Software for Business Intelligence

BizInt Smart Charts

Surfing the Pipeline: What's the Value in Searching More than One Drug Pipeline Database?

Diane Webb and Matt Eberle

Webinar 2023

Diane Webb
Co-Founder and President

John Willmore
Co-Founder & VP, Product Development

Matt Eberle
Lead Developer, Analytics and Custom Solutions

Bertha Adamson
Product Support Manager

www.bizint.com

Agenda for today's presentation

2022 "Surfing the Pipeline" case study – Amgen (Company)

- *Coverage: How many drugs did we retrieve from each database?*
- *Content: What does each database say about those drugs?*

Questions and Feedback

Coverage

- Number of records retrieved <> Number of drugs identified
- In a simple search, will we mostly identify the same set of drugs in each source?

Content

What I think Abraham Lincoln has to do with drug development
(yes it's kind of a stretch)

I'll explain drug development in a single slide.
(it might be a bit oversimplified, but wait- there's SmartArt)

Can Fax machines help me explain why you shouldn't try to dedupe drug pipeline data?
(Fax machines still exist, right?)

Amgen Case Study August 2022

Query: Company = Amgen.

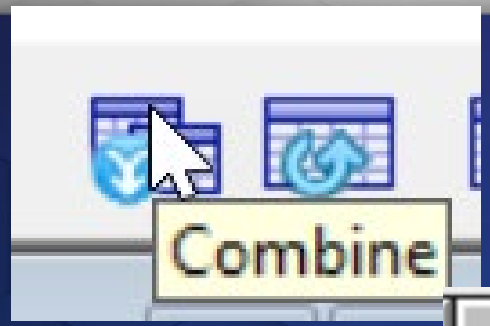
Any inclusion of subsidiaries was database-dependent

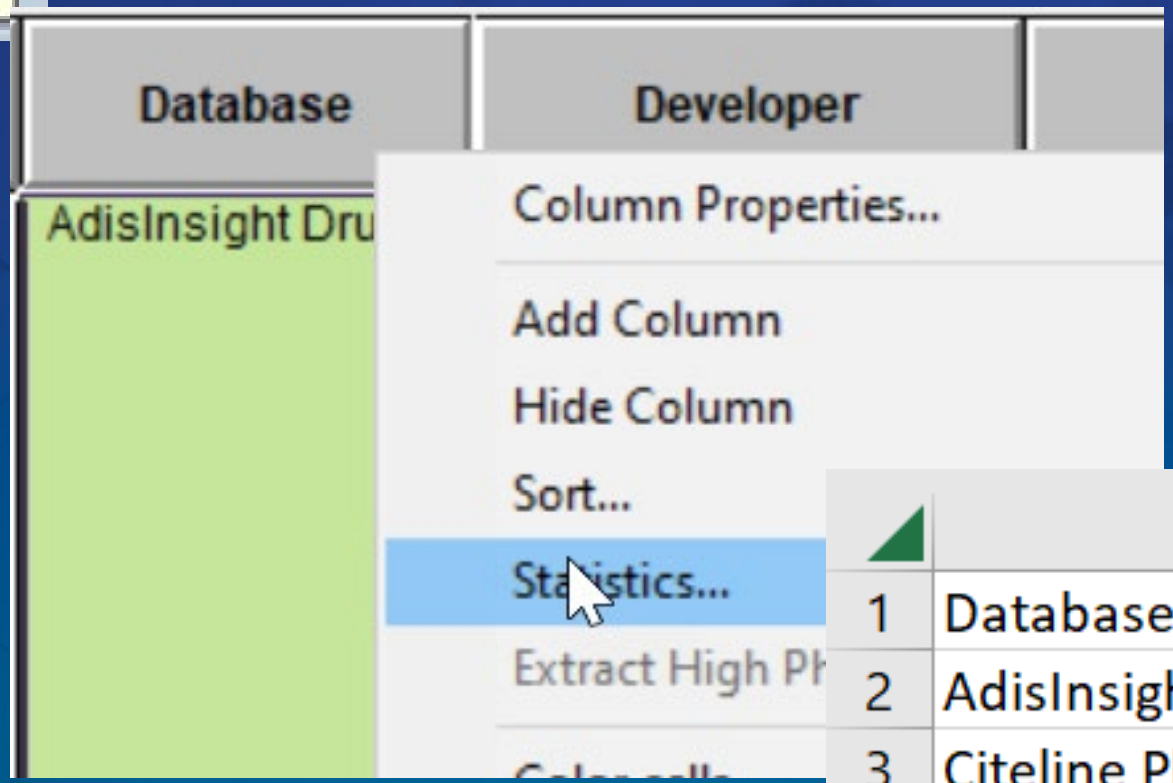
Total # of Records: 2,114

Total # of Drugs: 1,290

Database	Records Retrieved
AdisInsight Drugs	490
Citeline Pharmaprojects	652
Cortellis from Clarivate Analytics	530
GlobalData Drugs	442

