

## **Minerva Neurosciences Inc**

### **CORTELLIS COMPANY DETAILED PIPELINE REPORT**

A comprehensive coverage of the the company's drug pipeline portfolio including detailed product records.

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## GLOSSARY

### Number of Drugs in Active Development

Number of drugs associated with the company or subsidiary that are currently in active development, i.e. the development status for the drug(s) is one of the following: Discovery, Clinical, Phase I, Phase II, Phase III, Pre-registration, Registered, Launched, or Suspended.

### Number of Inactive Drugs

Number of drugs associated with the company or subsidiary that are currently classified as inactive, i.e. where the development status for the drug(s) is one of the following: No Development Reported, Discontinued, or Withdrawn.

### Number of Patents as Owner

Number of patents associated with the company where the company is listed as owner; i.e. the relationship type (or way the patent refers to the company) is: Patent Assignee/Owner, Patent owner (not assignee), Licensee for development and marketing, Licensee – marketing only (Distributor), Patent assignee of family member, Inferred assignee.

### Number of Patents as Third Party

Number of patents associated with the company where the company is listed as third party; i.e. the relationship type (or way the patent refers to the company) is: Patent assignee (not owner), Ex-Licensee for development and marketing, Ex-Licensee marketing only (Distributor), Customer of technology, Ex-Customer of technology, Patent opponent or infringer, Affiliate organization of inventor, Owner of underlying technology.

### Patents summary table

This table represents a summary of the core patent coverage for this company covering Therapeutic EP, US and WO patents since 1990 only.

### Number of Deals

A count of deals where the company or one of its subsidiaries is the primary company.

### Key Indications

Displays top ten key indications for the company and its subsidiaries based on frequency (indications occurring with high and identical frequency are always included, and this may result in more than ten Key Indications being listed). Includes both indications associated with patents where the company is patent owner and indications associated with drugs in active development. A drug is classified as 'active' if it features on a row (or rows) in the current development status table where the status is one of the following: Discovery, Clinical, Phase I, Phase II, Phase III, Pre-registration, Registered, Launched, or Suspended.

### Key Target-based Actions

Displays top ten key target-based actions for the company and its subsidiaries based on frequency (actions occurring with high and identical frequency are always included, and this may result in more than ten Key Target-based Actions being listed). Includes both target-based actions associated with patents where the company patent owner and target-based actions associated with drugs in active development. A drug is classified as 'active' if it features on a row (or rows) in the current development status table where the status is one of the following: Discovery, Clinical, Phase I, Phase II, Phase III, Pre-registration, Registered, Launched, or Suspended. A target-based action is one that is associated with a target.

### Key Technologies

Displays top ten key technologies for the company and its subsidiaries based on frequency (technologies occurring with high and identical frequency are always included, and this may result in more than ten Key Technologies being listed). Includes both key technologies associated with patents where the company relationship is patent owner and key technologies associated with drugs in active development. A drug is classified as 'active' if it features on a row (or rows) in the current development status table where the status is one of the following: Discovery, Clinical, Phase I, Phase II, Phase III, Pre-registration, Registered, Launched, or Suspended.

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# Minerva Neurosciences Inc

## COMPANY OVERVIEW

<b>Company Name</b>	Minerva Neurosciences Inc
<b>Parent Company Name</b>	Minerva Neurosciences Inc
<b>Website</b>	<a href="http://minervaneurosciences.com/">http://minervaneurosciences.com/</a>
<b>Country</b>	US
<b>Number of Drugs in Active Development</b>	5
<b>Number of Inactive Drugs</b>	0
<b>Number of Patents as Owner</b>	4
<b>Number of Patents as Third Party</b>	0
<b>Number of Deals</b>	4
<b>Key Indications</b>	Parkinsons disease,Depression,Schizophrenia,Insomnia,Alzheimers disease,Bipolar disorder,Sleep disorder,Anxiety disorder,Attention deficit-disruptive behaviour disorder,Cognitive disorder,Delusion,Drug dependence,Epilepsy,HIV associated dementia,Hallucination,Hyperactivity,Hypomania,Lewy body dementia,Motor
<b>Key Target-based Actions</b>	ErbB3 tyrosine kinase receptor modulator,Neuregulin ligand,Orexin 2 receptor antagonist,5-HT 2a receptor antagonist,Opioid receptor sigma antagonist 2,5-HT 1a receptor antagonist,5-HT receptor modulator,Acetylcholinesterase inhibitor,Catechol O-methyltransferase inhibitor,Dopamine receptor modulator,ErbB4 tyrosine kinase receptor modulator,Glial fibrillary acidic protein modulator,Neuregulin-1 ligand modulator,Peroxiredoxin 3 modulator,Transgelin 3 modulator,Triosephosphate isomerase 1 modulator,Tubulin beta 3 modulator,Visinin like protein 1 modulator
<b>Key Technologies</b>	Peptide,Biological therapeutic,Formulation solid,Small molecule therapeutic,Subcutaneous formulation,Suspension,Systemic formulation unspecified,Antibody,ELISA

## COMPANY PROFILE

### SUMMARY

Minerva Neurosciences, formed by the merger of Cyrenaic and SONKEI pharmaceuticals, in November 2013, is focused on the development and commercialization of drugs for the treatment of CNS diseases.

