gain greater insights into the dynamics of the disease.

Drugmaker **Sanofi** invested \$180M in French startup **Owkin**, whose predictive algorithms aim to improve the research and development of new cures against cancer. The transaction also includes a partnership, under which Owkin agreed to build prognostic models and help evaluate the response to treatment against four types of cancer via its platform.

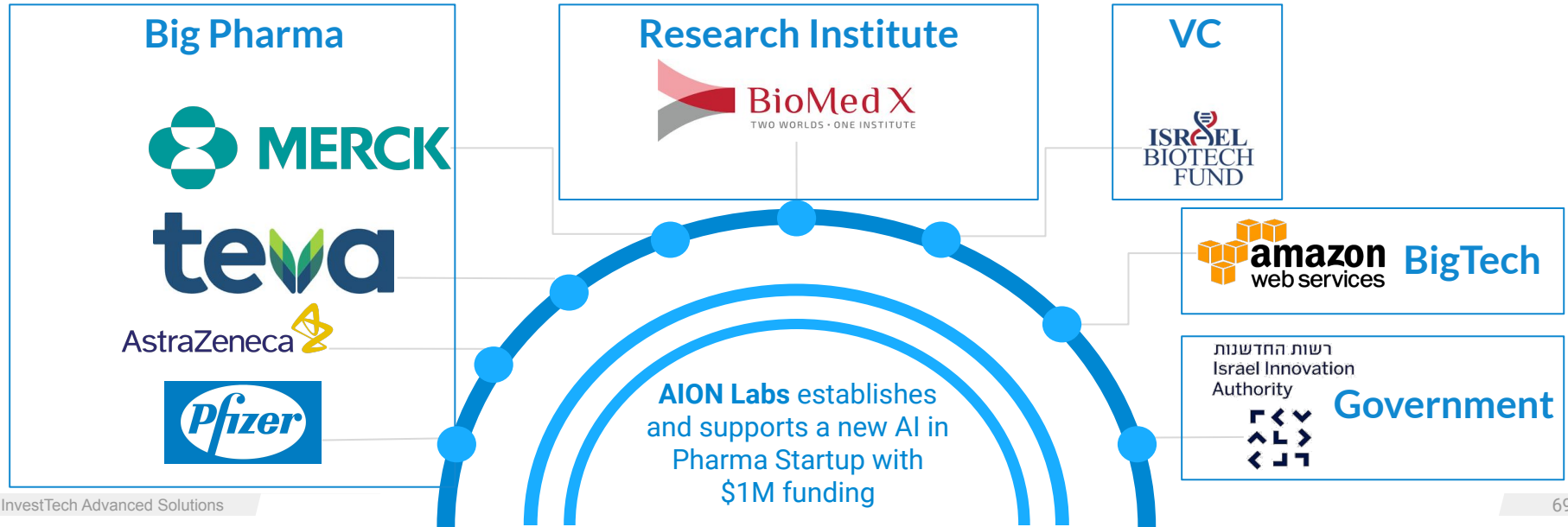
DEC

Moderna launched the Artificial Intelligence Academy for its employees in partnership with **Carnegie Mellon University**. The academy itself is meant to educate employees on how to integrate AI and machine learning solutions into Moderna systems and processes.

UK-based artificial intelligence company **BenevolentAI** and British-Swedish multinational biopharmaceutical company **AstraZeneca** announced second major collaboration milestone. BenevolentAI said that AstraZeneca had added a novel target for idiopathic pulmonary fibrosis, discovered using Benevolent AI's platform, to its drug development portfolio.

BIG INSTITUTIONS COLLABORATION FOR AI IN PHARMA

AION Labs, a new generation innovation lab spearheading the adoption of AI technologies to solve therapeutic challenges, is an excellent example of how Big Pharma, research institutes, government organizations and venture capitalists are searching for new forms of collaboration for encouraging and developing strong scientific and entrepreneurial interests in the pharmaceutical AI. The incubator invites everyone to propose the development of a next-generation platform for the design of high-affinity and biophysically well-behaved antibody binders directed towards epitopes of choice. The pharma partners involved in this project will provide data for model training and their expertise in setting specifications and evaluating the outcome. AION Labs will have been open for visionary applicants who work in the field of De Novo Computational Design of Therapeutic Antibodies until the end of 2021. Then, the chosen AION Labs startup team will be sponsored and supported by several industry-leading partners.