Amgen Case Study August 2022

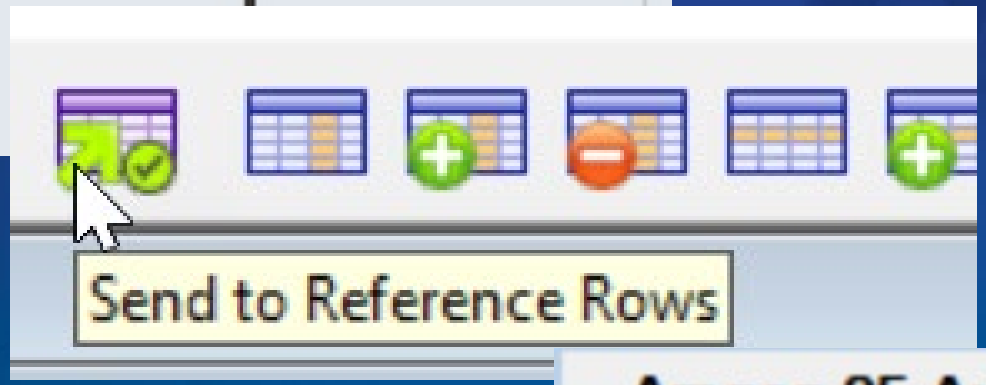




	A	B
1	Database	Count
2	AdisInsight Drugs	490
3	Citeline Pharmaprojects	652
4	Cortellis from Clarivate Analytics	530
5	GlobalData Drugs	442

Amgen Case Study August 2022

	Common Drug Name	Database
2114	Zyn-linkers technology, Zynaxis	Cortellis from Clarivate Analytics



Amgen 25-Aug-2022

	Common Drug Name	Database
1290	Zyn-linkers technology, Zynaxis	Cortellis from Clarivate Analytics

Amgen Case Study August 2022

Query: Company = Amgen.

Any inclusion of subsidiaries was database-dependent

Total # of Records: 2,114

Total # of Drugs: 1,290

824 Duplicates??

Database	Records Retrieved
AdisInsight Drugs	490
Citeline Pharmaprojects	652
Cortellis from Clarivate Analytics	530
GlobalData Drugs	442

Have we seen these results before?

- 2002: Amgen (originator or licensee)
- 2002: Epilepsy (therapeutic activity code/indication)
- 2003: COX-2 inhibitors (mechanism of action)
- 2008: HER-2 inhibitors (mechanism of action)
- 2014: Hepatitis-C (indication)
- 2019: Mesothelioma (indication)
- 2022: Amgen revisited

Yes!

20 Years of "Surfing the Pipeline" Case Studies

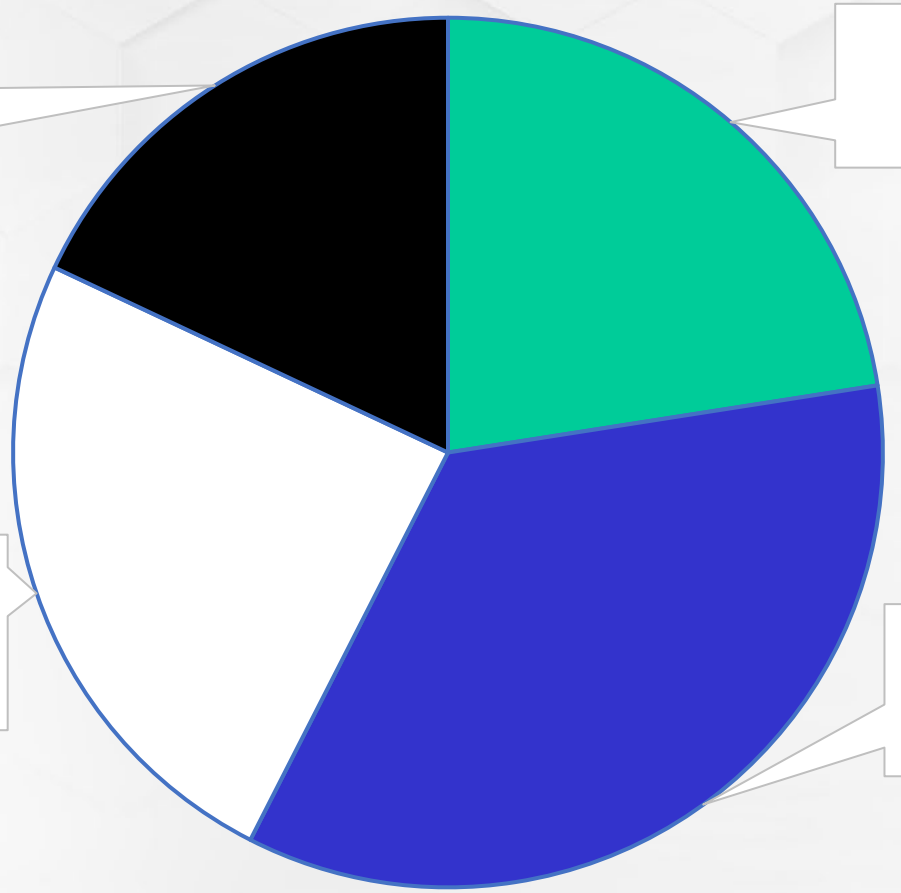
Drugs (where we found them)

Number of sources	# of Drugs (Common Drug Names)	% of Total Drugs
All sources	179	14%
3 sources	56	4%
2 sources	85	7%
A single source	972	75%