### ACQUISITIONS & SPIN-OFFS

In February 2014, Mind-NRG was acquired by Minerva Neurosciences.

### FINANCIAL

In March 2015, the company priced a private placement offering of 6,281,661 common stock shares and warrants to purchase up to an aggregate 6,281,661 shares at \$4.81 per share and \$0.125 per warrant. The warrants had an exercise price of \$5.772 per share. Gross proceeds from the offering were expected to be \$31 million and were to be used to fund the clinical development of Minerva's products. At that time, the offering was expected to close on March 18, 2015. Later that month, the offering was closed.

In January 2015, the company entered into a \$15 million debt facility with Oxford Finance LLC and Silicon Valley Bank.

In June 2014, Minerva announced its initial public offering of 5,454,545 shares of its common stock priced at \$6.00 per share and at that time, the underwriters were granted a 30-day option to purchase up to 818,181 additional shares of common stock at the same price. The offering was expected to close on July 07, 2014. In July 2014, the shares began trading on the NASDAQ global market under the symbol "NERV". In July 2014, the IPO was completed. By August 2014, the company had also sold approximately 0.7 million shares in a private placement. The net proceeds from the IPO and private placement were approximately \$29.9 million.

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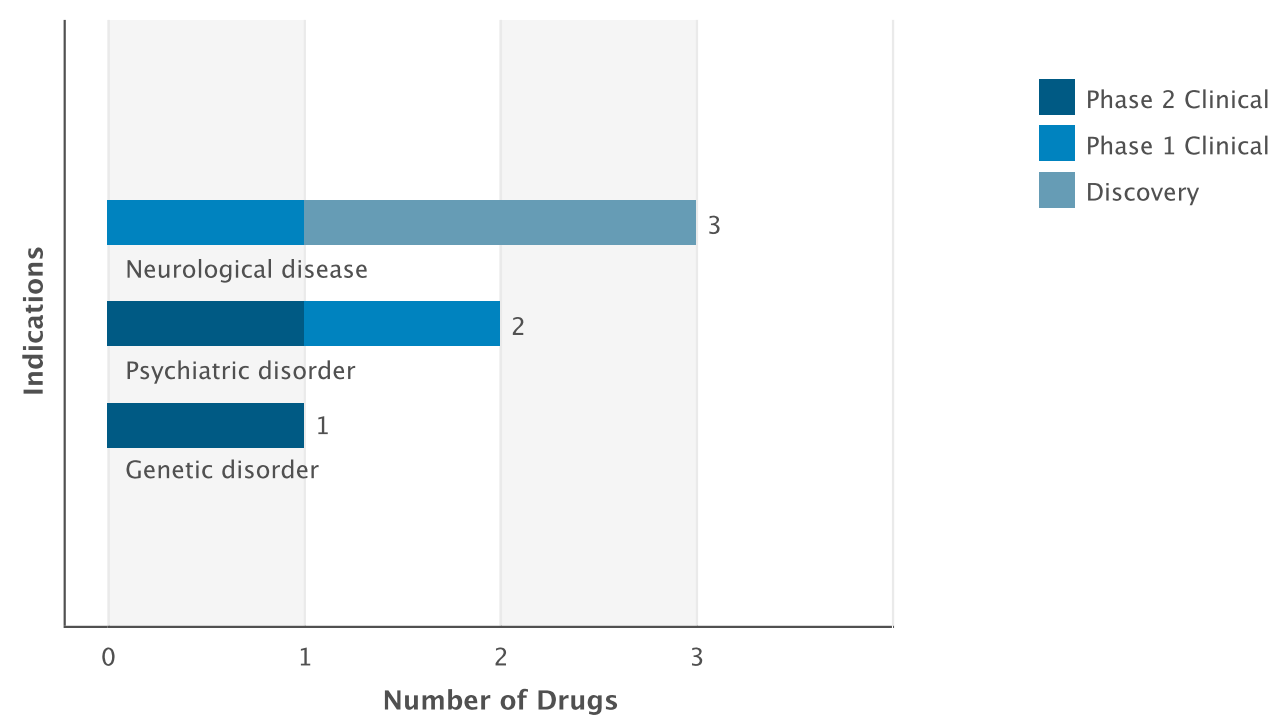