CORPORATION AND AI-COMPANIES PARTICIPATING IN THE PHARMA AI DEALS



SELECTED PHARMA AI DEALS STRUCTURE UNTIL 2021

AI Companies	Pharma Corporations	Pharma Corporations	AI Companies
<div><div>Tencent腾讯</div><div>BERG</div><div>Alibaba Group</div><div>NVIDIA</div><div>Mila</div></div>	<div><div>AstraZeneca</div></div>	<div><div>Benevolent</div><div>ProteinQure</div><div>AliveCor</div></div>	
<div><div>saama</div><div>5</div><div>XtalPi</div><div>Biovista</div></div>	<div><div>Pfizer</div></div>	<div><div>Atomwise</div><div>Cytoreason</div><div>Insilico Medicine 英科智能</div><div>IKTOS</div></div>	
<div><div>Exscientia</div><div>Atomwise</div><div>turbine</div><div>CYCLICA</div></div>	<div><div>BAYER</div></div>	<div><div>SYSTEMS ONCOLOGY</div><div>RECURSION PHARMACEUTICALS</div><div>SCHRÖDINGER.</div><div>5</div></div>	
<div><div>Exscientia</div><div>Researchably</div><div>BERG</div><div>Cytoreason</div><div>Ariana</div><div>JAMEEL CLINIC</div></div>	<div><div>SANOFI</div></div>	<div><div>Exscientia</div><div>CloudPharmaceuticals</div><div>Insilico Medicine 英科智能</div><div>Cytoreason</div><div>progentec</div></div>	
<div><div>komodo</div><div>physiq</div><div>BioSymetrics</div><div>RESONANT</div><div>DATAVANT</div></div>	<div><div>janssen</div></div>	<div><div>Insilico Medicine 英科智能</div><div>BERG</div><div>NANNA THERAPEUTICS</div><div>Google Quantum AI</div><div>lifebit</div></div>	
<div><div>PatchAI</div><div>ReverieLabs</div><div>Genialis</div><div>Exscientia</div></div>	<div><div>Roche</div></div>	<div><div>Nuclei</div><div>PHILIPS Healthcare</div><div>Atomwise</div><div>IKTOS</div><div>CYCLICA</div></div>	
<div><div>FOUNDATION MEDICINE</div><div>RECURSION PHARMACEUTICALS</div><div>Insilico Medicine 英科智能</div><div>WAVE</div></div>	<div><div>Takeda</div></div>	<div><div>Biovista</div><div>Benevolent</div><div>A2A PHARMA</div><div>DYNO THERAPEUTICS</div></div>	
<div><div>Exscientia</div><div>sirenas</div><div>Concerto HealthAI</div></div>	<div><div>Bristol-Myers Squibb</div></div>	<div><div>LUMEN BIOSCIENCE</div><div>tetrascience</div><div>5</div><div>e-therapeutics</div></div>	
<div><div>WuXi AppTec</div><div>Atomwise</div></div>	<div><div>abbvie</div></div>	<div><div>GeneTech</div><div>GNS HEALTHCARE</div><div>Mila</div></div>	
<div><div>SCHRÖDINGER.</div><div>bio map</div></div>	<div><div>AMGEN</div></div>	<div><div>zebiAI</div></div>	
<div><div></div></div>	<div><div>IVA</div></div>	<div><div>Biovista</div></div>	
<div><div></div></div>	<div><div>evotec</div></div>	<div><div>turbine</div></div>	
<div><div>CYCLICA</div></div>	<div><div>GAUM BIOSCIENCES</div></div>	<div><div>EVOLV</div></div>	
<div><div>Genialis</div></div>	<div><div>OncXerna</div></div>	<div><div>IKTOS</div></div>	
<div><div>CYCLICA</div></div>	<div><div>YUHAN</div></div>	<div><div>Inveni AI</div></div>	
<div><div>Atomwise</div></div>	<div><div>HANSOH PHARMA</div></div>		
	<div><div>SHIONOGI</div></div>		

SUMMARY



MAJOR OBSERVATIONS FOR Q4 2021:

KEY BUSINESS TAKEAWAYS



The segment of pharmaceutical AI continues consolidation with the increasing number of later stage mega-rounds, including those of XtalPi and Insitro (both \$400M), Exscientia and Insilico Medicine (both \$255M) and Arbor Biotechnologies (\$215M). The AI startups pack is clearly differentiating into leaders, who developed substantial resources, financial leverage, and technological advantage, and others lagging – companies with fewer resources or less mature technology and scientific assets.

