

InvestTech  
Advanced  
Solutions



NeuroTech  
Analytics

# INVESTMENT DIGEST

NeuroTech Industry Overview Q4-2021

# TABLE OF CONTENTS

<b>Investments in NeuroTech Industry</b>	3
NeuroTech Companies: Regional Breakdown	5
Top Companies By Investment & Investment Stage	7
NeuroTech Industry Framework	13
50 Leading Companies in NeuroTech Sector	14
Top 10 NeuroTech Companies by Total Investments In 2021	16
NeuroTech Landscape Overview	17
<b>30 Leading Investors In NeuroTech Sector</b>	20
Top 30 NeuroTech Investors	22
NeuroTech Industry Market Timeline	25
Conclusions	26
<b>NeuroTech Publicly Traded Companies</b>	28
NeuroTech Market Capitalizatiot	32
NeuroTech IPOs In 2021	34
<b>Key Takeaways</b>	43
<b>Legal Disclaimer</b>	50

## NeuroTech Investment Digest at a Glance

This Investment Digest summarizes key players and observations in the private equity and venture capital ecosystem, focusing on the NeuroTech industry. Here we have analyzed and summarized information about the key NeuroTech industry trends and market projections. The Digest outlines more than 1400 promising NeuroTech companies, Top 30 investors, and more than 90 NeuroTech-focused publicly traded corporations. The report delivers data on major investment rounds and relevant R&D trends illustrating the industry traction and readiness of institutional investors to potentially acquire most successful NeuroTech startups.

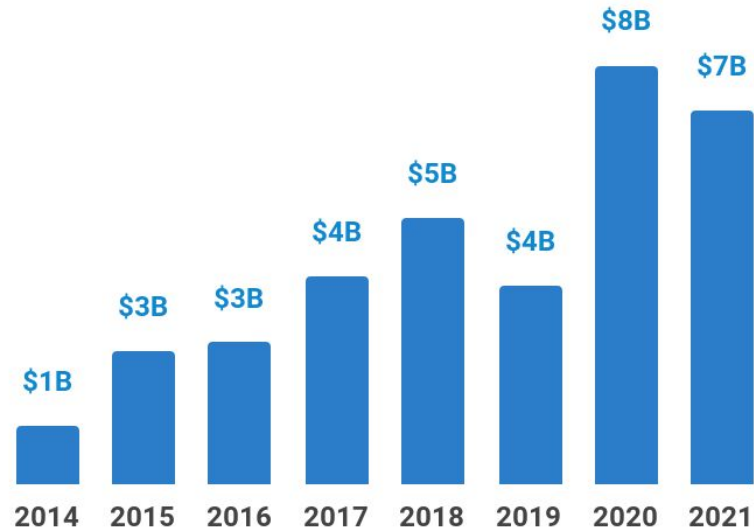
COVID-19 pandemic has brought the focus on to mental well being and contributed to the growth of NeuroTech.

3 NeuroTech companies went public (IPO) in Q4 2020, and more than a hundred received private equity funding.

NeuroTech is getting traction from all geographies and economies as is evident from the recent openness to positive regulations, investor activity, company growth pattern and distribution.

# INVESTMENTS IN NEUROTECH INDUSTRY

## NeuroTech Investment Trajectory



## Early Stage To Late Stage Investments Into NeuroTech Industry by Q4 of 2021: \$7.1B

**NeuroTech Industry** is one of the most promising and prospective sectors of modern biotech in particular and exponential markets in general.

Attraction of venture capital community towards **NeuroTech startups** over the past few years has resulted in various funding rounds worldwide, thus driving significant investment, especially in the pharmaceutical industry. So it can be predicted that the Pharma sector will be a key driver for the exponential growth of the NeuroTech market in the coming years.

During the **last 8 years**, the amount of investments in NeuroTech companies increased **seven times** from **\$1.1 billion** in 2014 to **\$7.1 billion** in 2021, which shows that interest in the NeuroTech industry is steadily growing.

**Overall investments** in the NeuroTech companies amount to **\$34.3 billion**.

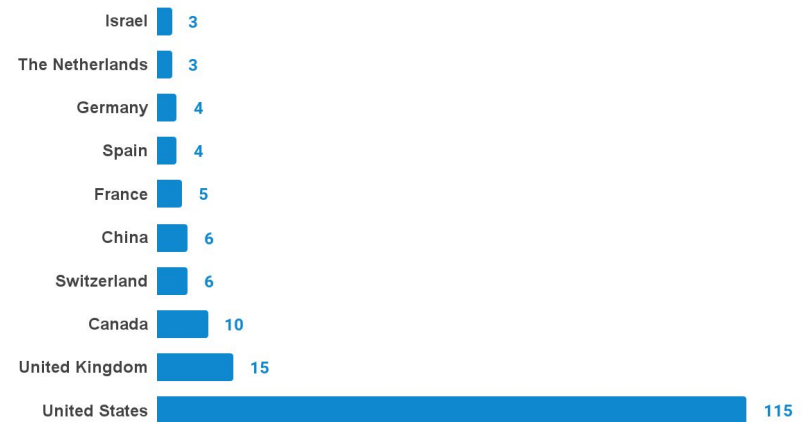
\*Based on data from 2014-2021

# TOP 10 COUNTRIES IN NEUROTECH SECTOR IN 2021

## Amount of Funding

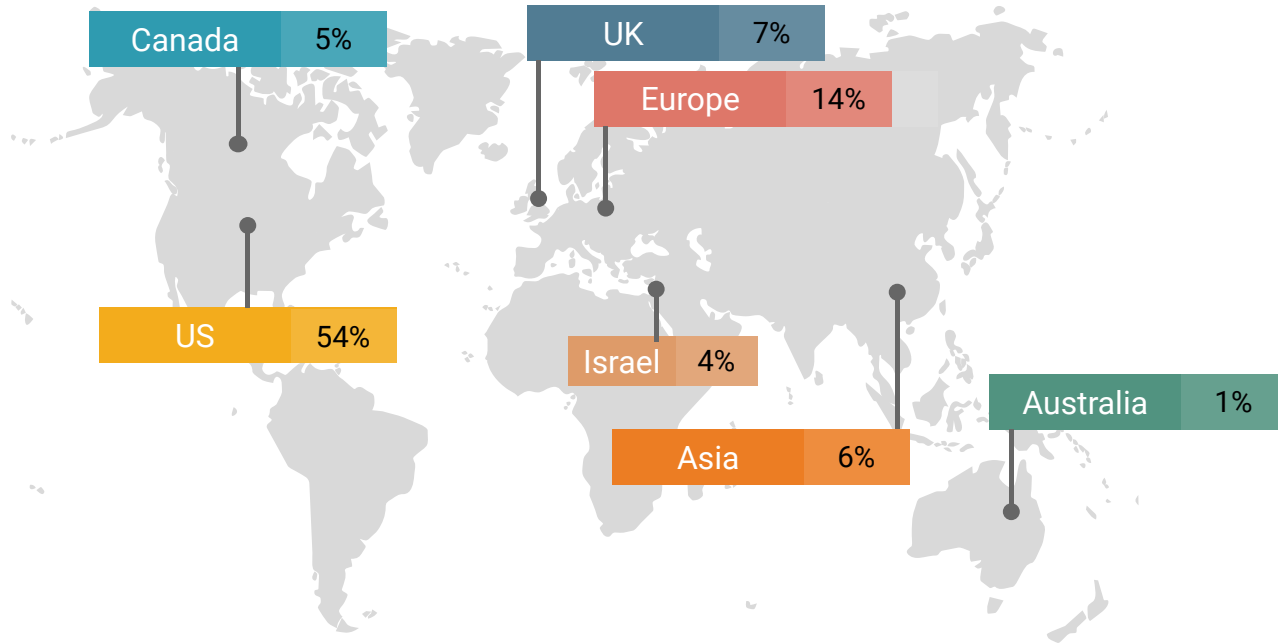


## Number of Companies



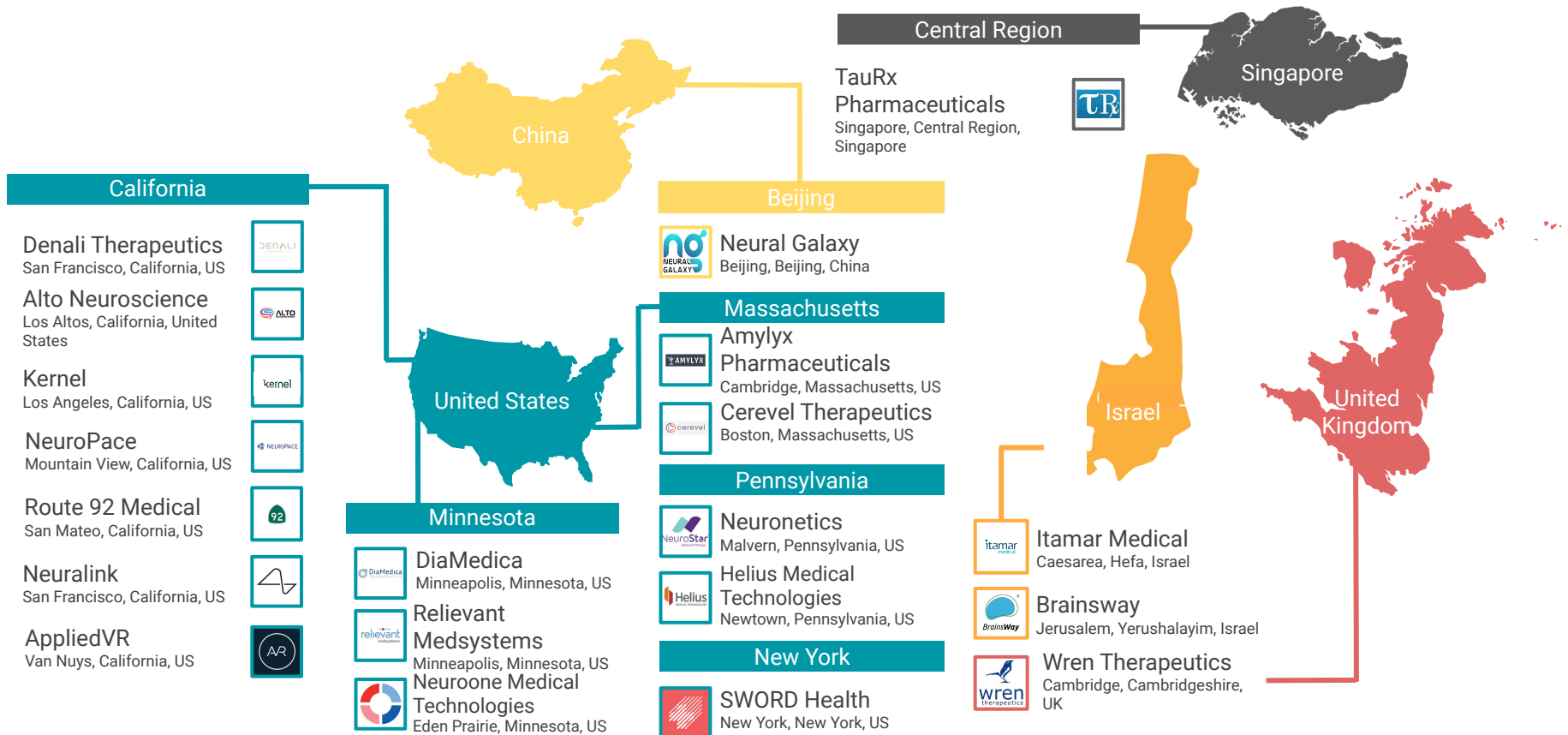
The United States firmly leads in NeuroTech Industry as shown by such quantitative indicators as total amount of investments and number of companies operating in the sector. **115 US-based** companies have aggregated more than **\$4.6 billion** money raised by 2021. Equally as well-known for its strong biomedical community as the US, **Hong Kong** is the second most invested country with **\$255 million** amount of money raised. Other countries with intense focus in NeuroTech Industry include **China, Switzerland, France, Israel**, and others. In terms of funding, Asia region is one of the most active region in the sector. Regions, such as Latin America and the Middle East and Africa, have seen the lowest investment due to a shortage of technical skills and a lack of research infrastructure.