# PRODUCT PORTFOLIO SUMMARY

## DRUGS

### Drugs by Indication

Active Drugs by Indication Chart



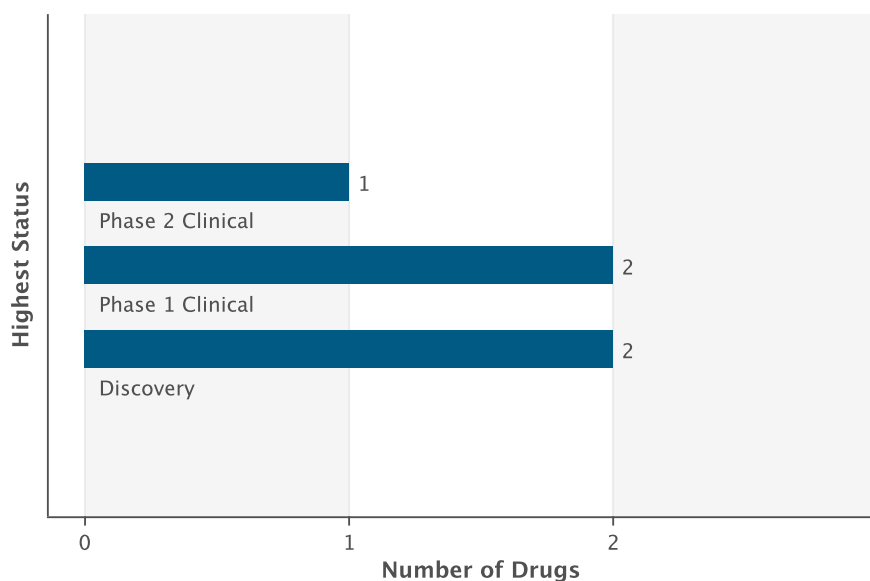
Drugs by Indication Table

Indication	Active	Inactive	Total
Psychiatric disorder	2	1	3
Neurological disease	3	0	3
Genetic disorder	1	1	2
Degeneration	0	1	1

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## Drugs by Highest Status

Active Drugs by Highest Status Chart



Drugs by Highest Status Table

Development Status	Number of Drugs
Phase 2 Clinical	1
Phase 1 Clinical	2
Discovery	2

## DEALS

Deal Type	Principal		Partner		Total
	Active	Inactive	Active	Inactive	
Drug - Development/Commercialization License	1	0	3	0	4

## CLINICAL TRIALS

Trials by Condition Studied

Condition Studied	Ongoing	All
Psychiatric disorder	0	2
Genetic disorder	0	1

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## Trials by Phase

Phase	Ongoing	All
Phase 2	0	1
Phase 1	0	2
Phase not specified	0	1

### Phase Definitions

#### Phase 3 Clinical

Includes Phase 3, Phase 3b, Phase 3a, Phase 2/3 (where enrolment count is 300 or over)

#### Phase 2 Clinical

Includes Phase 2, Phase 2a, Phase 2b, Phase 1/2 (where enrolment count is 100 or over), Phase 2/3 (where enrolment count is under 300 or not specified)

#### Phase 1 Clinical

Includes Phase 1, Phase 1a, Phase 1, Phase 1/2 (where enrolment count is under 100 or not specified), Phase 0

## PATENTS \*

Indication	As Owner	As Third Party	Total
Cardiovascular disease	1	0	1
Growth disorder	1	0	1
Degeneration	2	0	2
Immune disorder	1	0	1
Psychiatric disorder	4	0	4
Genetic disorder	3	0	3
Neurological disease	4	0	4
Injury	1	0	1
Toxicity and intoxication	1	0	1

\* This table represents a summary of the core patent coverage for this company covering Therapeutic EP, US and WO patents since 1990 only.

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## PRODUCT PORTFOLIO DRUG PIPELINE DETAIL

**PLEASE NOTE:** Highest status refers to highest development of that drug for one of the active companies

### MIN-101

#### MIN-101 SNAPSHOT

<b>Drug Name</b>	MIN-101
<b>Key Synonyms</b>	
<b>Originator Company</b>	Mitsubishi Chemical Holdings Corp
<b>Active Companies</b>	Minerva Neurosciences Inc
<b>Inactive Companies</b>	Mitsubishi Chemical Holdings Corp
<b>Highest Status</b>	Phase 2 Clinical
<b>Active Indications</b>	Schizophrenia
<b>Target-based Actions</b>	Opioid receptor sigma antagonist 2;5-HT 2a receptor antagonist
<b>Other Actions</b>	Antipsychotic
<b>Technologies</b>	Oral formulation;Small molecule therapeutic
<b>Last Change Date</b>	27-Mar-2015

#### MIN-101 DEVELOPMENT PROFILE

##### SUMMARY

Minerva Neurosciences (following the merger of Cyrenaic (which licensed the drug from Mitsubishi) and SONKEI pharmaceuticals), is developing MIN-101 (CYR-101; MT-210), a dual 5-HT<sub>2A</sub> /sigma 2 antagonist, as a modified release formulation, for the potential oral treatment of schizophrenia. A phase II trial began in March 2008,. In March 2015, the company received an regulatory approval in Latvia and ethical committee approvals in Latvia and Estonia for a phase IIb trial. By June 2008, Cyrenaic was seeking to outlicense the drug following proof-of-concept in phase II trials.