Notably, the BioTech industry embraces a new powerful trend of bringing companies to public markets via Special Purpose Acquisition Companies (SPACs). Roivant Sciences has been a most recent example of an AI-driven company having exited via SPAC. At the close of this transaction on September 30, 2021, Roivant's consolidated cash position is around \$2.5B.



The pharmaceutical AI sector is “heating up”. It has become a lucrative area for specialized biotech investors and investment funds (VCs) just entering the pharma space to include high-risk/high-return companies in their investment portfolios. This fact is backed by several observations, including an ongoing increasing investment activity during 2021, emergence of SPACs, the increasing rush among leading pharma to compete for partnerships with AI-driven companies, and the increasing amount of proof-of-concept breakthroughs, confirming that AI technology has achieved substantial maturity to be able to bring tangible value for drug discovery – far beyond a simple optimization gain. Among biggest investors in the AI-in-Pharma companies are GV, Y Combinator and SOSV.



Big pharma and contract research organizations increasingly compete for AI partnerships, and continue building in-house AI workflows – driven by rapidly emerging evidence of the AI tech feasibility and innovation potential. A number of highly notable proof-of-concept results has been announced during 2021, including Insilico Medicine's groundbreaking discovery of novel target and preclinical drug candidate for Idiopathic Pulmonary Fibrosis (IPF). **Moderna** launched the Artificial Intelligence Academy for its employees in partnership with **Carnegie Mellon University**.

MAJOR OBSERVATIONS FOR Q4 2021:

KEY FINANCIAL AND INVESTMENT TAKEAWAYS



The global COVID-19 pandemic prolongs the rise of the **overall biotech and drug discovery sectors**. During 2021 we have observed over 100 medium and large funding rounds for biotech and drug design companies, especially those focused on antiviral therapies and vaccines.



A number of successful **AI-driven companies closed large-sum late-stage venture capital rounds (B, C, and D)** in 2021 and several of them are now developing clinical stage drug candidates. We expect some of them go public in 2022: e. g. Oncocross targeted IPO to accelerate AI-drug development.



Q4 of 2021 was marked by notable IPOs in the AI-driven drug design space: 2 companies out of almost 500 under analysis closed IPOs. New York-based Roivant Science closed its IPO in October and raised \$611M. Exscientia, a pharmatech company that uses an end-to-end AI platform to design and discover new drugs launched IPO the same day as Roivant Science and raised \$350M.



When some of the companies complete IPOs in the nearest future, it will attract a significant number of non-biotech investors to enter the Life Sciences sector. The prospects of this trend are already vivid: big tech companies enter partnerships with both innovative startups and pharma companies to consolidate resources mainly in personalized medicine, cell and gene therapy and molecule prediction software.



The growing industry traction, reflected in the increasing number of R&D partnerships between big pharma and CROs with AI startups, is a sign that the market is maturing for rapid increase in M&A activity in the nearest future. Despite the crisis, AI-in-Pharma publicly traded companies present YTD growth with reaching **\$110B of cumulative capitalization as of December 30, 2021**.

MAJOR OBSERVATIONS FOR 2021:

Key Technology Takeaways

1. AI is regarded by some top executives at big pharma (GSK and others) as **a tool to uncover not only new molecules but also new targets**. The ability of deep neural networks to build ontologies from multimodal data (e.g. “omics” data) is believed to be among the most disruptive areas for AI in drug discovery, alongside data mining from unstructured data, like text (using natural language processing, NLP).
2. There is **a considerable trend for “AI democratization”** where various machine learning/deep learning technologies become available in pre-trained, pre-configured “off-the-shelf” formats, or in relatively ready-to-use formats – via cloud-based models, frameworks, and drag-and-drop AI-pipeline building platforms (for example, KNIME). This is among key factors in the acceleration of AI adoption by pharmaceutical organizations – where non-AI experts can potentially use fairly advanced data analytics tools for their research.
3. **Proof-of-concept projects keep yielding successful results** – in research studies, and in the commercial partnerships alike. For example, Recursion Pharmaceuticals and Exscientia achieved important research milestones using their AI-based drug design platforms.