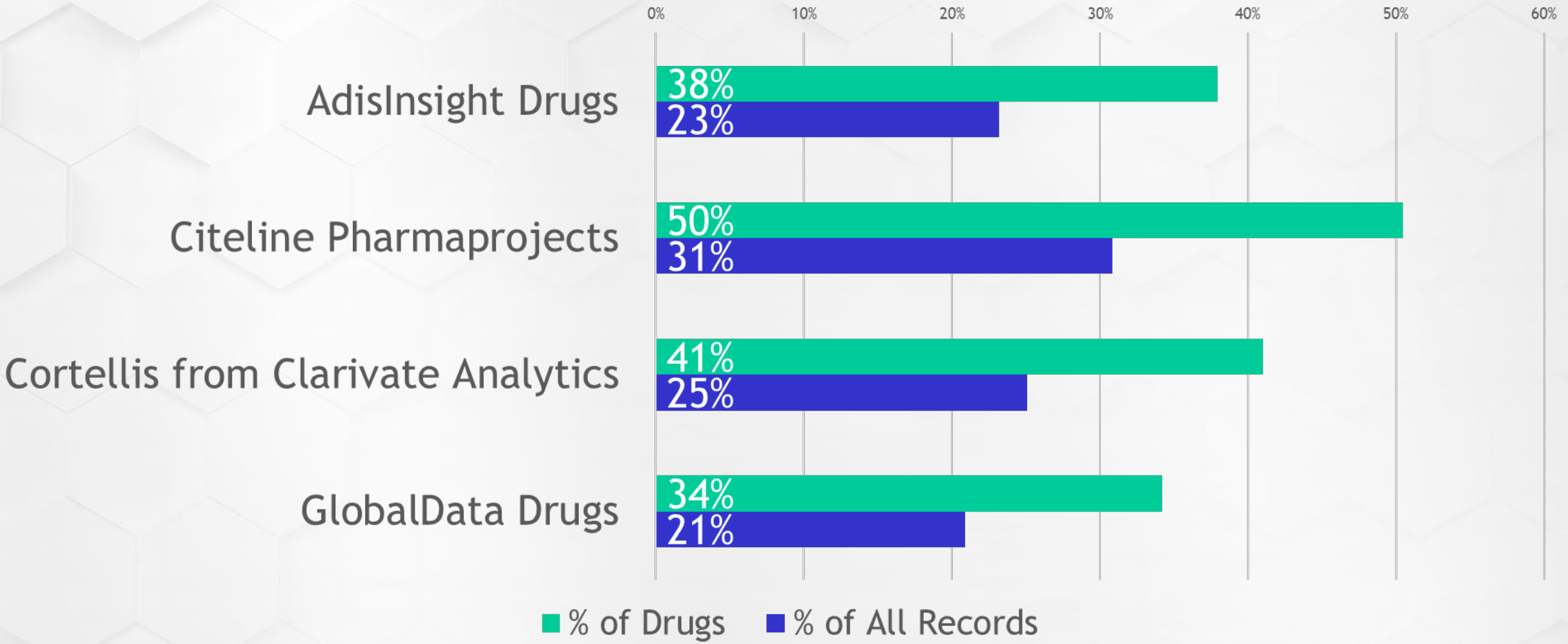
So…

We just need to be sure to search that single source then, right?

Distribution of drugs found in a single database



Coverage – is 50% the best we can do?



What's the reason for coverage differences?

Coverage variation - conclusions

Variations in indexing result in much of the coverage variation

- Alfimeprase: doesn't appear in R&D Insight
- CNTF: RDI record doesn't mention Amgen
- Abelcet (ABLC): IDdb record mentions Amgen, but not indexed by Amgen
- KRN-568: Indexed as Kirin & NPS in Pharmaprojects

WWW.BIZCHARTS.COM

Indexing!

Case study: HER-2

RDI – "missing records"

- **Strategy: mechanism of action = HER2 inhibitors**
- AE-37: mech = immunostimulants
- BMS 690514: mech = Epidermal growth factor receptor antagonists, Protein-tyrosine kinase receptor antagonists
- CAB 051: mech = Epidermal growth factor receptor antagonists
- E 75: mech = T cell stimulants
- HER-2 Protein AutoVac: mech = Epidermal growth factor inhibitors, Immunostimulants
- JNJ-26483327: mech = Epidermal growth factor receptor antagonists, Protein tyrosine kinase inhibitors

BizInt Smart Charts 2008

Each database must have indexed a record on your search term in order for you to retrieve it.

What's the reason for indexing differences?

Response from **Citeline** *editorial team*

Pharmaprojects' coverage includes pipeline drugs which are being developed by commercial organizations; academic and/or government development work is not in scope.

Response from **Adis** *editorial team*

The originator of a drug programme never changes even if that organisation is a 'ceased' organisation or has no role in the development of the programme.

Editorial policy!

Response from **Cortellis** *editorial team*

In both cases the mesothelioma indication is covered in trials run by NCI not by the originator or developing companies (cediranib – NCT00243074, and sorafenib – NCT00107432). If the company is not involved with a trial that is investigator-led, the indication should not be listed in the development status if the company does not list it as an active indication on its pipeline.

Be aware that each database has editorial policies which guide how a record is indexed.

And why are editorial policies different?

*Philip Brown (Pharmaprojects) - **Pharmacist**.*
Founded a stable of racehorses.

Sir Graeme Avery (Adis Insight) - Hospital Pharmacist.
Founded Sileni Winery, Knight Companion of the NZ Order of Merit

Josep R. Prous (Integrity) - Biochemist.
Awarded Creu de Sant Jordi,
Catalonia's highest civilian honor.

Ian Tarr (Cortellis) - Chemist.
Funded bioinformatics lab at University of Bath.

Founders?

The men who founded each database come from different backgrounds -- affecting editorial policies and hiring.

Sean Power & Jason Krantz (GlobalData) - Finance/Business.
Entrepreneurs pursuing ventures in healthcare information.

1915: (PP) ST-2427

Licensing

Agreements

Amgen Worldwide; Siteone Therapeutics had entered into a research and development collaboration with Amgen combining SiteOne's experienced drug discovery team and portfolio of novel NaV1.7 inhibitors with Amgen's neuroscience capabilities to accelerate the development of NaV1.7 therapeutic candidates in multiple potential applications for managing acute and chronic pain (Press

552: (RDI) Avutometinib - Verastem Oncology

have been identified.