#### MIN-101 DEVELOPMENT STATUS

##### CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Minerva Neurosciences Inc	Schizophrenia	France	Phase 2 Clinical	30-Nov-2013
Minerva Neurosciences Inc	Schizophrenia	UK	Phase 1 Clinical	04-Sep-2014
Mitsubishi Chemical Holdings Corp	Schizophrenia	Japan	Discontinued	30-Jun-2008

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## MIN-101 DRUG NAMES

Names	Type
CYR-101	Research Code
MIN-101	Research Code
MT-210	Research Code
dual 5-HT2A/sigma 2 antagonist (oral, schizophrenia), Minerva Neurosciences	

## MIN-101 CLINICAL TRIALS

### Trials by Phase and Condition Studied

Phase 4 Clinical		Phase 3 Clinical		Phase 2 Clinical		Phase 1 Clinical		Phase Unspecified		Total	
On-going	All	On-going	All	On-going	All	On-going	All	On-going	All	On-going	All
Schizophrenia											
0	0	0	0	0	1	0	0	0	0	0	1

### Total Trials by Phase and Status

Phase 4 Clinical		Phase 3 Clinical		Phase 2 Clinical		Phase 1 Clinical		Phase Unspecified		Total	
On-going	All	On-going	All	On-going	All	On-going	All	On-going	All	On-going	All
Total by Phase and Status											
0	0	0	0	0	1	0	1	0	0	0	2

### Phase Definitions

#### Phase 3 Clinical

Includes Phase 3, Phase 3b, Phase 3a, Phase 2/3 (where enrolment count is 300 or over)

#### Phase 2 Clinical

Includes Phase 2, Phase 2a, Phase 2b, Phase 1/2 (where enrolment count is 100 or over), Phase 2/3 (where enrolment count is under 300 or not specified)

#### Phase 1 Clinical

Includes Phase 1, Phase 1a, Phase 1, Phase 1/2 (where enrolment count is under 100 or not specified), Phase 0

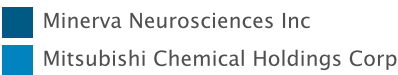
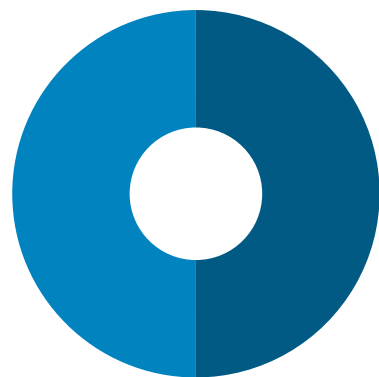
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MIN-101 DEALS AND PATENTS