# 1400+ NEUROTECH COMPANIES: REGIONAL BREAKDOWN

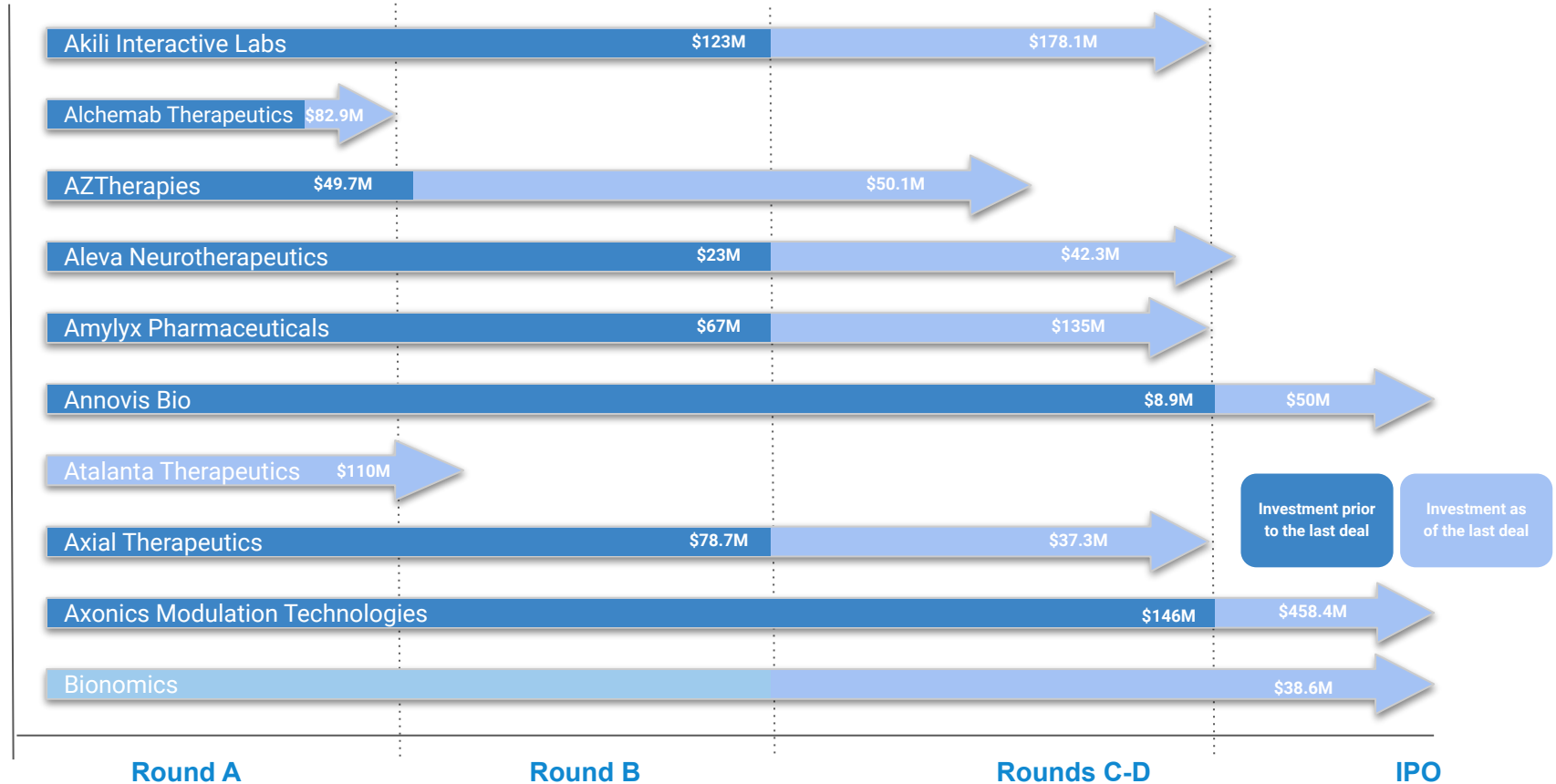


The **US** is still firmly in the lead in terms of its proportion of NeuroTech companies with **54%** share. **Europe** is the second largest market, holding **14%** of the market share. However, Asia-Pacific region has begun to aggressively increase its activity in NeuroTech Industry. Asian market is dominated by India and China followed by Japan in terms of number of NeuroTech companies, 32, 15, 12, respectively. Besides the Asian region, one of the most active country in the space is **Israel** with **54** active companies developing neurotechnology solutions. The growth of the market can be attributed to the rising cases of neurological diseases and increased support for R&D activities by governments & investors.