Company Agreements

In November 2021, Mirati Therapeutics entered into clinical collaboration agreement with Verastem Oncology to evaluate the combination of adagrasib with VS 6766 in KRASG12C-mutant non-small cell lung cancer (NSCLC). The agreement pertains phase I/II trial which is designed to evaluate the effect of combination of adagrasib and VS 6766 in patients with KRASG12C-mutant NSCLC. Under the terms of the agreement, Verastem Oncology and Mirati will have joint oversight of the study. Financial terms were undisclosed.

In September 2021, Verastem Oncology entered into a clinical collaboration agreement with Amgen to evaluate the combination of Verastem's VS 6766 with Amgenâ€™s sotorasib in a phase I/II trial for the treatment of KRAS G12C-mutant non-small cell lung cancer (NSCLC).

ST-2427 and Avutometinib (VS-6766) *are* in the other sources

	Common Drug Name	Database	Highest Phase (Normalized)
1	ST-2427	Cortellis from Clarivate Analytics	Phase 1
2	ST-2427	AdisInsight Drugs	Phase 1
3	ST-2427	Citeline Pharmaprojects	Phase 1
4	ST-2427	GlobalData Drugs	Phase 1
5	VS-6766	Cortellis from Clarivate Analytics	Phase 2
6	VS-6766	Citeline Pharmaprojects	Phase 2
7	VS-6766	GlobalData Drugs	Phase 2
8	VS-6766	AdisInsight Drugs	Phase 2

Content

Content

- Conflicting information benefits from clarifying details from multiple sources
- Multiple sources means a more detailed view

Phase Status:

liatermin
AZD 8630
AMG 119
BMS 9862
JSP 191
Cabirali
obicetra
AMG 634
pacanalo
CK-136
VGL 101
AMG 786
NT 501
TNB-486
AMG301
XmAb-968
AMG176

Product	Database	Originator	Highest Phase
AMG-119	GlobalData Drugs	Kite Pharma Inc	It's Complicated
AMG 119	AdisInsight Drugs	Amgen	It's Complicated
AMG-119	Citeline Pharmaprojects	Amgen	It's Complicated
AMG-119	Cortellis from Clarivate Analytics	Amgen Inc	It's Complicated

Records: Amgen 25-Aug-2022

149: (PP) AMG-119

AMG-119

AMG 119, AMG-119, AMG119, DLL3 CAR-T cells, Amgen, DLL3 CAR-T therapy, Amgen, DLL3 chimaeric antigen receptor therapy, Amgen

Drug Key: 148470
Latest Change Date: 2021-12-27

Overview

Amgen has suspended the development of AMG-119, a chimaeric antigen receptor-T cell (CAR-T)

Latest Change: Suspension of Phase I trial (20170124) confirmed per NCT03392064

Key Events

Date	Event	Detail
2021-03-23	Development Suspended	Phase I Clinical Trial
2020-02-14	Development Restarted	Phase I Clinical Trial
2020-01-02	New Licensee	BeiGene; China
2019-12-18	Orphan Drug Status Granted	The US; Cancer, lung, small cell
2019-07-30	Development Suspended	Phase I Clinical Trial

Records: Amgen 25-Aug-2022

148: (RDI) AMG 119

As at July 2021, no recent reports of development had been identified for phase-I development in Small-cell-lung-cancer (Second-line therapy or greater) in USA (IV, Infusion).

Key Development Milestones

As of March 2021, Amgen suspended a phase I trial that was designed to evaluate the safety and tolerability of AMG 119 in adults with relapsed/refractory small cell lung cancer (20170124; NCT03392064). The trial was initiated in June 2018, and intended to enrol approximately 41 patients in the US.

Drug Development History (Extended)

Event Date	Update Type	Event	Update Date

AMG 119

Hematology / Oncology | Small-Cell Lung Cancer | CAR T

1

DESCRIPTION

AMG 119 is a delta-like ligand 3 (DLL3) chimeric antigen receptor T cell (CAR T) cellular therapy. It is being investigated for the treatment of small-cell lung cancer.

receptor (CAR) against delta-like ligand 3 (DLL3), based on Kite's engineered autologous cell therapy (eACT) platform, for the potential treatment of small-cell lung cancer (SCLC) [1623940], [2018501], [2027373]. In July 2018, a phase I trial in relapsed/refractory SCLC was initiated [2018501]. In July 2019, Amgen announced that it was 'pausing' the DLL3 CAR T program in the Kite collaboration to focus on bispecific T-cell engager (BiTE) drugs [2182739], [2182740]; however, in December 2019, Orphan designation was granted in the US, so it was presumed at that time, that development had been reinstated [2232852]. In February 2020, the phase I trial was ongoing, but no longer recruiting participants, and had enrolled 6 patients, rather than the planned 41 [2018501]. In March 2021, the trial was listed as suspended, possibly to resume in the future [2018501]. In August 2021, the drug was still listed in phase I on the company pipeline [2504589].