Obstacles That Still Remain

1. **Global shortage of AI talent** continues to be a serious challenge for the biopharma industry, repeating the trend from our previous reports. While big pharmaceutical companies invest substantial capital in recruitment of AI specialists, still the majority of them are acquired by large tech corporations (Google, Amazon, Alibaba, Tencent, Baidu etc).
2. **Lack of available quality data is still a challenge for the unleashing full potential of deep learning technologies**. Numerous variations of deep learning (DL) are believed to be the most lucrative area of AI for applications such as drug discovery and clinical research. The key challenge is that DL algorithms are “data-greedy”, while big data in biotech is not always well-versed for modeling, or is inaccessible due to privacy reasons.
3. **Ethical, legal, and regulatory issues for AI adoption in the pharmaceutical sciences**. This set of challenges is related to the previous point, but also includes other questions – AI explainability, patentability of AI-generated results, non-optimal regulations in various countries, slowing down the progress and adoption of AI technologies in general, and in the pharmaceutical industry in particular.

Scope of Services:

- Investment landscape profiling, identifying investment ideas in the biotech/healthcare tech space.
- Preliminary due-diligence (business, science and technology, intellectual property (IP) profiling, freedom of operation assessment, legal assessment etc).
- Comprehensive due-diligence (deep business, science and technology assessment, IP and legal assessment, growth potential assessment etc).
- Infringement analysis of technology (i.g. If you plan to partner or invest in a data-analytics biotech, or AI-development vendors, it is essential to understand their technological assets, both in terms of innovation potential and in terms of legal protection and non-infringement risk management).
- SWOT analysis of companies and technological sectors, competitive profiling.
- Industry profiling and growth strategy development for top-tier companies and governments.

Deep Pharma Intelligence (DPI) is a strategic partner to the leading Life Science organizations, investment institutions (VC funds, investment banks), and governments across the globe — in matters related to investments, strategic positioning, and policy development in the areas of pharmaceutical and biotech research, and healthcare tech.

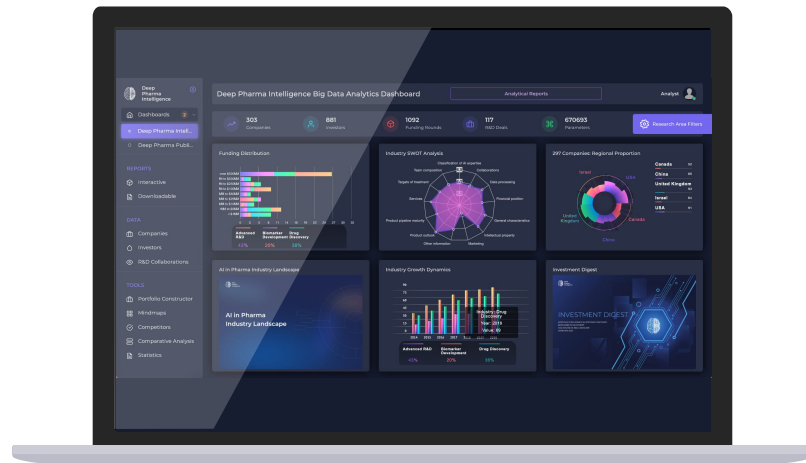
While Deep Pharma Intelligence is regularly producing **open industry reports** covering high-growth sectors in the Life Sciences, including artificial intelligence (AI), digital health, and new therapies, some of the more in-depth research is only available to company's clients and strategic partners under the "Proprietary Analytics" category.

DPI's range of **proprietary services includes custom consulting projects**, based on the specific customer needs, as well as a collection of **pre-produced "ready-to-use" proprietary reports**, developed by the research team, covering general trends and specific action ideas and strategy insights related to the most promising investment prospects (e.g. new technologies, biotech startups), M&A prospects (e.g. pipeline development targets), and strategic growth ideas (trends profiling, industry overviews etc).