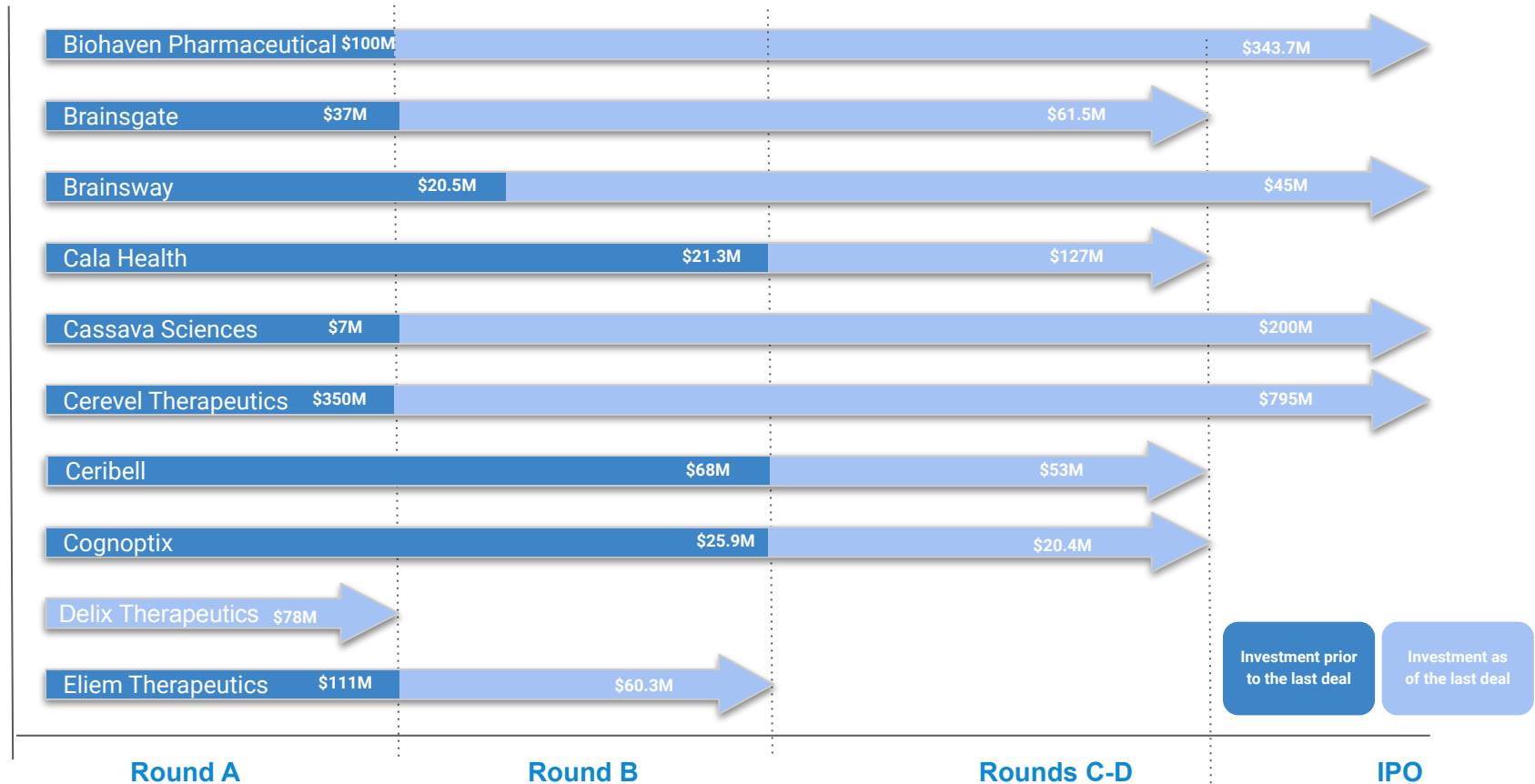
# TOP 20 NEUROTECH COMPANIES



# TOP COMPANIES BY INVESTMENT AND INVESTMENT STAGE

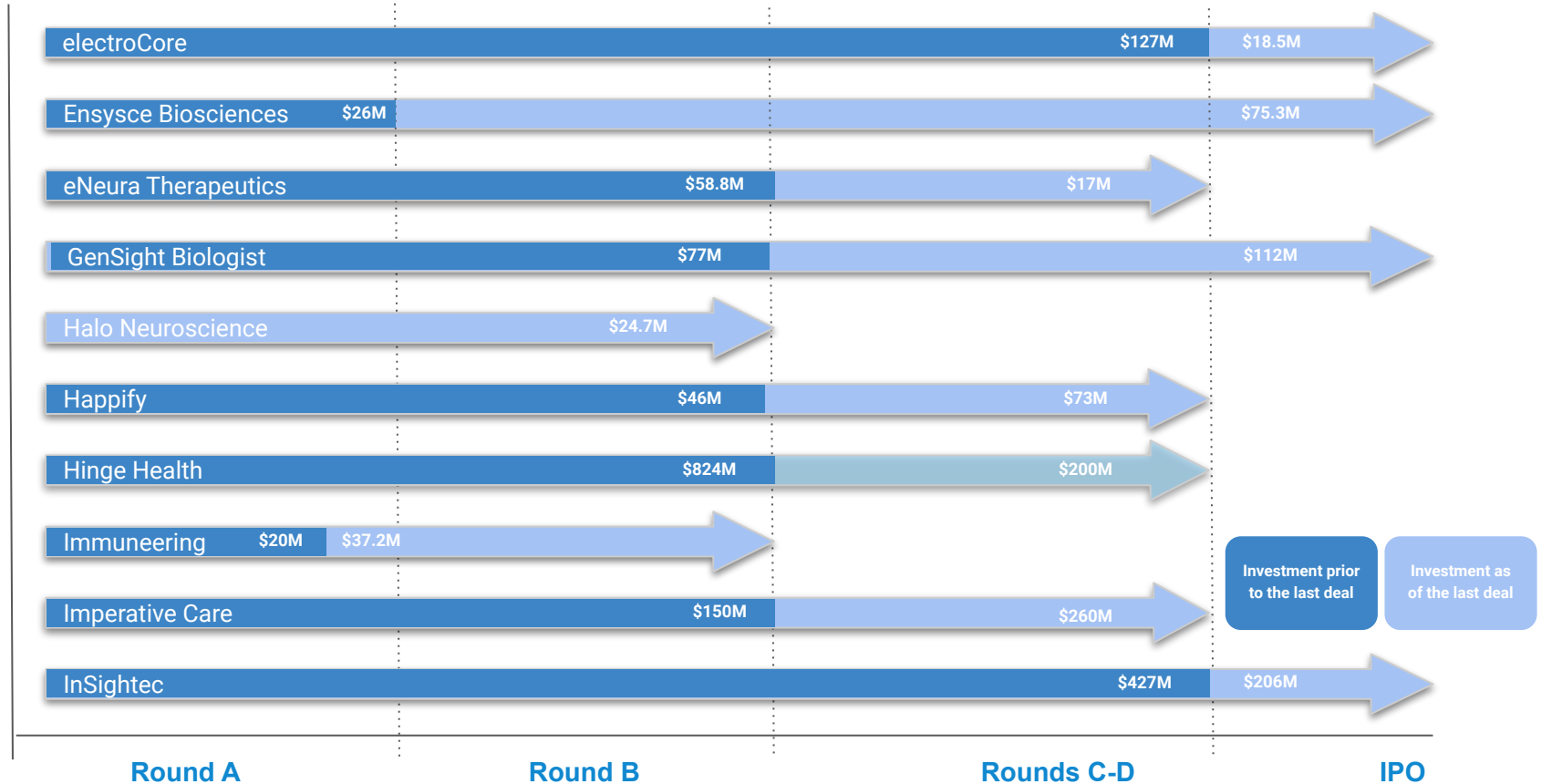


# TOP COMPANIES BY INVESTMENT AND INVESTMENT STAGE

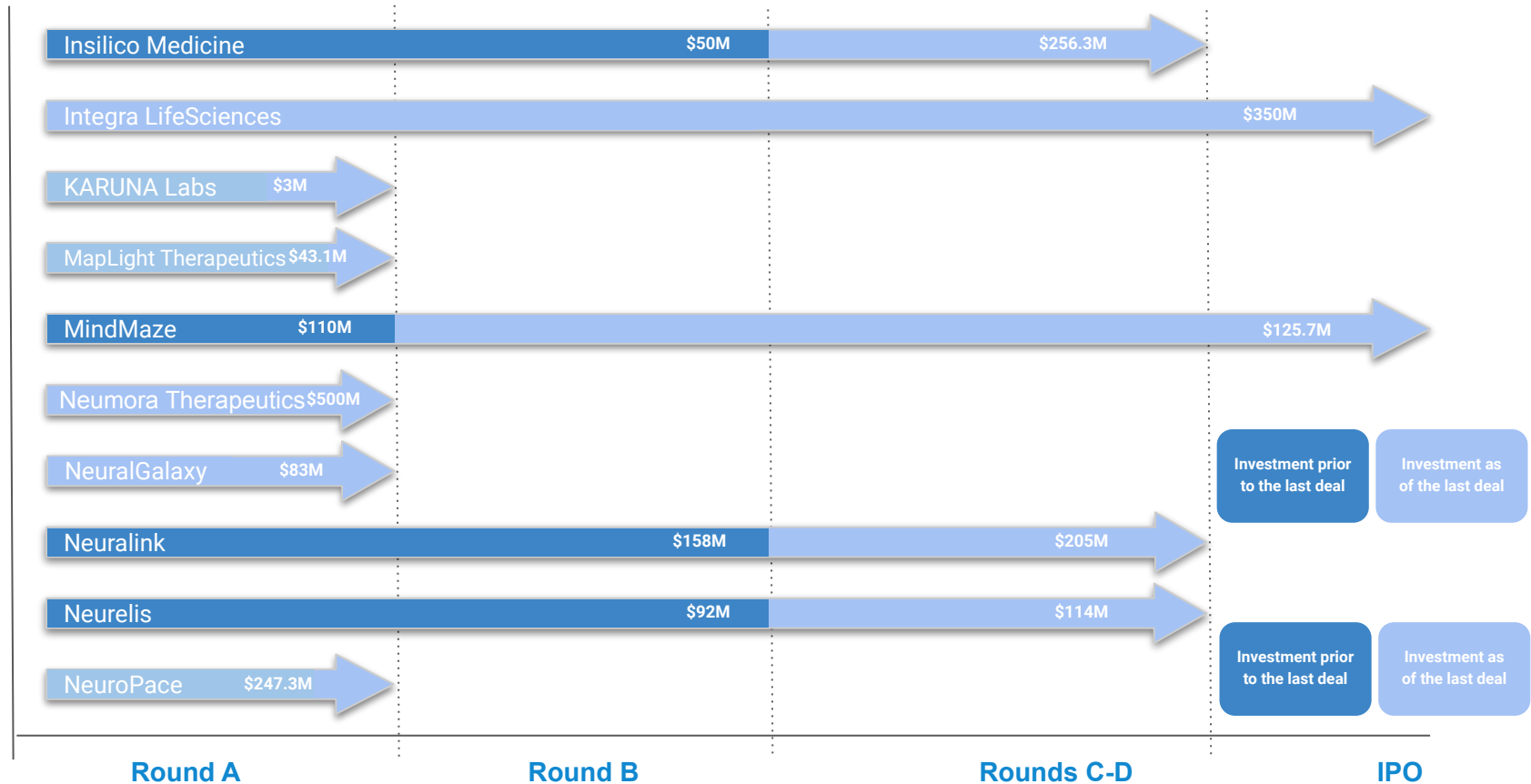




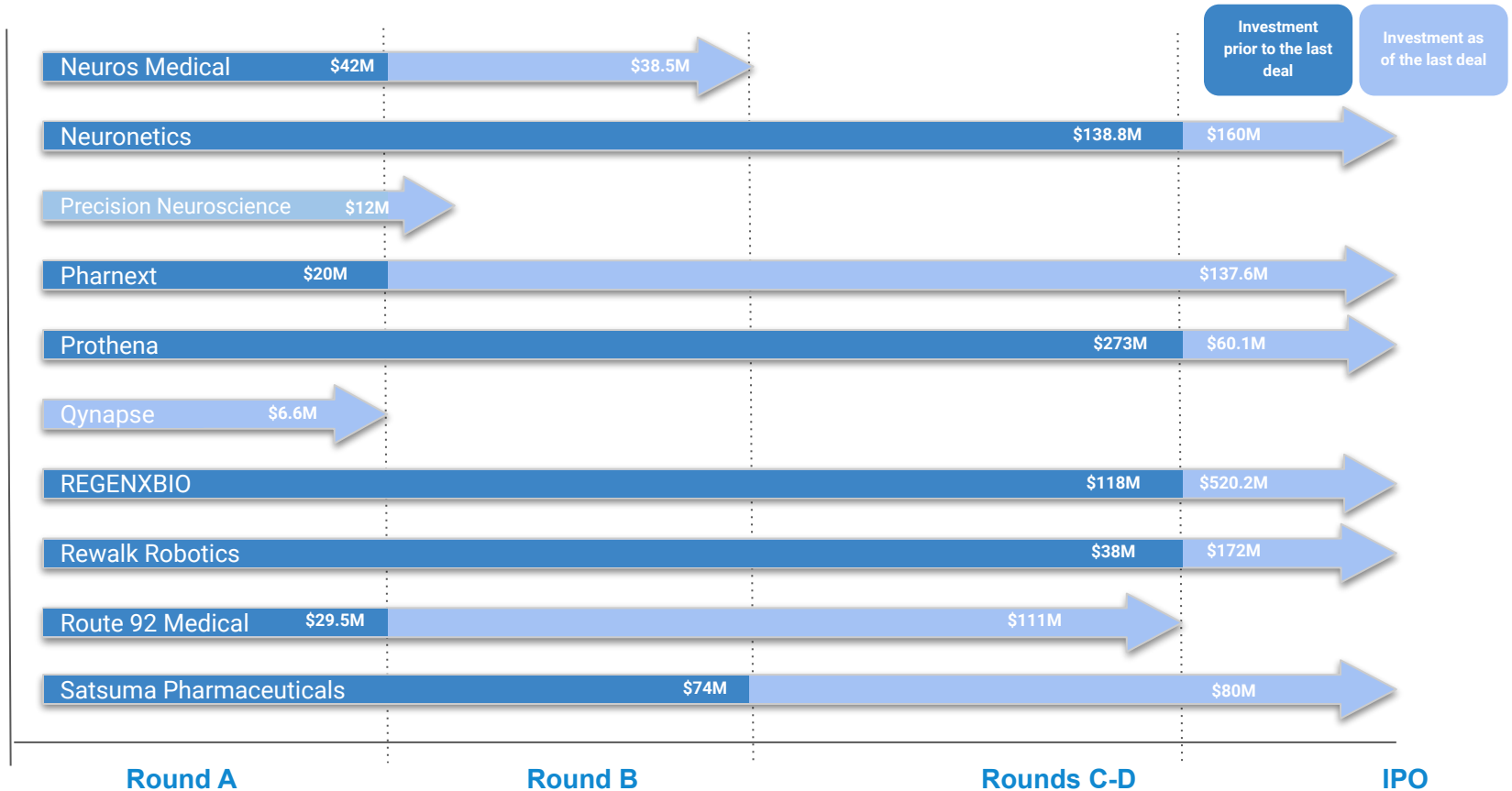
# TOP COMPANIES BY INVESTMENT AND INVESTMENT STAGE



# TOP COMPANIES BY INVESTMENT AND INVESTMENT STAGE



# TOP COMPANIES BY INVESTMENT AND INVESTMENT STAGE



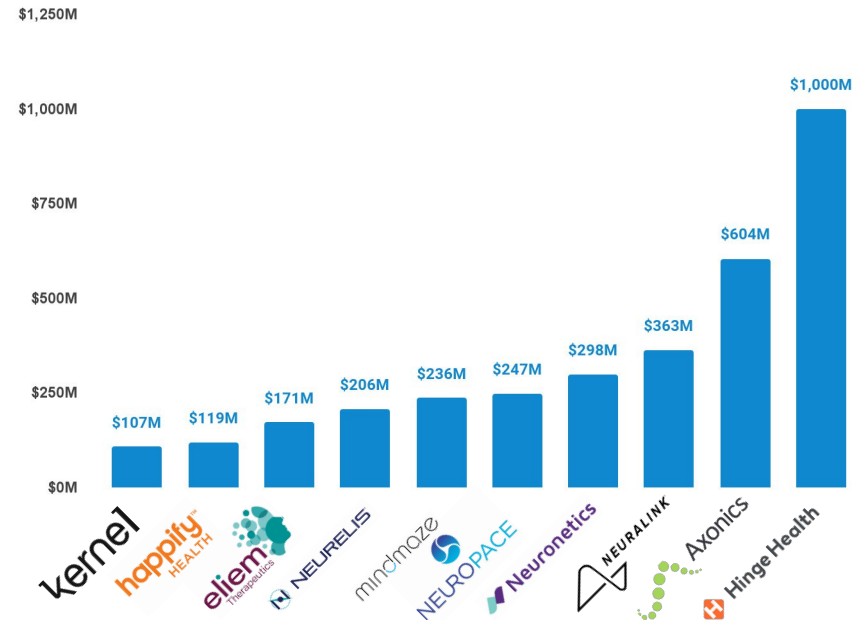
# TOP INVESTMENT DEALS IN Q4 2021

Some of the major deals included:

- **Hinge Health** — \$1B has the most advanced technology for electrical nerve stimulation with less pain and opioids (Series E round);
- **Axonics Modulation Technologies** — \$604.4M develops novel implantable neuromodulation (Post-IPO Equity);
- **Neuralink** — \$363M develops a brain machine interface that provides solutions of enabling people with paralysis (Series C Round);
- **Neuronetics** — \$298.4M is non-invasive therapies for psychiatric and neurological disorders (Post-IPO Equity);
- **NeuroPace** — \$247.3M develops and markets implantable devices for the treatment of neurological disorders (Grant);
- **MindMaze** — \$235.7M is a digital neurotherapeutic platform that provides digital treat and rehab patients (Venture Round);
- **Neurelis** — \$206.1M earmarked to commercialize its lead orphan drug product, VALTOCO® (diazepam nasal spray) for those with as episodes of frequent seizure activity (Series D round);
- **Eliem Therapeutics** — \$171.3M develops novel therapies for neuronal excitability disorders in chronic pain and epilepsy (Series B round);
- **Happify** — \$118.7M to advance and expand Digital Health Platform (Series D Round);
- **Kernel** — \$107.0M specializes in developing brain-recording technologies (Series C Round).

During the Q4 2021, new announced investments into the NeuroTech companies globally had reached the \$3.4 billion mark.

## Top 10 Investment Deals



# NEUROTECH INDUSTRY FRAMEWORK

## Stakeholder Groups

Scientists & Health Care Professionals

Patients / Consumers

Investors and Founders

Civil Society and Army

Entrepreneurs / Manufacturers

Regulators

## Types of Use

Diagnosis

Rehabilitation

Therapy

Improvement

Surgery

Training & Learning

## Markets

Healthcare

Education

Wellness

Lifestyle Computing

Sport

Military

## Opportunities & Concerns

Enhancement vs. therapy

Safety

Cognitive Liberty

Hype & False Claims

Human Identity

Distributive Justice & Access

# 50 LEADING COMPANIES IN NEUROTECH SECTOR

1	AC Immune
2	Acorda Therapeutics
3	Akili Interactive Labs
4	Aleva Neurotherapeutics
5	Aspect Imaging
6	Axonics Modulation Technologies
7	BlackThorn Therapeutics
8	Cala Health
9	Cerevel Therapeutics
10	Ceribell
11	Cognition Therapeutics
12	Conformal Medical
13	Cortexyme

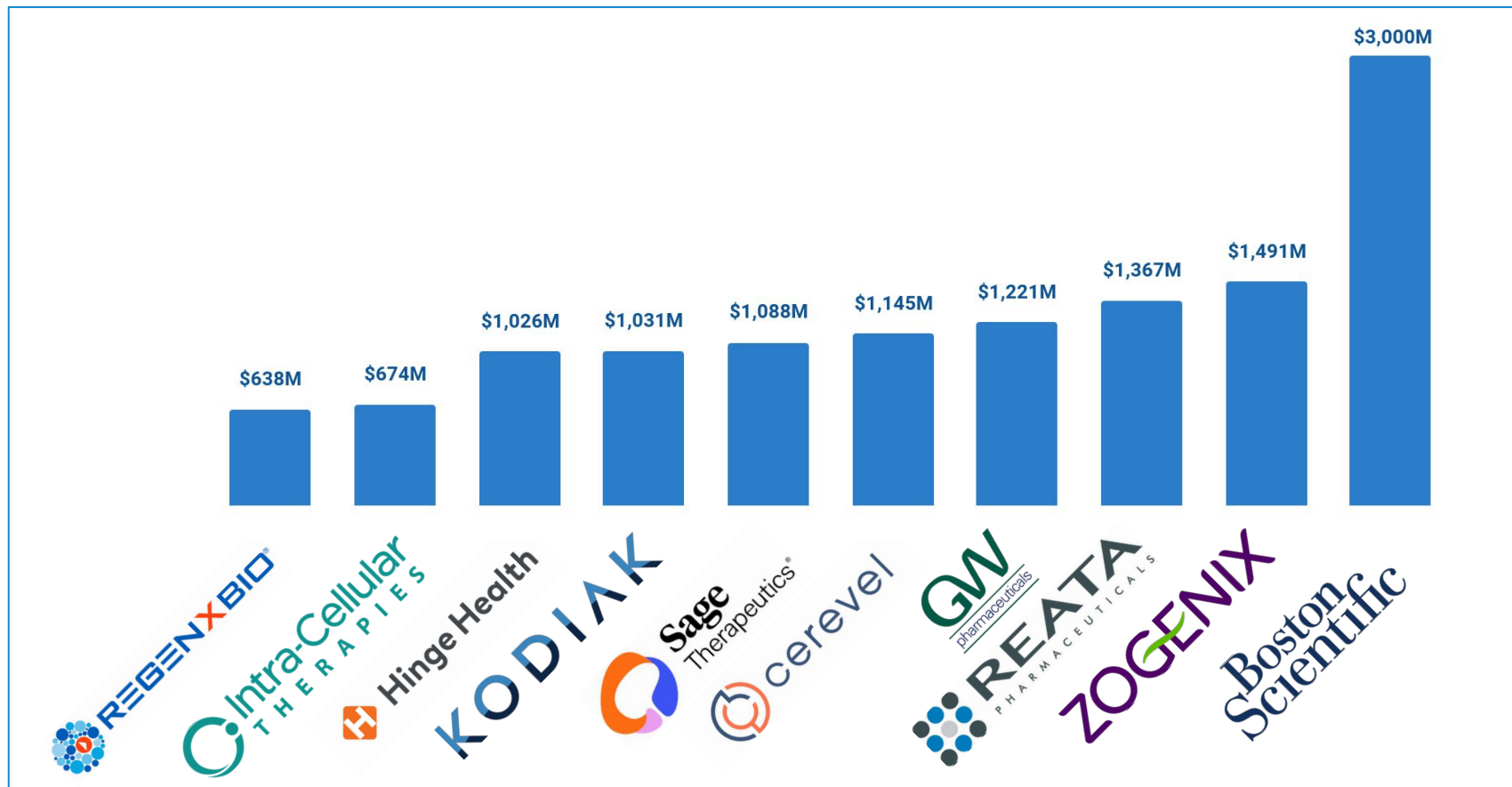
14	CTRL-labs
15	Denali Therapeutics
16	Dreem
17	electroCore
18	eNeura Therapeutics
19	ESCAPE Bio
20	InSightec
21	Inspire Medical Systems
22	Itamar Medical
23	Kernel
24	Lumos Labs
25	Mainstay Medical

# 50 LEADING COMPANIES IN NEUROTECH SECTOR

26	Medtronic
27	MindMaze
28	Mindstrong
29	Neuralink
30	NeurogesX
31	Neuronetics
32	NeuroPace
33	Neuros Medical
34	Nevro
35	Nexstim
36	NICO
37	Nyxoah
38	Prevail Therapeutics

39	Prothena
40	Relieva Medsystems
41	ReNeuron Group
42	SAGE Therapeutics
43	Saluda Medical
44	Sosei Group
45	Spinal Modulation
46	Stimwave Technologies
47	TauRx Pharmaceuticals
48	Viz
49	Watermark Medical
50	Zhimeng Biopharma