DEALS

Deals by Parent Company Chart

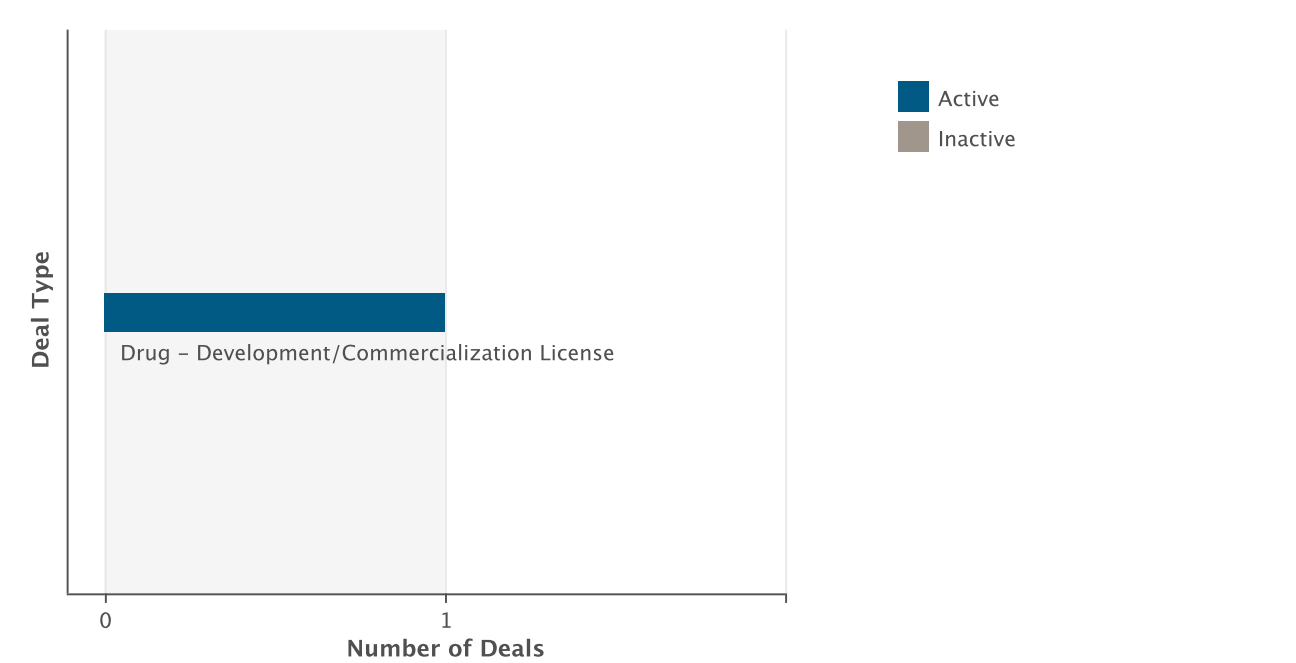


Deals by Parent Company Table

Company Name	Principal		Partner		Total
	Active	Inactive	Active	Inactive	
Mitsubishi Chemical Holdings Corp	1	0	0	0	1
Minerva Neurosciences Inc	0	0	1	0	1

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Deals by Type Chart

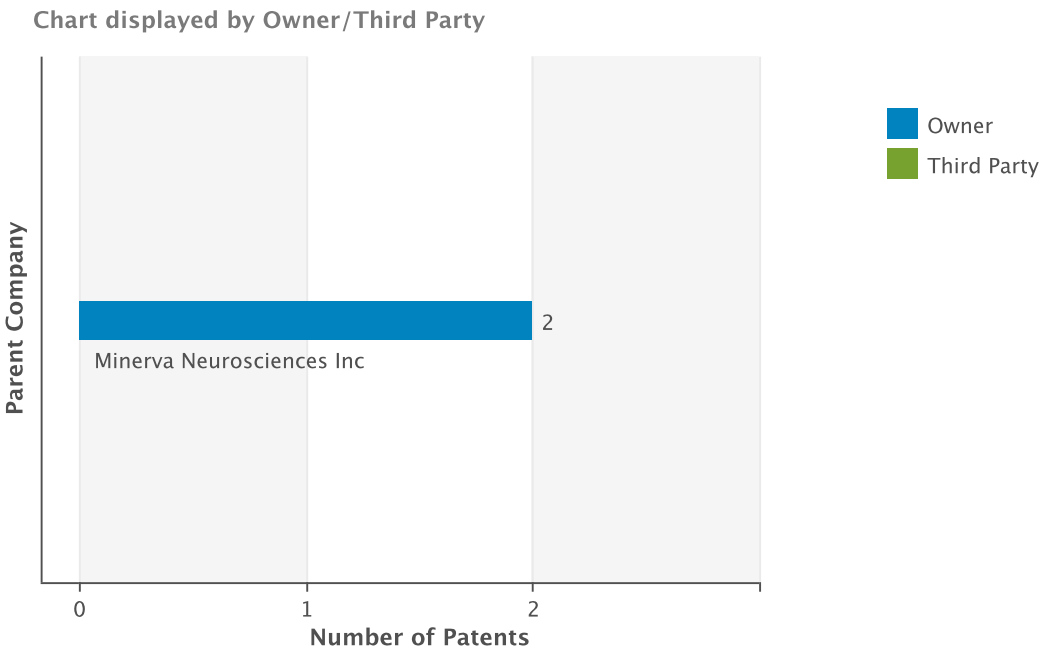


Deals by Type Table

Deal Type	Active	Inactive	Total
Drug - Development/Commercialization License	1	0	1