DEEP PHARMA INTELLIGENCE: BIG DATA ANALYTICS DASHBOARD

Deep Pharma Intelligence is building a sophisticated cloud-based engine for advanced market and business intelligence in the pharmaceutical and healthcare industries. It includes a data mining engine, infrastructure for expert data curation and advanced visualization dashboards, including mindmaps, knowledge graphs and 3-dimensional visualizations.

The project generates **data-driven insights about emerging areas in the fields of medical research and technology**, including pharmaceuticals, BioTech, medical devices and Healthcare Tech industries. The Dashboard is a well-suited tool for both private and institutional investors looking for an additional enhancement to their market analytics, providing sufficient means for the development of the competitive advantages.



The analytics can deliver funding targets to investors, funding to companies and detailed SWOT analysis

Investment institutions, private and public companies in the Pharma/BioTech space, research institutions, universities and more

- Investment analytics and actionable insights about primary and secondary markets.
- SWOT analysis of the most promising entities and technologies, providing a clear view of opportunities and risks.
- Identification of growth opportunities, including partnerships, technology deals and transaction prospects.
- Competitive intelligence.
- Business and technical due diligence and more.

ABOUT INVESTTECH ADVANCED SOLUTIONS



Who We Are

InvestTech Advanced Solutions provides modern investment analytics and data management tools and algorithms.

Our products are **sophisticated data-driven quantifiable investment recommendations** generated to conduct tangible, fast, comprehensive, and inexpensive **analysis and due diligence for deep tech startups, companies, and corporations**, represented in investment reports.

In addition, InvestTech Advanced Solutions provides proprietary **real-time financial analytics and consulting** for publicly traded corporations in deep tech sectors, which includes 3 stages: data parsing, AI-driven data analysis, and user-friendly data visualization.

InvestTech Advanced Solutions also specializes in **advanced financial engineering**, including **financial derivatives construction and de-risking methods and tools development**.

INVESTTECH ADVANCED SOLUTIONS: ANALYTICAL REPORTS

InvestTech Advanced Solutions in cooperation with analytical subsidiaries of Deep Knowledge Group produces regular open access reports covering emerging technologies, innovations, companies, and trends across the variety of DeepTech domains.

These reports focus on major areas of high-potential industries, maintaining ratings of market players based on their innovation potential and business activity.

The scope of analytical reports accounts for over 10 investment digests that are subject to periodic updates. The elements comprised in every report are as follows:

Industry Trends	Investors	Investment Rounds	R&D Trends
Venture capital ecosystem	Private Companies	Public Companies	M&A Landscape

Explore the entire scope of analytical reports at:

www.invest-solutions.tech/reports

Longevity Investment Digest

This landmark report outlines major investment rounds, relevant R&D trends, illustrates the traction of the Longevity Industry and delivers the comparison of market players. The information in the digest covers key industry trends, 23,000 Longevity companies, 50 leading investors, and more than 600 Longevity-focused publicly traded corporations.



INVESTTECH ADVANCED SOLUTIONS: PROPRIETARY ANALYTICS

Some of the more in-depth research is only available to our clients and strategic partners as proprietary analytics. As a rule, this analytics covers the topics that are of great interest to parties concerned and delivers the extensive scope of information on particular topics.

Proprietary Analytics delivers practical answers to certain questions in order to optimize the short and long-term strategies of companies related to the industry. Proprietary reports are supported by our rapidly developing data mining engine and analytics dashboards.

Ready-to-use
proprietary
reports

Custom
Consulting
Projects

Investment
Prospects

M&A
Prospects

Strategic
Growth Ideas

Trends
Profiling

Niche
Industries
Overviews

Case Studies

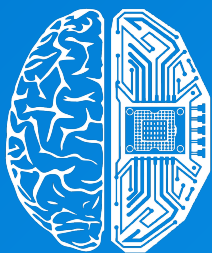
Access our website to learn more:

www.invest-solutions.tech

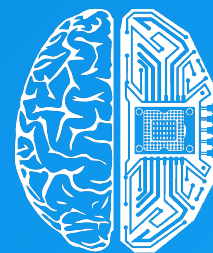
Proprietary Version of Longevity Derivatives and Financial Instruments Report

This report thoughtfully explores Longevity-derived financial instruments. The study includes derivatives explanation and analysis, including the comparison to other financial instruments. The proprietary version delivers an exhaustive overview of the biomarkers-based Longevity assessment solutions.





**DEEP
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