# TOP 10 NEUROTECH COMPANIES BY TOTAL INVESTMENTS IN 2021

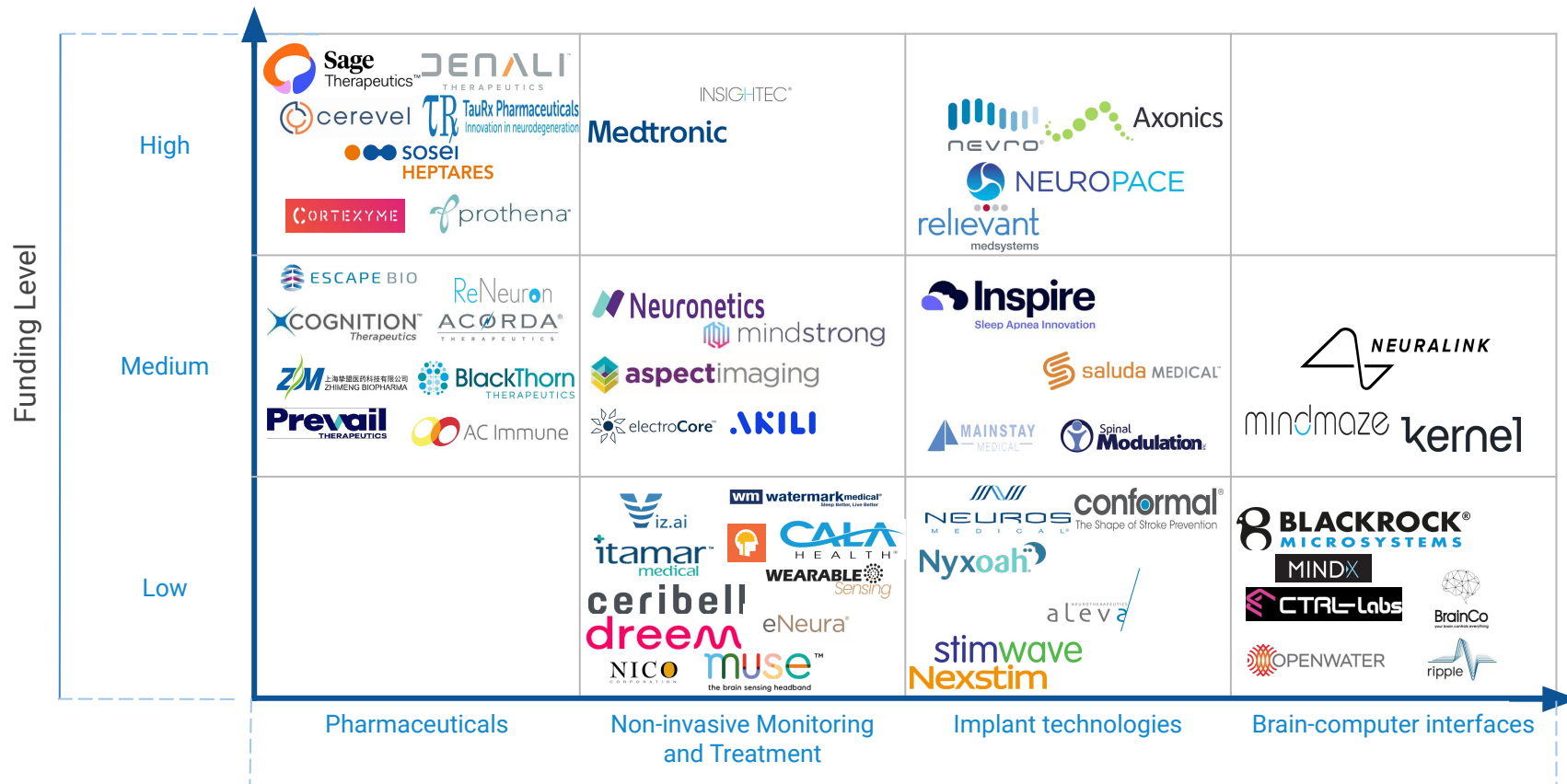




# NEUROTECH LANDSCAPE OVERVIEW 2021 COMPANY BENCHMARKING

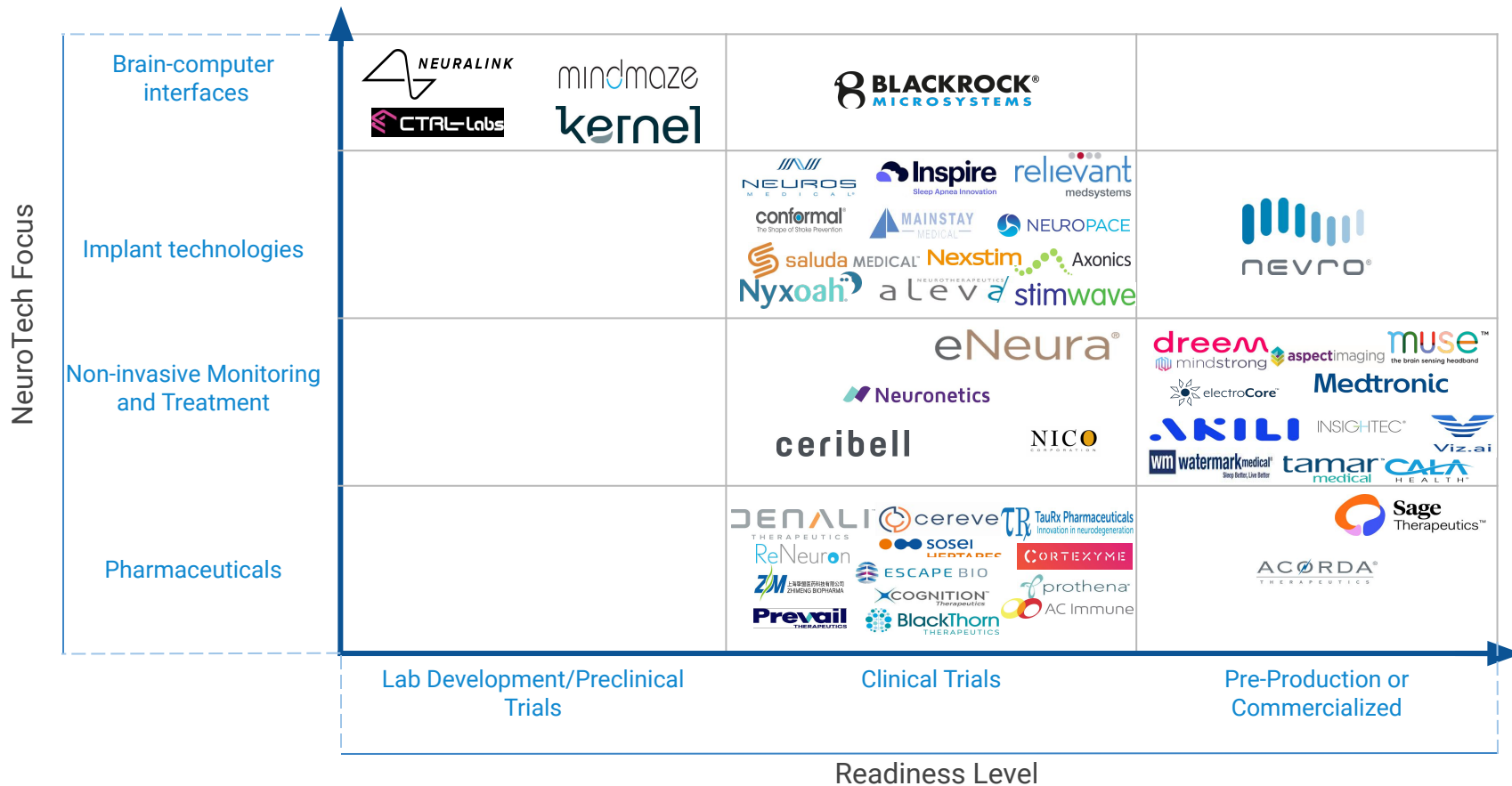


# COMPARISON OF TOP NEUROTECH COMPANIES

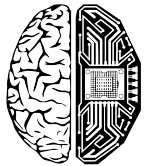


NeuroTech Focus

# COMPARISON OF TOP NEUROTECH COMPANIES

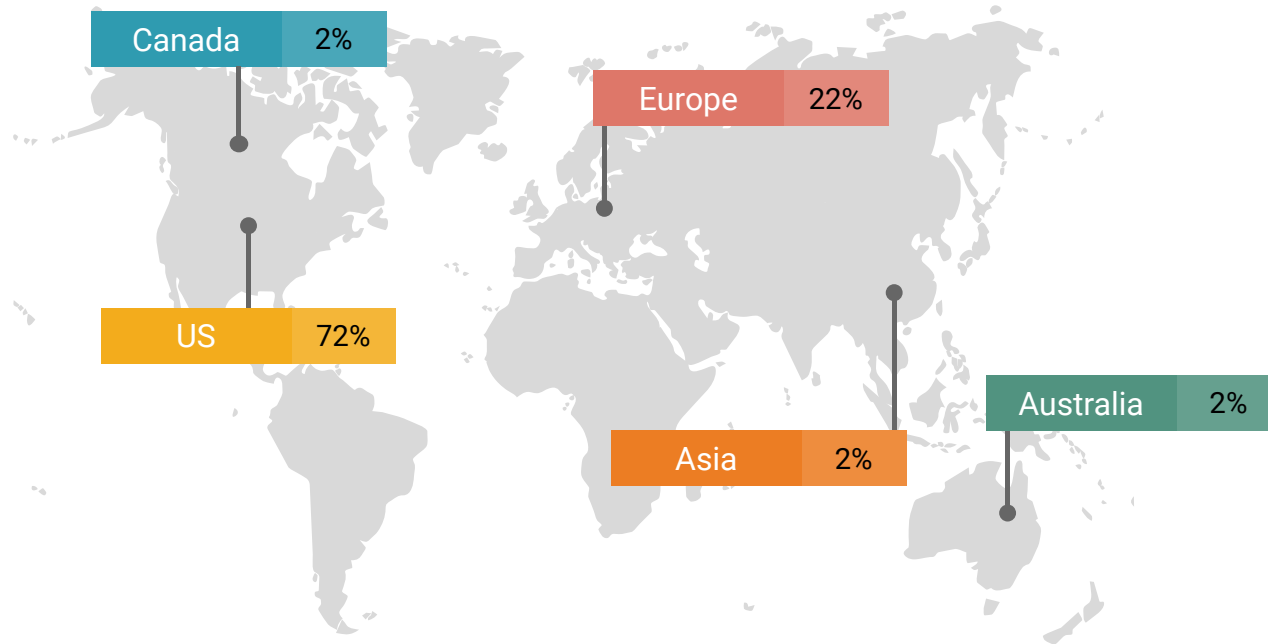


# 30 Leading Investors in NeuroTech Sector













**InvestTech  
Advanced  
Solutions**

# TOP 30 INVESTORS: REGIONAL PROPORTION













The highest investor activity is in the **US** with **72%** of Top 30 investors. This is due to the availability of huge capital and the large number of companies emerging out of the US NeuroTech ecosystem. About a quarter of top investors are from **European** region. **Asia, Canada and Australia** have got very few investor activity accounting for only **6%** of Top 30 investors, which can be related to the comparatively low amount of policies stimulating the allocations in this area. The pattern of investor activity in Asia, Australia and Canada calls for much needed fund flow in these regions.











# TOP 30 NEUROTECH INVESTORS (1/3)

INVESTORS	INVESTMENTS OVERALL	NEUROTECH COMPANIES	INVESTMENTS OVERALL
<b>EASME</b> 	<b>18</b>	<b>16</b>	NeuroPsyCAD, QMENTA, Aura Innovative Robotics, Bitbrain, NeuroPrex, Kinetic, Starlab, Neurosteer, Emotra AB, Afferent Technologies, BalanSeat, SensArs, G.Tec Medical Engineering, Mediagnost, Neuro Device Group, Cogisen
<b>SOSV</b> 	<b>18</b>	<b>8</b>	QV Bioelectronics, Eno, Axem Neurotechnology, Koniku, Convalesce, Nuro, Neurocreate, Truust Neuroimaging
<b>Venture Kick</b> 	<b>17</b>	<b>10</b>	Neurosoft Bioelectronics, SensArs, Neurobotx, Mindmaze, Amal Therapeutics, IDUN Technologies, Aleva Neurotherapeutics, Ability Rehab Solutions, Limbic Life
<b>NEA</b> 	<b>13</b>	<b>6</b>	Wispr AI, SetPoint Medical, Satori Pharmaceuticals, Transcept Pharmaceuticals, NeuroPace, MedSpecialists
<b>Y Combinator</b> 	<b>9</b>	<b>7</b>	Voicery, MindPortal, CloudMedx, Nectome, Verge Genomics, UroDev Medical, BrainKey
<b>Khosla Ventures</b> 	<b>9</b>	<b>4</b>	StimScience, Pymetrics, Kernel, Thync
<b>Creative Destruction Lab (CDL)</b> 	<b>8</b>	<b>8</b>	Neurolytic Healthcare, QV Bioelectronics, Neurocreate, AgenT, Navega Therapeutics, BrainFx, Axem Neurotechnology, Winterlight Labs
<b>MassChallenge</b> 	<b>8</b>	<b>8</b>	Actipulse Neuroscience, NeuroApplied, Neurosoft Bioelectronics, Healium dba Storyup Studios, Myndlift, Pymetrics, BrainCo, Neuroscouting
<b>Kleiner Perkins</b> 	<b>7</b>	<b>3</b>	MindPortal, Spinal Modulation, NeuroPace
<b>HTGF</b> 	<b>7</b>	<b>2</b>	Amal Therapeutics, EBS Technologies