PATENTS

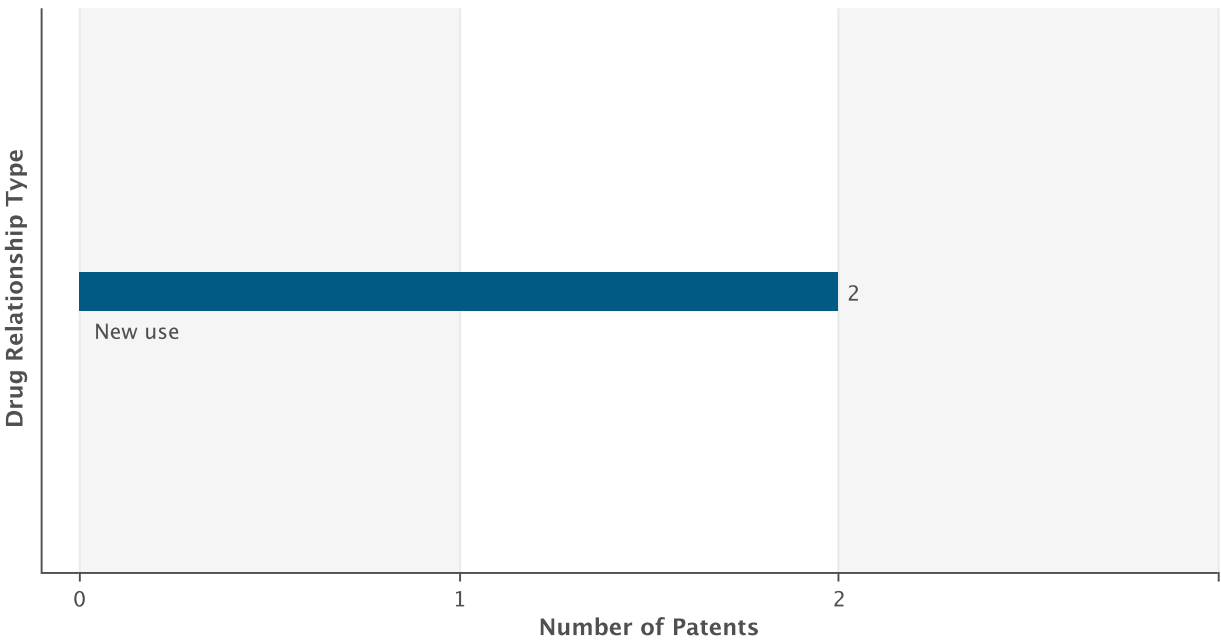
Patents by Parent Company Chart



Patents by Parent Company Table

Company Name	As Owner	As Third Party	Total
Minerva Neurosciences Inc	2	0	2

Patents by Drug Relationship Type Chart



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Patents by Drug Relationship Type Table

Drug Relationship	Total
New use	2

## MIN-202

### MIN-202 SNAPSHOT

Drug Name	MIN-202
Key Synonyms	
Originator Company	Minerva Neurosciences Inc
Active Companies	Minerva Neurosciences Inc;Janssen Pharmaceutica NV
Inactive Companies	
Highest Status	Phase 1 Clinical
Active Indications	Insomnia
Target-based Actions	Orexin 2 receptor antagonist
Other Actions	
Technologies	Small molecule therapeutic;Systemic formulation unspecified;Formulation solid;Suspension
Last Change Date	27-Mar-2015

### MIN-202 DEVELOPMENT PROFILE

#### SUMMARY

Minerva Neurosciences, in collaboration with Janssen Pharmaceutica, is developing MIN-202, a selective orexin-2 receptor antagonist, for the potential treatment of insomnia. In December 2013, a phase Ib trial was initiated for secondary insomnia in patients with major depressive disorder (MDD). In January 2015, preliminary results from phase I, Ib and bioavailability study of suspension and solid dose formulations were reported. In March 2015, a phase IIa in primary insomnia and a second phase Ib in MDD was expected to be initiated in mid-2015.

### MIN-202 DEVELOPMENT STATUS

#### CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Janssen Pharmaceutica NV	Insomnia	US	Phase 1 Clinical	31-Dec-2013
Minerva Neurosciences Inc	Insomnia	EU	Phase 1 Clinical	31-Dec-2013

### MIN-202 DRUG NAMES

Names	Type
orexin-2 receptor antagonist (insomnia), Minerva Neurosciences	
MIN-202	Research Code

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## MIN-202 CLINICAL TRIALS

### Trials by Phase and Condition Studied

Phase 4 Clinical		Phase 3 Clinical		Phase 2 Clinical		Phase 1 Clinical		Phase Unspecified		Total	
On-going	All	On-going	All	On-going	All	On-going	All	On-going	All	On-going	All
Major depressive disorder											
0	0	0	0	0	0	0	1	0	0	0	1

### Total Trials by Phase and Status

Phase 4 Clinical		Phase 3 Clinical		Phase 2 Clinical		Phase 1 Clinical		Phase Unspecified		Total	
On-going	All	On-going	All	On-going	All	On-going	All	On-going	All	On-going	All
Total by Phase and Status											
0	0	0	0	0	0	0	2	0	1	0	3

### Phase Definitions

#### Phase 3 Clinical

Includes Phase 3, Phase 3b, Phase 3a, Phase 2/3 (where enrolment count is 300 or over)

#### Phase 2 Clinical

Includes Phase 2, Phase 2a, Phase 2b, Phase 1/2 (where enrolment count is 100 or over), Phase 2/3 (where enrolment count is under 300 or not specified)