Latest Change

24-Mar-2022 (Development profile section source updates)

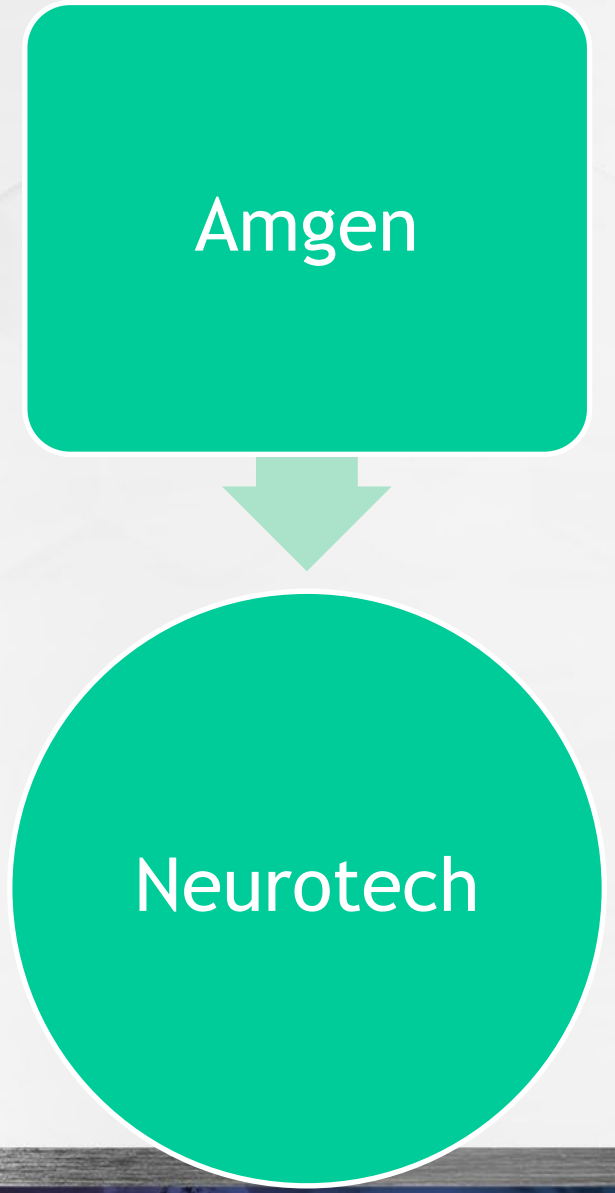
How about another example?

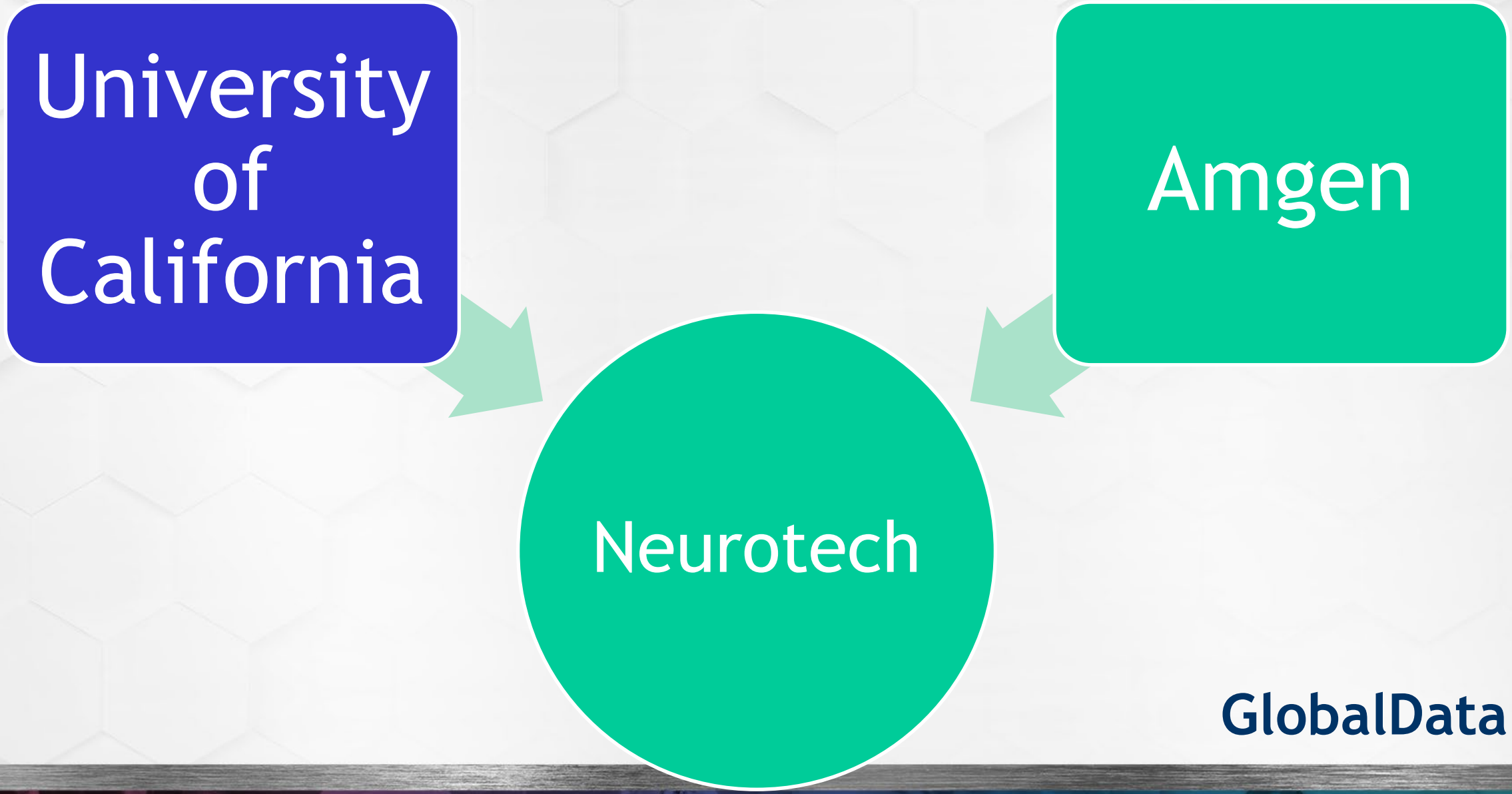
- Step 1: Eureka! – an idea for a new drug
- Step 2: ??
- Step 3: A new therapeutic (oh and also Profit)