# TOP 30 NEUROTECH INVESTORS (2/3)

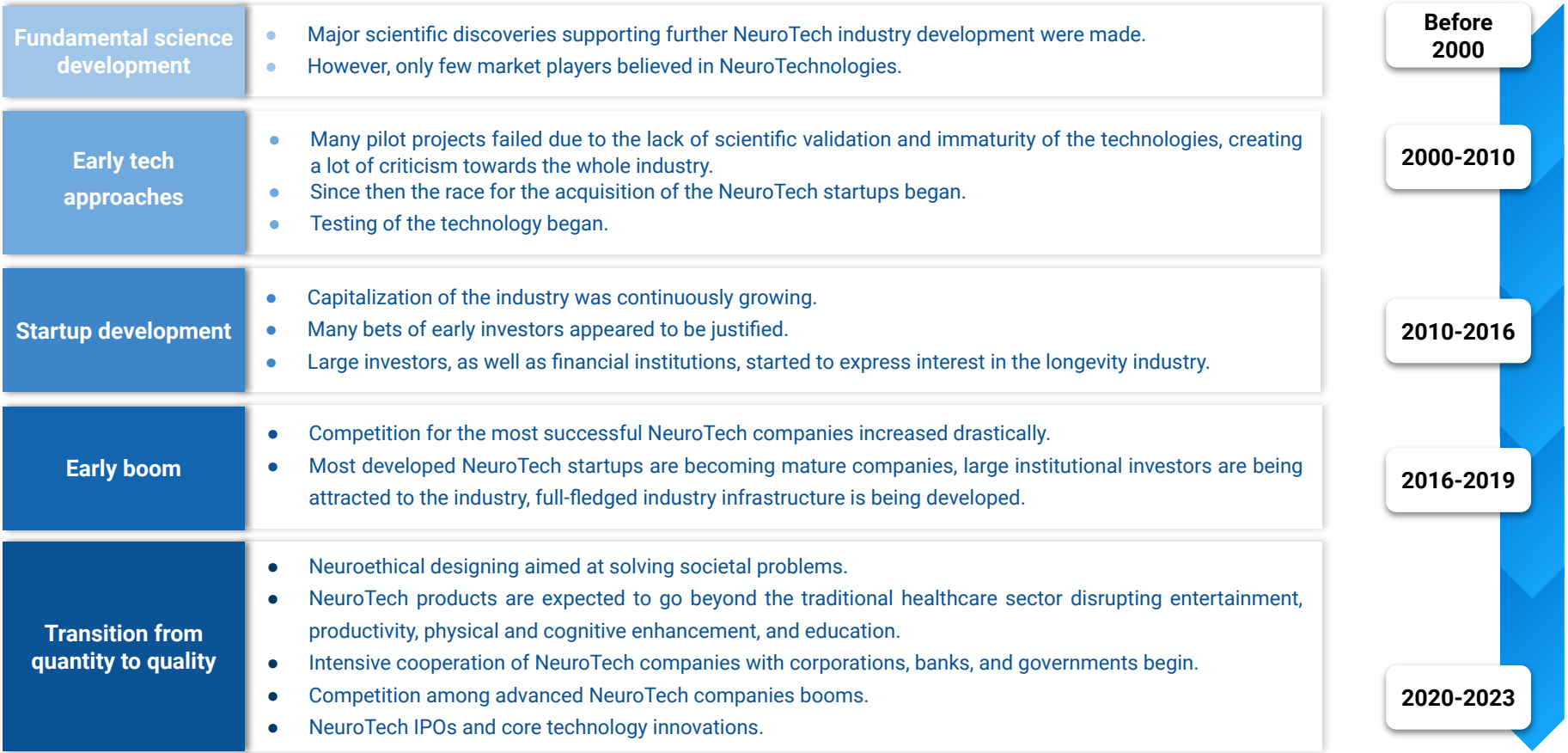
INVESTORS	INVESTMENTS OVERALL	NEUROTECH COMPANIES	INVESTMENTS OVERALL
Sand Hill Angels 	6	2	Tivic Health, Koniku
Bpifrance 	5	5	Pixyl, Coave Therapeutics, Dreem, Open Mind Neurotechnologies, Conscious Labs
Norwest 	5	2	Lumos Labs, Center'd
GV 	5	3	Neuralink, Cala Health, CTRL-labs
Techstars 	4	3	Branching Minds, NeuroApplied, Avalon AI
500 Startups 	4	4	Earable Inc, Myndlift, Memoir Health, Prospect Bio
Index Ventures 	4	2	Minerva Neuroscience, Mind-NRG
Threshold 	4	3	Verge Genomics, NeuroVigil, Spinal Modulatio
Insight Partners 	4	2	Central Reach, Harver
Venrock 	3	3	Athena Neurosciences, Biohaven Pharmaceutical, Memory Pharmaceuticals

# TOP 30 NEUROTECH INVESTORS (3/3)

INVESTORS		INVESTMENTS OVERALL	NEUROTECH COMPANIES	INVESTMENTS OVERALL
Silicon Valley Bank		3	3	Akili Interactive Labs, AdHawk Microsystems, Minerva Neuroscience
Founders Fund		3	3	Neuralink, Earable Inc, CTRL-labs
Wayra		3	2	Ingen.io, Sincrolab
First Round Capital		2	2	NeuroVigil, PeerPong
Start-Up Chile		2	2	Actipulse Neuroscience, Sigmind
Greylock		2	1	ClearForest
Intel Capital		2	1	AdHawk Microsystems
Menlo Ventures		2	1	Lumos Labs
Andreessen Horowitz		1	1	Halo Neuroscience
Canaan Partners		1	1	Adlyfe



# NEUROTECH INDUSTRY MARKET TIMELINE



# CONCLUSIONS

---

## I. Why NeuroTech has not boomed in mass market yet

Despite the fact that impressively much has been accomplished in neuroscience over the last several years (including a recent presentation by Neuralink), neurotech companies have been struggling to enter the mass market due to a general lack of awareness of the products or expensive R&D costs. Moreover, markets have been slow to accept the new technology and many neurotech startups are only now making their products available for customers and making modest revenue. Additionally, innovative NeuroTech approaches have many FDA approval-related risks.

## II. COVID-19 impact

A wider audience became hooked to neurotech during the pandemic. The COVID-19 pandemic brought additional attention to mental health and neuro-related diseases. The pandemic highlighted such challenges, allowing various startups to grow and address them. Thus, once more COVID-19 became an accelerator for the industry to show wider audience the importance of its products and research.

## III. Investors are changing the approach to funding the neurotech companies

Citing the number of deals and the volume of investment, venture capital funds have preferred biotech approaches over medical devices. The degree of invasiveness of a therapeutic treatment is one of the crucial factors making investors be wary to innovative approaches. However, early-stage investors, whose allocations are associated with high investment risks, consider neurotech products, notably medical devices, to be less invasive than some of the new cell therapies coming down the road. Moreover, some of them believe that cell-based therapies for neurological diseases and disorders are not effective for now, and as a result, there's a "significant opportunity" for neurological companies to grow in the next few years.

## IV. The NeuroTech Industry is expected to see the new approvals from regulatory bodies

The industry has witnessed some approvals in 2021. For example, in November FDA granted approval to Blackrock Neurotech's brain-computer interface (BCI). This device can include improved mobility and independence that leads to returning to work, participating in leisure activities and communicating more effectively and quickly. One more example dated July, 2021, is Quicktome's brain-mapping platform allowing neurosurgeons to visualise and understand a patient's brain networks prior to performing life-changing brain surgery.

# CONCLUSIONS

---

## V. Emerging diversifications

NeuroTech industry is experiencing a “quantity to quality” transition. On this journey, many approaches are being studied and evaluated, which leads to the emergence of many new approaches and diversification of investments. This trend is also a reason why the number of mega rounds in NeuroTech industry is lower, comparing to the BioTech or Pharma markets.

## VI. Risks, Ethics and Regulation

The concepts of ethical innovations and neurorights took a centrestage in Q4 as Chile became the first country to enshrine neurorights in its constitution and is now finalising legislation to regulate technologies that record or alter brain activity. Chile’s decision in October has gathered much attention from all kinds of stakeholders in the neurotech world as this law could form the basis for future regulations and lawmaking in this space.

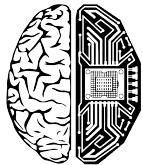
## VII. Path to commercialisation

The number of Neurotech devices on the verge of commercialisation are increasing with positive push from the regulatory bodies. Peter Thiel backed Blackrock Neurotech received breakthrough device designation from FDA in November for its MoveAgain Brain Computer Interface System. The device is expected to help immobile patients to control devices through neuronal activity. Blackrock will be competing against Synchron to become the first to receive approval for an implanted brain-computer interface. Synchron began clinical trials in July of its Stentrode device, which is inserted in the jugular vein to gather neurological signals that are then used to control a computer mouse and keyboard.

## VIII. The Neurotech industry will go way up

Neurotech field is witnessing accelerated growth at all levels as evidenced by 3 recent IPOs, startup fundings, investor activity, and positive approach from regulatory bodies.

# NeuroTech Publicly Traded Companies

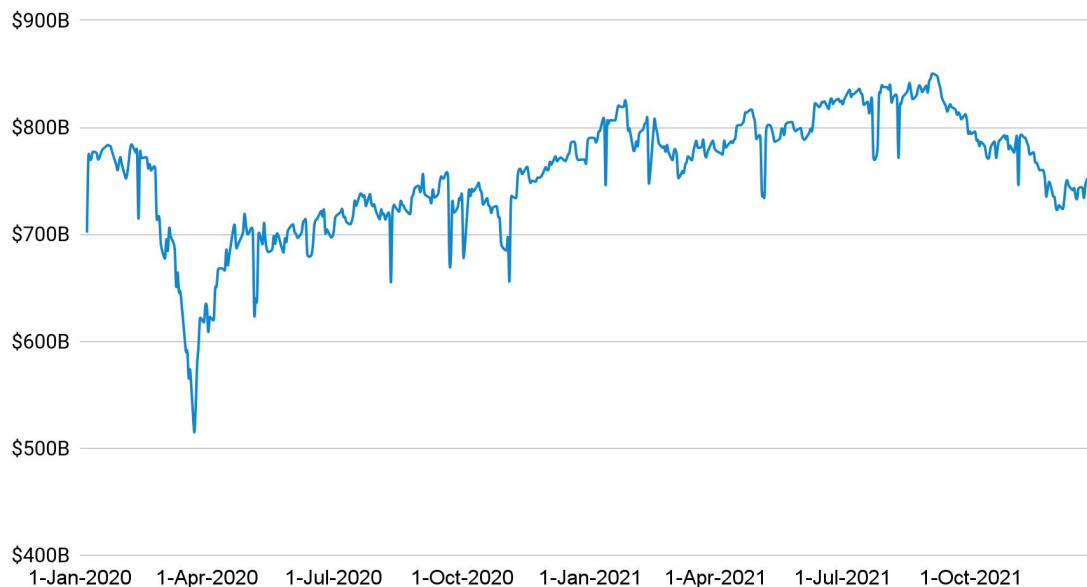


**InvestTech  
Advanced  
Solutions**



# NEUROTECH PUBLICLY TRADED COMPANIES

## Cumulative Capitalization Dynamics, 2020 - 2021



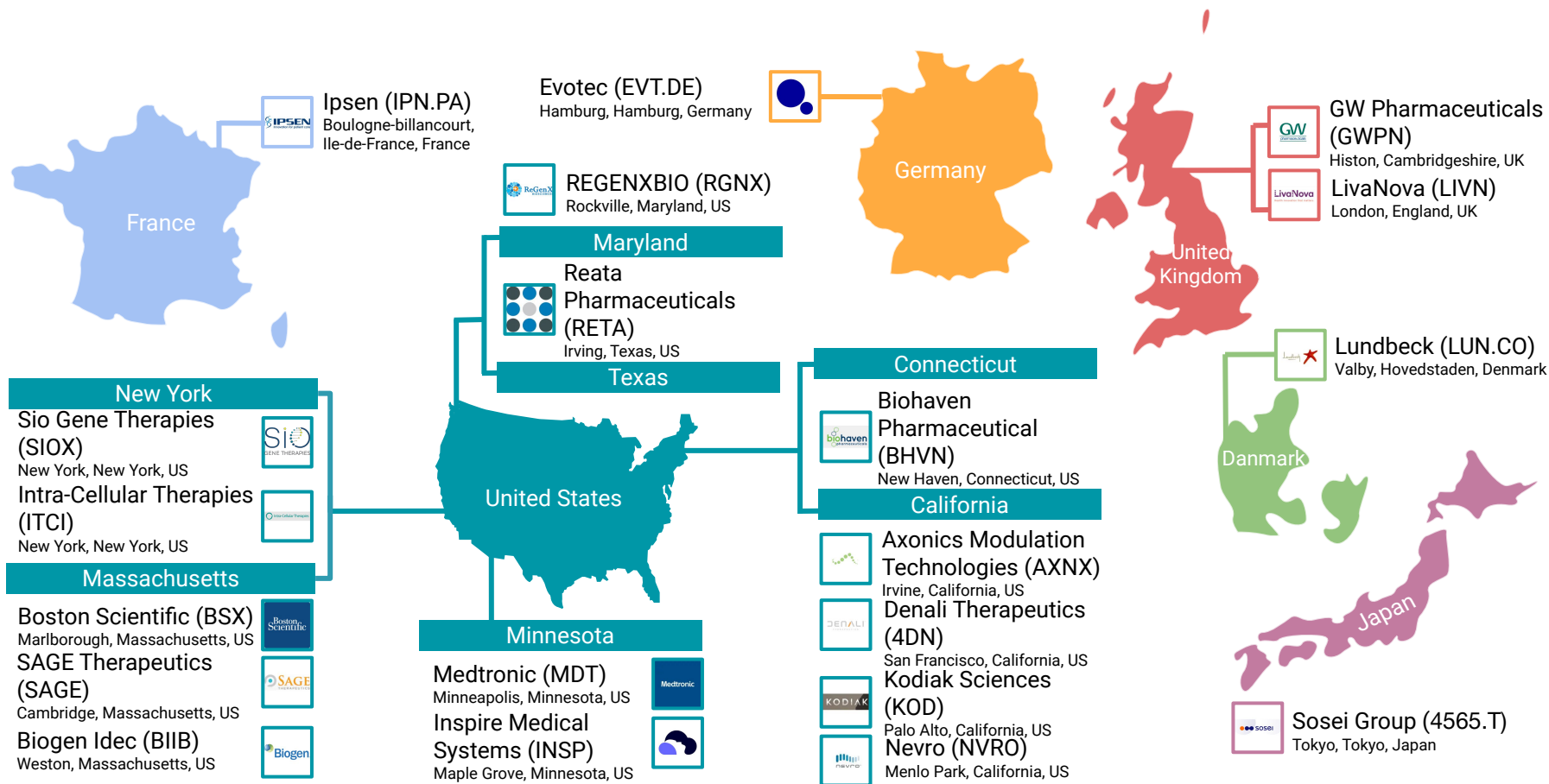
The coronavirus pandemic had a striking effect on the NeuroTech publicly-traded companies and caused the industry's decline by 25%. Despite that, NeuroTech firms have recovered by the end of 2021. The majority of the market is represented by old mature healthcare companies which own different divisions, with neuroscience as one of them.