#### Phase 1 Clinical

Includes Phase 1, Phase 1a, Phase 1, Phase 1/2 (where enrolment count is under 100 or not specified), Phase 0

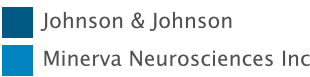
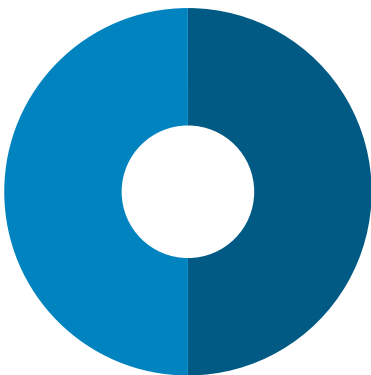
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MIN-202 DEALS AND PATENTS

DEALS

Deals by Parent Company Chart

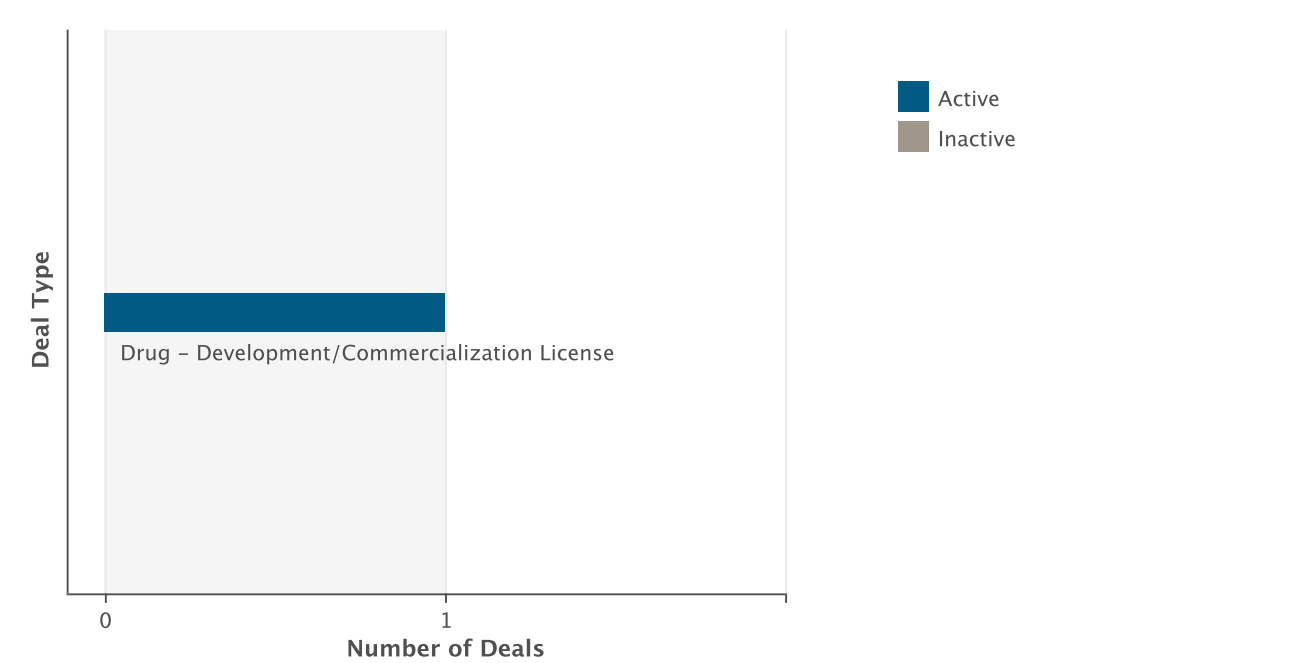


Deals by Parent Company Table

Company Name	Principal		Partner		Total
	Active	Inactive	Active	Inactive	
Johnson & Johnson	0	0	1	0	1
Minerva Neurosciences Inc	1	0	0	0	1

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Deals by Type Chart



Deals by Type Table

Deal Type	Active	Inactive	Total
Drug - Development/Commercialization License	1	0	1

## MIN-117

### MIN-117 SNAPSHOT

<b>Drug Name</b>	MIN-117
<b>Key Synonyms</b>	
<b>Originator Company</b>	Mitsubishi Pharma Corp
<b>Active Companies</b>	Minerva Neurosciences Inc
<b>Inactive Companies</b>	Mitsubishi Tanabe Pharma Corp;Sonkei Pharmaceuticals Inc;Mitsubishi Pharma Corp
<b>Highest Status</b>	Phase 1 Clinical
<b>Active Indications</b>	Depression
<b>Target-based Actions</b>	5-HT 1a receptor antagonist
<b>Other Actions</b>	5-HT uptake inhibitor;Antidepressant
<b>Technologies</b>	Small molecule therapeutic;Systemic formulation unspecified
<b>Last Change Date</b>	27-Mar-2015

### MIN-117 DEVELOPMENT PROFILE

#### SUMMARY

Minerva Neurosciences (following the merger of US licensee Sonkei Pharmaceuticals and Cyrenaic) under license from Mitsubishi Tanabe Pharma is developing MIN-117, a 5-HT reuptake inhibitor and a 5-HT<sub>1a</sub> receptor antagonist, for the potential treatment of depression. In March 2015, the company received an ethical committee approval in Latvia for a phase IIb trial. At that time, the enrollment was expected to be in the second quarter of 2015.