Relationship Status:

Common Drug Name	Database	Developer	Companies (Roles)	Companies (All)	Company (Key)	Highest Phase (Normalized)
NT 501	GlobalData Drugs	University of California Amgen Inc	Amgen Inc (Primary) Neurotech Pharmaceuticals Inc (Licensee) University of California (Licensor)	University of (Amgen Inc Neurotech Pharmaceuticals Inc	Amgen Inc	Phase 3
NT 501	AdisInsight Drugs	Neurotech USA	Neurotech USA (Originator) Neurotech USA (Owner) Amgen (Technology Provider) Lowy Medical Research Institute (Collaborator) National Eye Institute (Collaborator) Stanford University (Collaborator) University of Miami (Collaborator)	Neurotech USA Amgen Lowy Medical Research Institute National Eye Institute Stanford University University of Miami		Phase 3
NT 501	Cortellis from Clarivate Analytics	Amgen Inc	Amgen Inc (Originator) Neurotech Pharmaceuticals Inc	Amgen Inc Neurotech Pharmaceuticals Inc		Phase 3

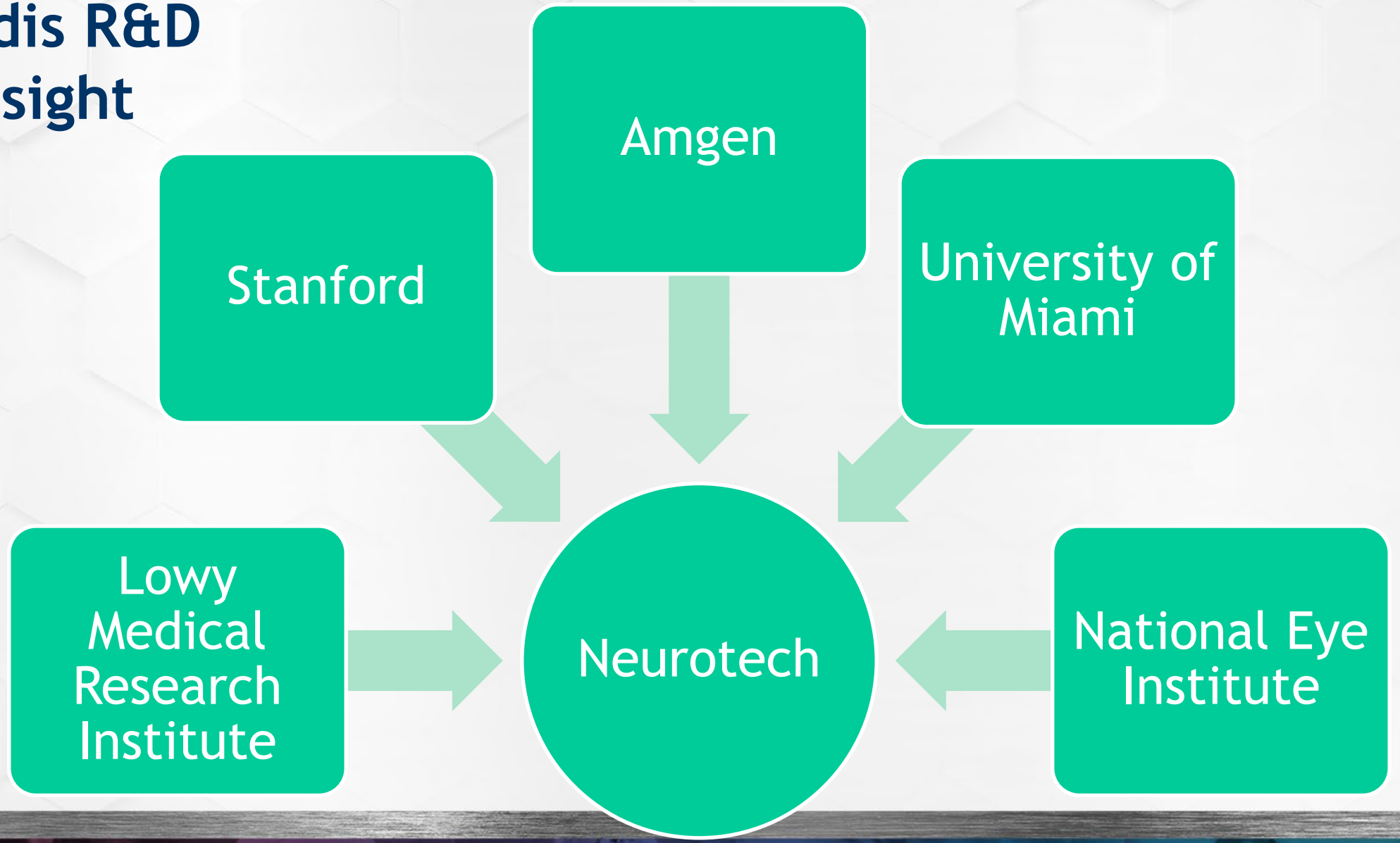
Cortellis



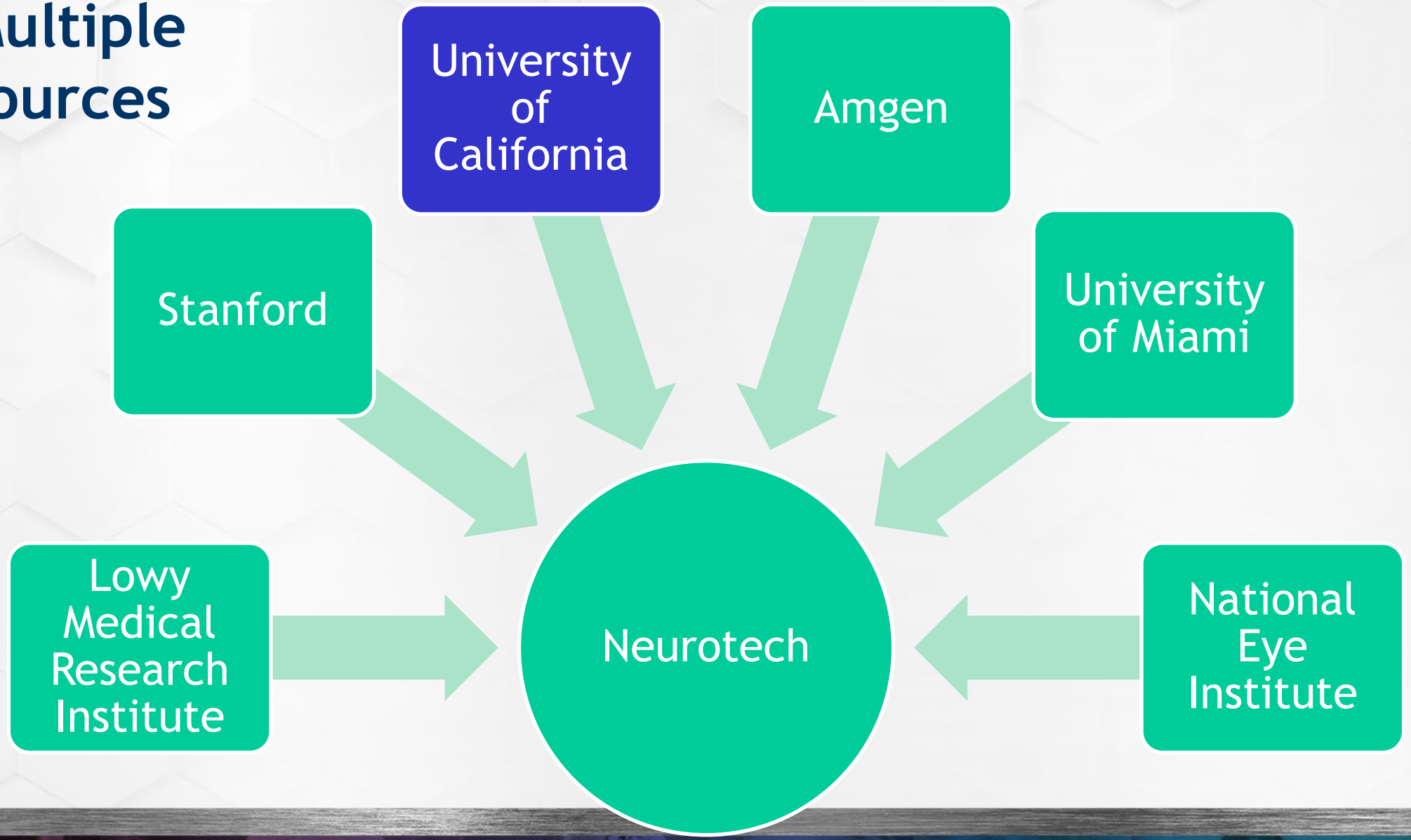


GlobalData

Adis R&D Insight



Multiple sources



What about Pharmaprojects?

Common Drug Na						Highest Phase (Normalized)