The biggest companies by market capitalization are Medtronic, Boston Scientific, Lundbeck, Biogen, Denali, TerrAscend.

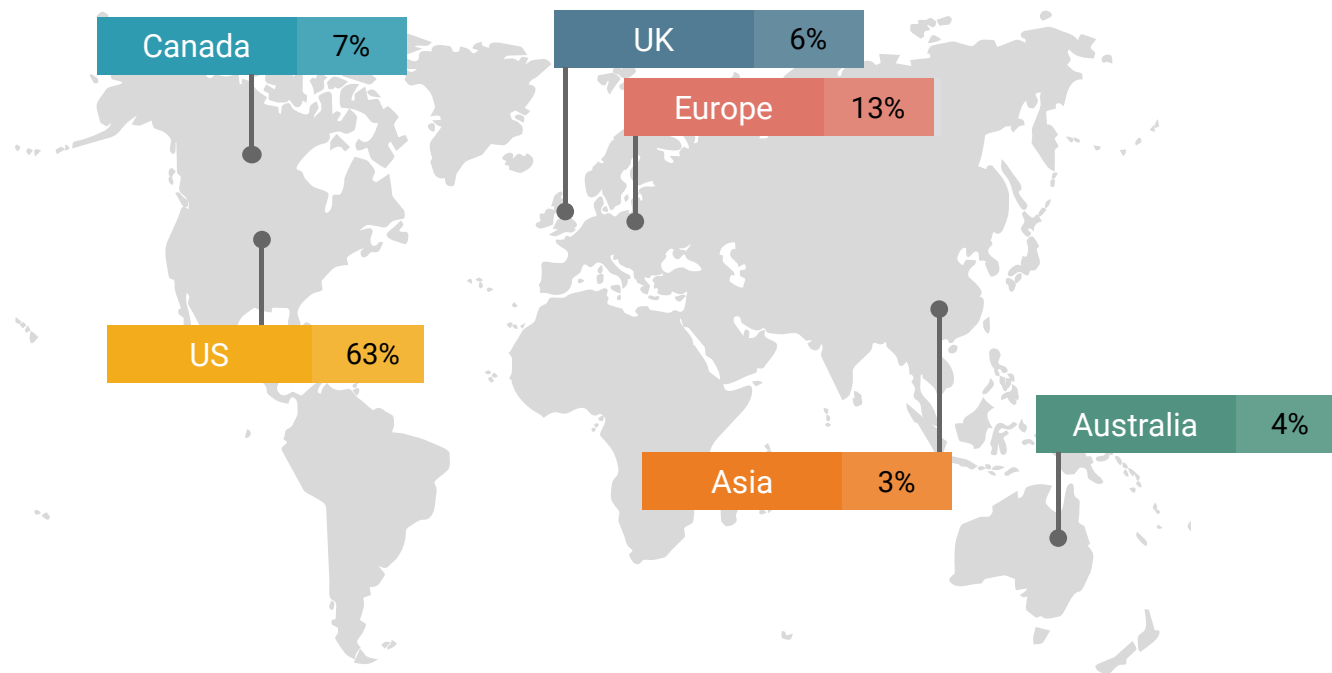
Despite the dominance of the mature players, 11 young companies closed IPO successfully in 2021: **Better Therapeutics, Onward, Eliem Therapeutics, Immuneering, Acticor Biotech, Alzamend Neuro, Virpax Pharmaceuticals, NeuroPace, Cognition Therapeutics, NeuroSense Therapeutics, Nyxoah.**

Technologically, publicly-traded NeuroTech companies are similar to other companies in the sector (which secured series B or C funding rounds), which means that their market capitalization growth can be an approximation of the dynamics of the whole sector.

# TOP 20 NEUROTECH PUBLICLY TRADED COMPANIES



# 90 PUBLIC COMPANIES: REGIONAL PROPORTION



The distribution of public companies is almost equal to general distribution of NeuroTech companies. Most of the companies located in North America or Europe and the most popular stock exchange is NASDAQ. Nevertheless, there is an increasing visible trend for NeuroTech companies in Asia. In terms of total equity funding, among the biggest Asian NeuroTech companies are Sosei Group (\$66M) and SanBio (\$28M).

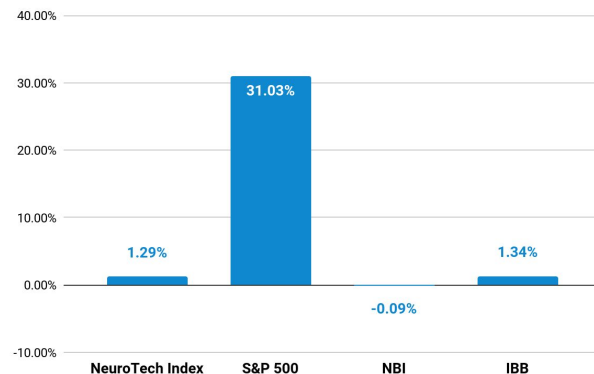
# NEUROTECH MARKET CAPITALIZATION

The composite of 90 NeuroTech-focused public companies was compared to the key market Indices. As of the end of 2021 their market performance reflects the dynamics of key indices (iShares Biotechnology ETF (IBB) and NASDAQ Biotechnology Index (NBI). The comparison with these benchmarks is justified by the fact that the prevailing number of selected public companies are engaged in Pharma and /or BioTech activities with NeuroTech directions being among them.

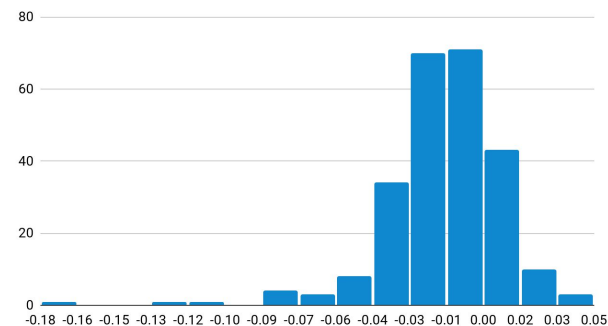
Taking into account the disruptive nature of NeuroTech products and services, and possible risks associated with them, the overall performance of NeuroTech companies demonstrate solid results in 2021.

Index	Correlation with Indices	Average daily return in 2021	Average daily volatility in 2021	Skewness	Kurtosis
<b>NeuroTech Index</b>	-	-1.24%	2.57%	-1.924	9.047
<b>IBB</b>	-11.49%	0.01%	1.38%	-0.124	0.126
<b>S&amp;P500</b>	2.54%	0.11%	0.82%	-0.342	0.689
<b>NBI</b>	45.24%	0.01%	1.39%	-0.080	0.090

## Market Capitalization Growth During 2021

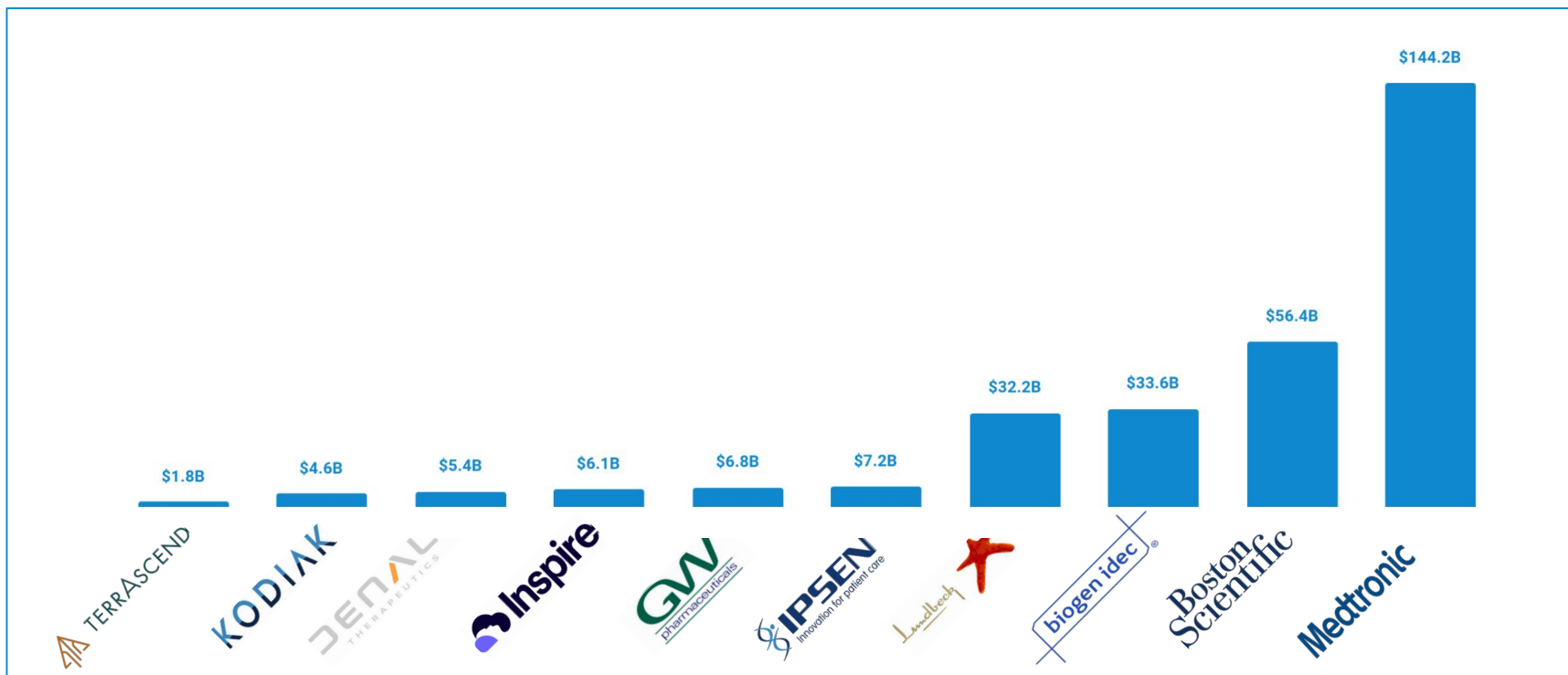


## NeuroTech Stock Returns in 2021 Histogram





# TOP 10 PUBLIC COMPANIES BY MARKET CAPITALIZATION IN 2021

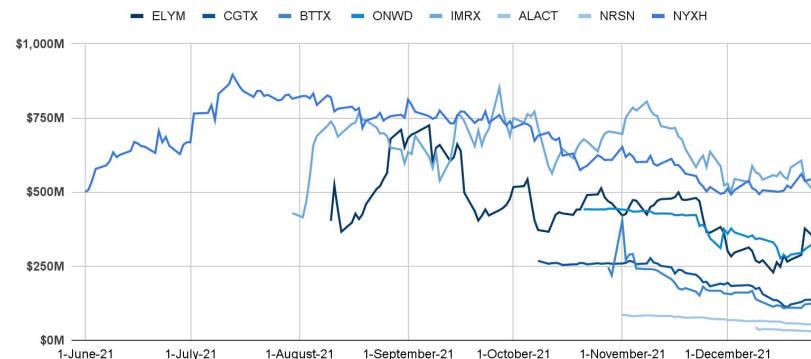


The chart represents Top 10 public companies operating in the NeuroTech sector. Most of the companies belong to the healthcare industry with departments or subsidiaries which specialized in NeuroTechnologies. Most of the top-tier companies have large experience in transforming a medical system and innovating new medical solutions. Most of the companies develop innovative pharmaceuticals for people suffering from CNS disorders. However, there are gene therapy providers as well as suppliers of implants.

# NEUROTECH IPOs IN Q3-Q4 2021

Despite the COVID-19 crisis, all new public companies announced successful closing of the IPO. Their stocks present high volatility with little growth by the end of the year, although net income of all corporations remains negative. All IPOs took place in the USA and 4 were made in the second half of 2021. New Neurotech public companies' overall dynamics are similar to ones of BioTech and Pharma industries when these companies rarely show significant financial results, especially profitability in the first year of trading.

## Capitalization Change in 2021



Company	Ticker	Country	Funding Amount, \$M	Investments in 2021, \$M	Number of Investors	IPO Date	Capitalization \$M	Current Ratio	Enterprise Value, \$M	Net income TTM, \$M
Eliem Therapeutics	ELYM	USA	171	80	6	10.08.2021	471	28.38	115	-57
Cognition Therapeutics	CGTX	USA	157	45	17	08.10.2021	256	2.27	185	-11
Better Therapeutics	BTTX	USA	148	113	5	29.10.2021	187	1.14	157	-32
Onward	ONWD	Netherlands	73	100	11	21.10.2021	441	9.15	103	-23
Immuneering	IMRX	USA	57	112	1	30.07.2021	365	29.11	412	-28
Acticor Biotech	ALACT	France	33	17	11	01.11.2021	NA	3.11	53	-11
NeuroSense Therapeutics	NRSN	Israel	5	12	1	09.12.2021	NA	8.08	42	-5
Nyxoah	NYXH	Belgium	74	85	5	02.07.2021	748	6.68	418	-20

# ELIEM THERAPEUTICS

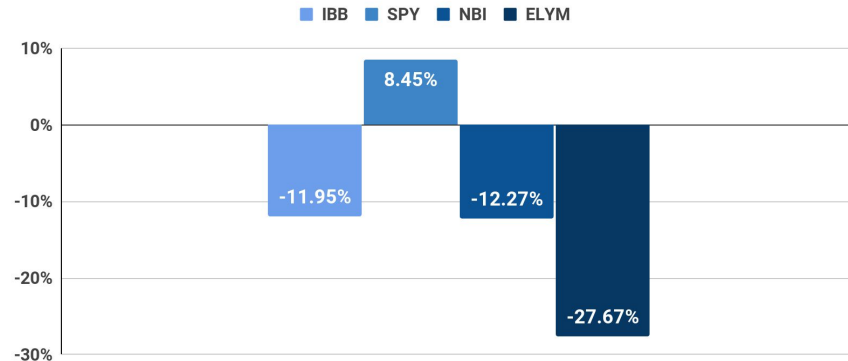


The two lead drug candidates ETX-810 and ETX-155 have clinically validated mechanisms of action for neurological diseases and have demonstrated encouraging clinical and preclinical results. ETX-810 is in its Phase II clinical trial where primary completion date is 31 December, 2021 and study completion is estimated by 31 March, 2022.