NT 501						hase 3
NT 501						hase 3
NT 501						hase 3

1: NT-501

NT-501

CNTF, Neurotech, NT 501, NT-501, NT501, NTC-201E, NTC-501, NTC201E, NTC501, Renexus

Drug Key: 24777
Latest Change Date: 2022-03-21

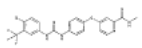
Overview

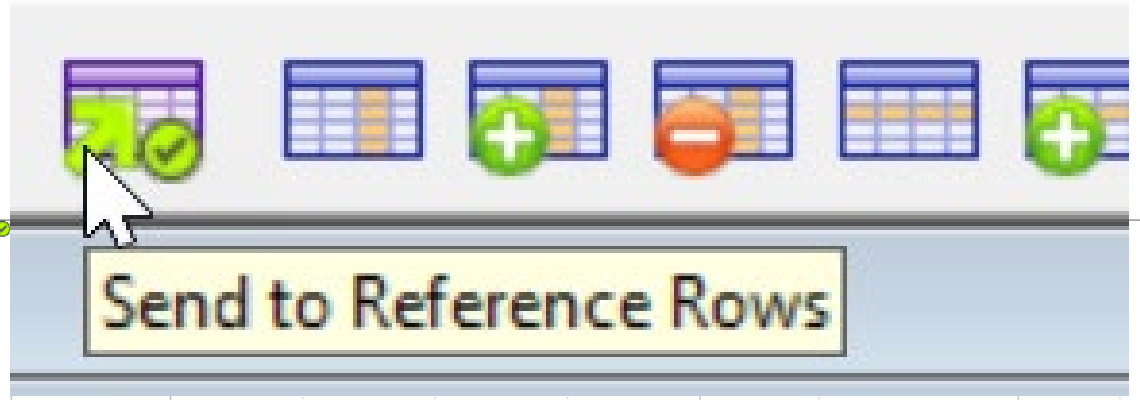
NT-501 is under development by Neurotech, using its encapsulated cell technology (ECT), for the treatment of retinitis pigmentosa (RP), glaucoma and other ocular disorders (Press release, Neurotech, 1 Nov 2021, https://www.businesswire.com/news/home/20211101005378/en/Neurotech-Pharmaceuticals-Appoints-Thomas-Aaberg-Jr.-M.D.-as-Chief-Medical-Officer). It was previously under development for retinitis pigmentosa and Usher syndrome (Direct communication, Neurotech, 30 May 2000; Company Web Page, Neurotech, 3 May 2005 & 1 Nov 2010, http://www.neurotechusa.com/ect/nt-501.asp). It is an intraocular implant of encapsulated human cells engineered to release ciliary neurotrophic factor (CNTF), licensed from Amgen, which protects photoreceptors from degenerating (BIO 2001 (San Diego); Scrip Daily Online, 28 Aug 2002, S00768786).