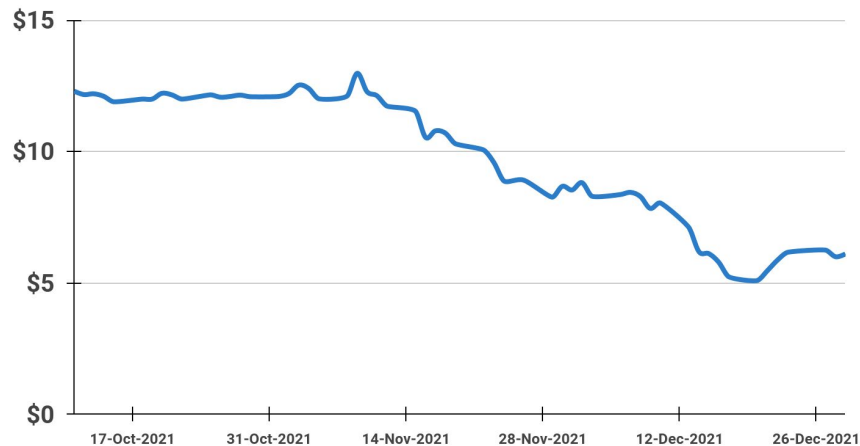
Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (\$M)
ELYM	0.06%	8.92%	-27.67%	300.33

Eliem Therapeutics is a clinical-stage biotechnology company developing medicines for patients with neurologic diseases. The pipeline has two clinical stage compounds in conditions focused on pain and other neurological conditions. The company continues to grow its preclinical pipeline in neurology.

The graph below depicts a comparative performance of the NPCE with 3 ETFs: iShares Biotechnology ETF (IBB), S&P 500 (SPY), NASDAQ Biotechnology (NBI) between 22.04.2021 and 28.12.2021.



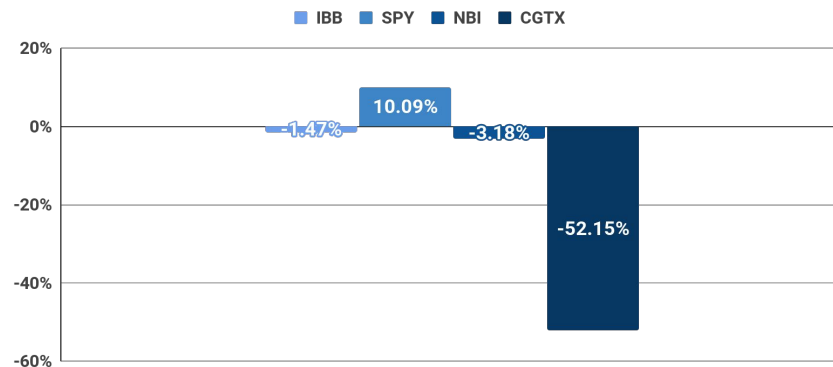
# COGNITION THERAPEUTICS



The development of the proprietary CT1812 has completed three Phase 1 trials and enrollment has concluded in two Phase 2 clinical trials with two additional physiology trials ongoing in patients with Alzheimer’s disease. Cognition has been awarded a \$80M grant from the NIA to study CT1812 in a study of 540 Alzheimer’s disease patients. This study will be conducted in collaboration with the distinguished Alzheimer’s Clinical Trial Consortium (ACTC). With renewed interest in alzheimer’s progression the company is in unique position to advance where it will be holding a virtual panel discussion on research and innovation in neurodegenerative diseases.

Cognition Therapeutics develops new therapeutics to treat patients suffering from Alzheimer’s disease and other neurodegenerative disorders. The company’s candidates work by binding to protein components of the  $\sigma$ -2 (sigma-2) receptor complex, which is present on synapses and acts as a key regulator of cellular damage and stress response.

Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (\$M)
CGTX	-1.22%	4.21%	-52.15%	126.82



# BETTER THERAPEUTICS



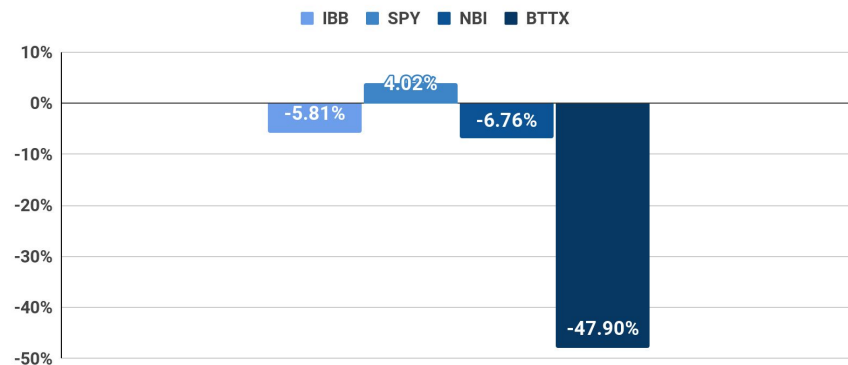
The stock is currently down 48.8% year-to-date, down 48.8% over the past 12 months, and down 48.8% over the past five years. Better Therapeutics stock surged higher after completing its SPAC merger with Mountain Crest Acquisition Corp II.

Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (\$M)
BTTX	-0.13%	7.50%	-47.90%	122.95



Better Therapeutics Inc is a prescription digital therapeutics company developing a novel form of cognitive behavioral therapy to address the root causes of cardiometabolic diseases. The company has developed a proprietary platform for the development of FDA-regulated, software-based solutions for type 2 diabetes, heart disease and other conditions.

The graph below depicts a comparative performance of the BTTX with 3 ETFs: iShares Biotechnology ETF (IBB), S&P 500 (SPY), NASDAQ Biotechnology (NBI) between 01.11.2021 and 28.12.2021.



# IMMUNEERING



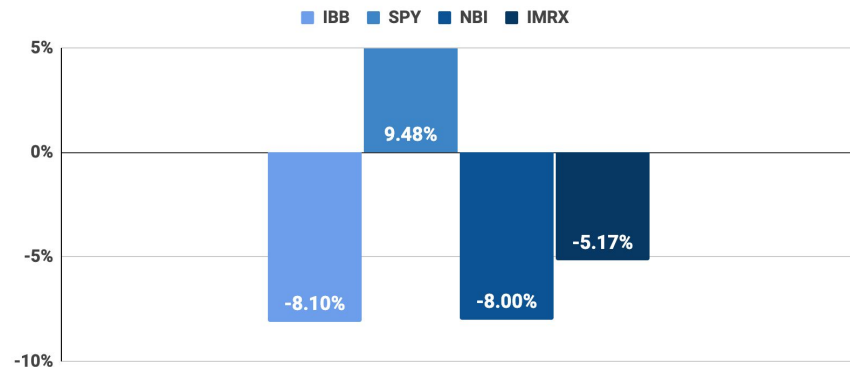
The stock is currently up 16.5% year-to-date, up 16.5% over the past 12 months. In the last twelve months Immuneering insiders were buying shares, but not selling. Over the last year, the biggest insider purchase was made by Co-Founder, Robert Carpenter for \$4.9m worth of shares, at about \$15.00 per share.

Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (\$M)
IMRX	0.18%	6.81%	-5.17%	432.69



Immuneering Corp. engages in the development of new medicines which are unlikely to be found by traditional drug discovery methods. Its pipeline of drug candidates focuses on treating aspects of disease that have eluded conventional approaches, including cancer cachexia and metastasis. The company was founded by Robert J. Carpenter and Benjamin J. Zeskind in 2008 and is headquartered in Cambridge, MA.

The graph below depicts a comparative performance of the IMRX with 3 ETFs: iShares Biotechnology ETF (IBB), S&P 500 (SPY), NASDAQ Biotechnology (NBI) between 30.07.2021 and 28.12.2021.



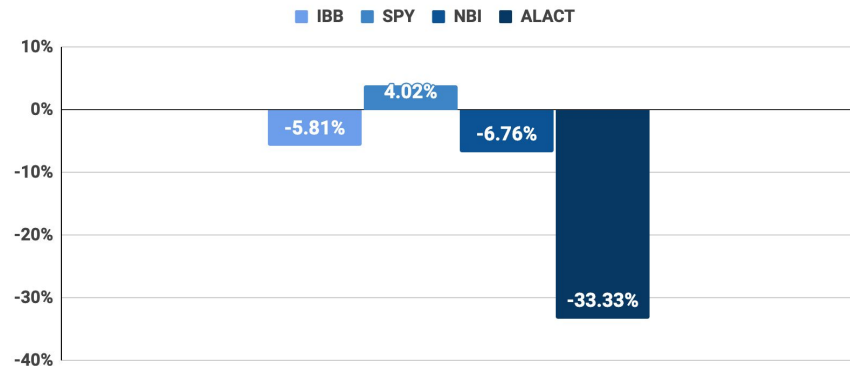


Acticor Biotech SAS engages in the development of an antithrombotic agent for the treatment of the acute thrombotic diseases. It specializes on ischemic stroke. The company was founded on November 26, 2013 and is headquartered in Paris, France.

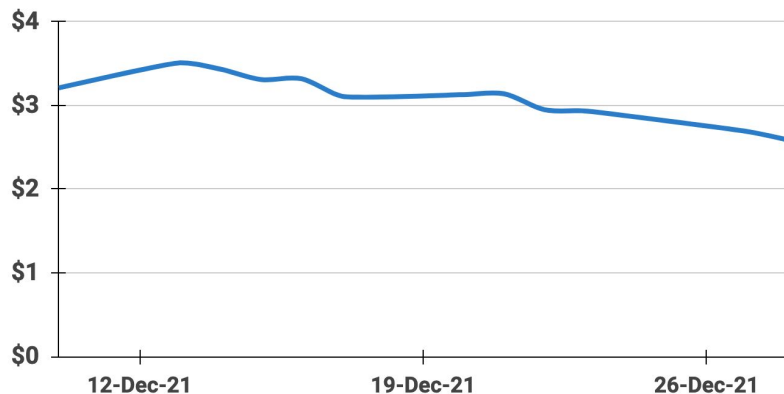
The graph below depicts a comparative performance of the ALACT with 3 ETFs: iShares Biotechnology ETF (IBB), S&P 500 (SPY), NASDAQ Biotechnology (NBI) between 01.11.2021 and 28.12.2021.

There was a modest IPO in November. The French firm Acticor Biotech raised €15.5M when listing on Euronext Growth Paris to fund the development of its antibody drug for stroke. Also the Company announced that FDA has provided clearance for the initiation of a clinical trial in US with glenzocimab, a novel humanized monoclonal antibody fragment, for use in patients with acute ischemic stroke.

Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (\$M)
ALACT	-0.96%	2.22%	-33.33%	15.41



# NEUROSENSE THERAPEUTICS

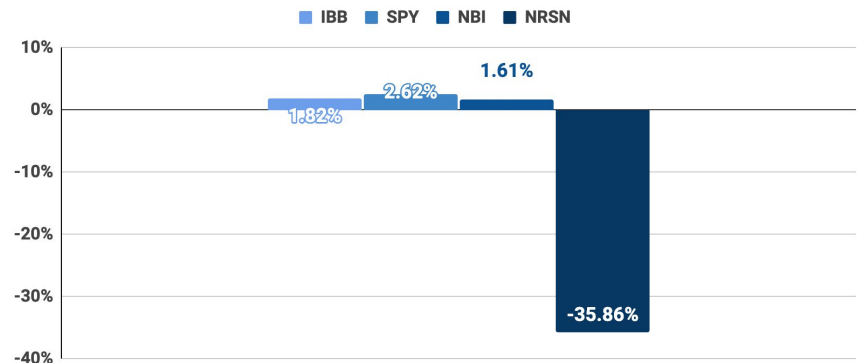


NeuroSense Therapeutics priced its 2M units IPO at \$6/unit for gross proceeds of \$12M in December. Each unit consists of one share with an exercise price of \$6/share. According to Board Chairman of NeuroSense “With this IPO the company enters a new era in its mission to improve the lives of ALS and other patients through the development of new treatment options.”

Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (\$M)
NRSN	-3.38%	7.07%	-35.86%	29.13

NeuroSense Therapeutics is a clinical-stage biotechnology company focused on discovering and developing treatments for patients suffering from debilitating neurodegenerative diseases, these diseases include Amyotrophic Lateral Sclerosis, or ALS, Alzheimer's disease and Parkinson's disease, among others.

The graph below depicts a comparative performance of the NRSN with 3 ETFs: iShares Biotechnology ETF (IBB), S&P 500 (SPY), NASDAQ Biotechnology (NBI) between 09.12.2021 and 28.12.2021.







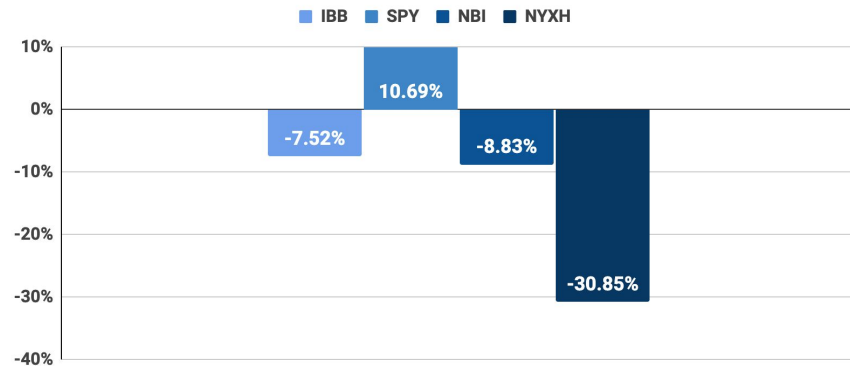
Nyxoah began trading on Euronext Brussels with an initial market capitalisation of €364.21 million in September. Nyxoah successfully raises up to €85 million. The IPO was multiple times oversubscribed and closed ahead of schedule. Nyxoah is the first Belgian participant to Euronext's Techshare programme to carry out an IPO.

Ticker	Mean daily return	Volatility of daily returns	Growth after IPO	Capitalization (\$M)
NYXH	-0.25%	3.67%	-30.85%	475.18

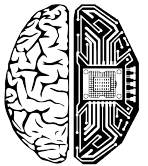


Nyxoah SA engages in the research and development, manufacture and sale of medical devices. It focuses on the development and commercialization of solutions and services to treat sleep disordered breathing conditions. Its lead solution platform is based on the Genio system, a validated, user-centered, neurostimulation therapy for obstructive sleep apnea (OSA).

The graph below depicts a comparative performance of the NRSN with 3 ETFs: iShares Biotechnology ETF (IBB), S&P 500 (SPY), NASDAQ Biotechnology (NBI) between 02.07.2021 and 28.12.2021.



# Key Takeaways



**InvestTech  
Advanced  
Solutions**



# Major Observations for 2021: Key Business Takeaways

1

The investment in NeuroTech is relatively small in comparison with other areas of medicine and biotech, but today there is a tendency to a growing number of neurological disorders, so the development of NeuroTechnologies becomes an important part of our future life. The industry has witnessed an inflow of considerable investment estimated at \$7.1 billion. The overall investments in NeuroTech companies amount to \$34.3 billion. Interest in the NeuroTech industry is steadily growing. Among all sectors in the industry, Neuropharmacology companies tend to have more funding.

2

In the regional proportion, the USA is an absolute leader in the industry. With 54 % share of the total number of companies, the USA is far ahead of Europe, the second-biggest market with 21%. Only 6% belongs to Asian companies, but their NeuroTech sector has been strongly increasing during last years.

3

Despite the small number of companies, China and India are increasing total investments and size of the companies. This can be partially explained by active interest for the governmental bodies. For example, since China has adopted a national strategy of military-civil fusion, this neurotechnology emphasis is also evident on the civilian side through the China Brain Project. The China Brain Project launched in 2016 along with the country's Thirteenth Five-Year Plan that highlighted innovation in brain and brain-inspired research.

4

Despite the fact that impressively much has been accomplished in neuroscience over the last several years (including a recent presentation by Neuralink), only exceptional startups based on novel high-promise applications have been able to enter the mass market due to a general lack of awareness of the products or expensive R&D costs.

5

COVID-19 pandemics had a negative impact on the industry, especially on public companies, in 2020. Despite it, NeuroTech companies had recovered for the end of the year.

# Major Observations for 2021: Key Financial and Investment Takeaways

1

Reaching all-time high in 2020, the NeuroTech industry took a clear hit from COVID-19 pandemic. Still, 2021 showed higher funding than in 2019, scoring more than 7 billion USD of investments.

2

The United States firmly leads in NeuroTech Industry as shown by such quantitative indicators as total amount of investments and number of companies operating in the sector. 115 US-based companies have raised more than \$5.8 billion by 2021.

3

Over **250 NeuroTech companies were funded in 2021**, more than **50 closed large-sum late-stage venture capital rounds (B, C, and D)**. We expect some of them to go public in 2022.

4

2021 was marked by **11 IPOs** in the NeuroTech sector: Better Therapeutics, Onward, Eliem Therapeutics, Immuneering, Acticor Biotech, Alzamend Neuro, Virpax Pharmaceuticals, NeuroPace, Cognition Therapeutics, NeuroSense Therapeutics and Nyxoah.

5

Despite the global funding boom in private investments, public NeuroTech companies received a serious blow at their stock indicators with a 25% loss of capitalization, from which they recovered only at the end of the year.

6

In 2021 among the most successful fundings appeared **Hinge Health** (\$300M), **Neurelis** (\$114M), **Atalanta Therapeutics** (\$110M).

7

TRL levels of NeuroTech products and services will play a crucial role while assessment the risks of investing. The tangible metrics for analysis of disruption level along with assessment the regulatory environment will be essential factors shaping the future investment landscape.

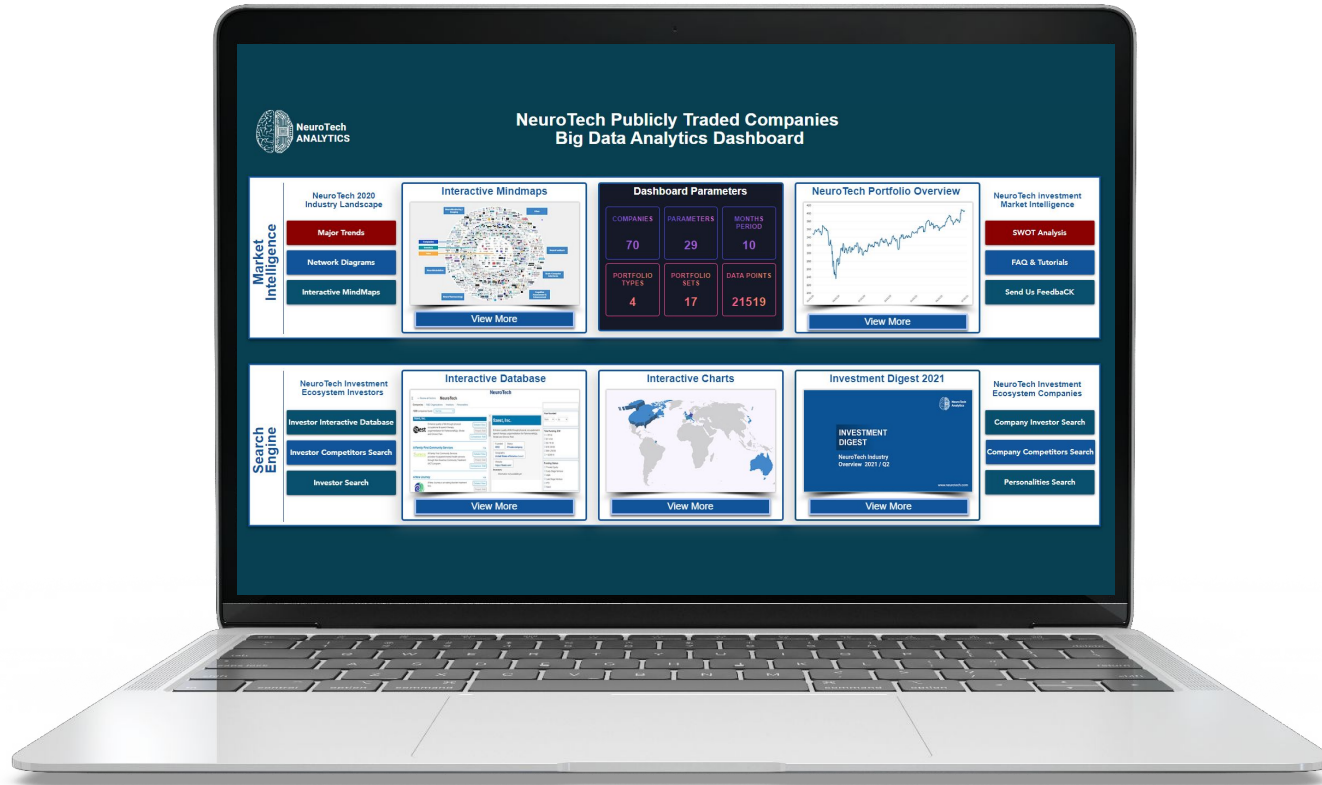
## Key Technology Takeaways

- 1 **The huge leaps in the scientific understanding of the brain and the human genome**, as well as advances in computer technology, have led to the recent acceleration of NeuroTech development and the establishment of a direct channel of communication between the brain and the machine.
- 2 Healthcare and research have long been the only applications of NeuroTechnologies, with the main focus on neurodegenerative diseases, psychiatric disorders, brain tumors and injuries. Today, however, there are **plenty of non-invasive brain-computer interface devices and various forms of brain stimulation**, such as Vagus nerve stimulation, available directly to consumers. This has opened up opportunities for improved health and wellness, entertainment, productivity, physical and cognitive enhancement, and education.
- 3 Advances in high-performance computing, data analysis, and algorithmic approaches allow researchers to attempt to **reconstruct the brain and create its digital copy**. This will enable in silico experiments, improved experimental methods, testing and generating new hypotheses and theories.

## Obstacles That Still Remain

- 1 **Current scientific understanding of how the brain actually works is still limited** which complicates the process of integrating devices within the greater nervous system in effective and reproducible ways.
- 2 **Neuroscience has to move away from small-scale collaborations towards large teams** that bring together the huge range of competences and financial resources in order to fully achieve its potential to make fundamental contributions to medicine and our understanding of the brain.
- 3 **Direct-to-consumer NeuroTechnologies face multiple challenges including safety risks, data protection, transparency, and lack of ergonomics.**
- 4 **NeuroTechnological innovation should be balanced with an appropriate international set of governance principles** developed through a multi-disciplinary consultative process involving government officials, companies, non-governmental organizations, scientists, ethicists, and legal and governance scholars. National and local governments can adapt provisions from such international principles in developing their own regulations.

# NEUROTECH PUBLICLY TRADED COMPANIES BIG DATA ANALYTICS DASHBOARD



<https://www.neurotech.com/dashboard>

# ABOUT NEUROTECH ANALYTICS

**NeuroTech Analytics** is the leading NeuroTech-focused analytical hub, producing advanced analytical materials on the whole scope of NeuroTech industries using sophisticated multi-dimensional analytical frameworks and algorithmic methods that combine hundreds of specially-designed and specifically-weighted metrics and parameters to deliver sophisticated market intelligence, pragmatic forecasting and tangible industry benchmarking.

## **Our analytics covers the following aspects of NeuroTech market:**

- Leading NeuroTech companies, investors, NGOs, hubs, conferences, influencers, journalists, research institutions;
- Market structure;
- Technologies usage and implementation;
- Current and future trends of NeuroTech industry, as well as predictions;
- Cases of the most successful and impactful players of the market;
- Aspects of global NeuroTech race;
- Investment opportunities, problems and risks;
- Analysis of technology and investment readiness levels for different NeuroTech sectors;
- Social and ethical implications of NeuroTech.

# Who We Are

NeuroTech Analytics is the world's premier source of NeuroTech Industry Analytics, Forecasting and Benchmarking.

NeuroTech.com is the central repository of market insights and analytics, and news for the NeuroTech space, including sectors, influencers, investors, technologies, R&D centers, Hubs, companies, and trends.

By analyzing current technological and business trends in NeuroTech, presenting the overview of various NeuroTech markets and technologies, and highlighting and forecasting trends, NeuroTech Analytics is able to identify the key drivers of NeuroTech industry, estimate its prospects, opportunities and risks, offer recommendations considering what has to be done to develop an efficient market strategy in NeuroTech market.

# ABOUT INVESTTECH ADVANCED SOLUTIONS

# Who We Are



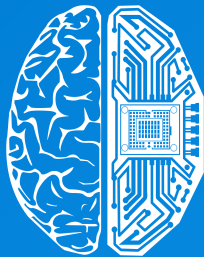
InvestTech Advanced Solutions provides modern investment analytics and data management tools and algorithms.

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.

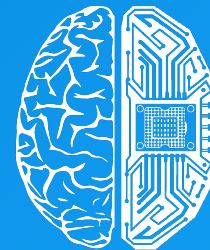
In addition, InvestTech Advanced Solutions provides proprietary **real-time financial analytics and consulting** for publicly traded corporations in deep tech sectors, which includes 3 stages: data parsing, AI-driven data analysis, and user-friendly data visualization.

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





**NeuroTech  
Analytics**



**InvestTech  
Advanced  
Solutions**

[info@neurotech.com](mailto:info@neurotech.com)

[www.neurotech.com](http://www.neurotech.com)

[info@invest-solutions.tech](mailto:info@invest-solutions.tech)

[www.invest-solutions.tech](http://www.invest-solutions.tech)

## NeuroTech Analytics & InvestTech Advanced Solutions (ITAS) Disclaimer

The information and opinions in this report were prepared by Neurotech Analytics and InvestTech Advanced Solutions. The information herein is believed by Neurotech Analytics and ITAS to be reliable but Neurotech Analytics and ITAS makes no representation as to the accuracy or completeness of such information. There is no guarantee that the views and opinions expressed in this communication will come to pass. Neurotech Analytics and ITAS may provide, may have provided or may seek to provide advisory services to one or more companies mentioned herein. In addition, employees of Neurotech Analytics and ITAS may have purchased or may purchase securities in one or more companies mentioned in this report. Opinions, estimates and analyses in this report constitute the current judgment of the author as of the date of this report. They do not necessarily reflect the opinions of Neurotech Analytics and ITAS and are subject to change without notice. Neurotech Analytics and ITAS has no obligation to update, modify or amend this report or to otherwise notify a reader thereof in the event that any matter stated herein, or any opinion, estimate, forecast or analysis set forth herein, changes or subsequently becomes inaccurate. This report is provided for informational purposes only. It is not to be construed as an offer to buy or sell or a solicitation of an offer to buy or sell any financial instruments or to participate in any particular trading strategy in any jurisdiction.