What if we do not have conflicting information?

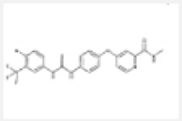
Common Drug Name	Database	Highest Phase (Normalized)
sorafenib	Citeline Pharmaprojects	Launched
sorafenib	AdisInsight Drugs	Launched
sorafenib	GlobalData Drugs	Launched
sorafenib	Cortellis from Clarivate Analytics	Launched

These records are clearly not the same

	Common Drug Name	Database	Company (Key)	Structure	Highest Phase (Normalized)	Brands				Exclusivities		Patents		Licensing	Extract	Update Date
						Organization	Country	Indication	Brand Name	Exp Date	Description	Number	Priority			
1 a	sorafenib	AdisInsight Drugs			Launched	Onyx Pharmaceuticals, Bayer HealthCare, Bayer	European Union, Japan, USA, World	Thyroid cancer, Liver cancer, Renal cell carcinoma	Nexavar							2021-11-19
1 b	sorafenib	Citeline Pharmaprojects			Launched							US7235576	US 2001-01-12	Bayer; Onyx Worldwide: Bayer had exclusive marketing rights and Onyx had a 50% share of profits excluding Japan, where Onyx was to receive royalties; however, as per the revised collaboration agreement Bayer and Onyx are free to use their respective Nexavar sales forces to promote regorafenib and additional products outside of the collaboration in the future. [CONT.]		2020-03-12
1 c	sorafenib	Cortellis from Clarivate Analytics													Bayer and Onyx (now Amgen) have developed and launched sorafenib (Nexavar; BAY-43-9006), an oral small-molecule cytostatic pan-kinase inhibitor. The product is indicated in the US for the treatment of unresectable hepatocellular carcinoma (HCC), advanced renal cell carcinoma (RCC) and locally recurrent or metastatic, progressive, differentiated thyroid carcinoma refractory to radioactive iodine treatment [1194389] [CONT.]	2022-08-24
1 d	sorafenib	GlobalData Drugs	Bayer AG		Launched					2010-11-16	I-546 (Treatment Of Unresectable Hepatocellular Carcinoma)					2021-06-16
										2010-12-20	NCE (New Chemical Entity)					
										2016-11-22	I-677 (Treatment Of Patients With Locally Recurrent Or Metastatic, Progressive, Differentiated Thyroid Carcinoma (DTC) That Is Refractory To Radioactive Iodine Treatment)					
										2020-11-22	ODE-56 (Treatment Of Patients With Locally					



A more complete picture draws from multiple records

Common Drug Name	Database	Company (Key)	Structure	Highest Phase (Normalized)	Brands				Exclusivities		Patents		Licensing	Extract
					Organization	Country	Indication	Brand Name	Exp Date	Description	Number	Priority		
sorafenib	1a RDI | link 1b PP | link 1c COR | link 1d GDDR | link	Bayer AG		Launched	Onyx Pharmaceuticals, Bayer HealthCare, Bayer	European Union, Japan, USA, World	Thyroid cancer, Liver cancer, Renal cell carcinoma	Nexavar	2010-11-16	I-546 (Treatment Of Unresectable Hepatocellular Carcinoma)	US7235576	US 2001-01-12	Bayer; Onyx Worldwide; Bayer had exclusive marketing rights and Onyx had a 50% share of profits excluding Japan, where Onyx was to receive royalties; however, as per the revised collaboration agreement Bayer and Onyx are free to use their respective Nexavar sales forces to promote regorafenib and additional products outside of the collaboration in the future. [CONT.]	Bayer and Onyx (now Amgen) have developed and launched sorafenib (Nexavar; BAY-43-9006), an oral small-molecule cytostatic pan-kinase inhibitor. The product is indicated in the US for the treatment of unresectable hepatocellular carcinoma (HCC), advanced renal cell carcinoma (RCC) and locally recurrent or metastatic, progressive, differentiated thyroid carcinoma refractory to radioactive iodine treatment [1194389] [CONT.]
		1d GDDR	*1c COR*					*1a RDI*	2010-12-20	NCE (New Chemical Entity)		*1b PP*	*1b PP*	*1c COR*
									2016-11-22	I-677 (Treatment Of Patients With Locally Recurrent Or Metastatic, Progressive, Differentiated Thyroid Carcinoma (DTC) That Is Refractory To Radioactive Iodine Treatment)				
									2020-11-22	ODE-56 (Treatment Of Patients With Locally Recurrent Or Metastatic, Progressive, Differentiated Thyroid Carcinoma (Dct) That Is Refractory To Radioactive Iodine Treatment.)				
									1d GDDR					

(Much) more info:
bizint.com/surfing

Image by Kanenori from Pixabay

bizint.com/surfing

Software for
Business Intelligence

BizInt Smart Charts

Questions?
Comments?

THE JOURNEY CONTINUES