In February 2007, the agent was listed as being in phase I trials, presumably in Japan ; however, no development in Japan has been reported since.

Mitsubishi Tanabe Pharma was developing the drug as Wf-516 (structure shown).

### MIN-117 DEVELOPMENT STATUS

#### CURRENT DEVELOPMENT STATUS

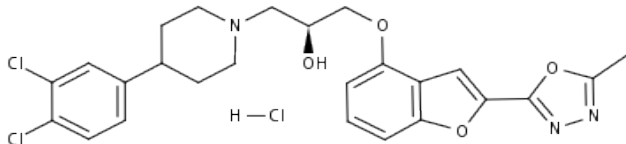
Company	Indication	Country	Development Status	Date
Minerva Neurosciences Inc	Depression	Europe	Phase 1 Clinical	30-Nov-2013
Minerva Neurosciences Inc	Depression	US	Phase 1 Clinical	30-Nov-2013
Mitsubishi Tanabe Pharma Corp	Depression	Europe	Discontinued	30-Nov-2013
Sonkei Pharmaceuticals Inc	Depression	US	Discontinued	30-Nov-2013

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Company	Indication	Country	Development Status	Date
Mitsubishi Tanabe Pharma Corp	Depression	Japan	No Development Reported	02-Oct-2009

## MIN-117 CHEMICAL STRUCTURES

CAS Registry Number:	Confidence Level:
	4
	
Name	Type
Wf-516	Research Code
SON-117	Research Code

## MIN-117 DRUG NAMES

Names	Type
serotonin reuptake inhibitor/5-HT1a receptor antagonist (depression), Mitsubishi Tanabe/Sonkei	
5-HT reuptake inhibitor, Mitsubishi Tanabe Pharma	
5-HT1a receptor antagonist, Mitsubishi Pharma	
MIN-117	Research Code
5-HT reuptake inhibitor, Mitsubishi Tanabe Pharma/Minerva Neurosciences	
SON-117	Research Code
Wf-516	Research Code
5-HT reuptake inhibitor, Mitsubishi Pharma	

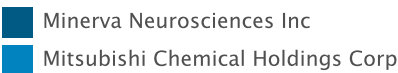
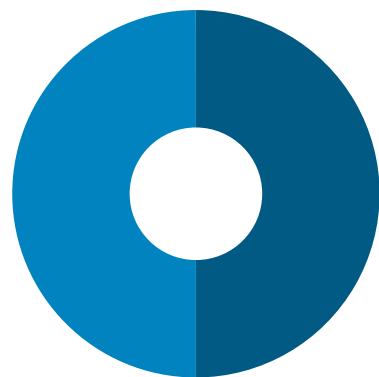
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MIN-117 DEALS AND PATENTS

DEALS

Deals by Parent Company Chart



Deals by Parent Company Table

Company Name	Principal		Partner		Total
	Active	Inactive	Active	Inactive	
Minerva Neurosciences Inc	0	0	1	0	1
Mitsubishi Chemical Holdings Corp	1	0	0	0	1

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Deals by Type Chart



Deals by Type Table

Deal Type	Active	Inactive	Total
Drug - Development/Commercialization License	1	0	1

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## MIN-301 analog (sc, Parkinsons disease), Minerva Neurosciences

### MIN-301 analog (sc, Parkinsons disease), Minerva Neurosciences SNAPSHOT

Drug Name	MIN-301 analog (sc, Parkinsons disease), Minerva Neurosciences
Key Synonyms	
Originator Company	Minerva Neurosciences Inc
Active Companies	Minerva Neurosciences Inc
Inactive Companies	
Highest Status	Discovery
Active Indications	Parkinsons disease
Target-based Actions	ErbB3 tyrosine kinase receptor modulator;Neuregulin ligand
Other Actions	Nootropic agent;Antiparkinsonian
Technologies	Biological therapeutic;Subcutaneous formulation;Peptide
Last Change Date	06-Jan-2015

### MIN-301 analog (sc, Parkinsons disease), Minerva Neurosciences DEVELOPMENT PROFILE

#### SUMMARY

Minerva Neurosciences is investigating an analog of MIN-301, a recombinant neuregulin 1beta1 peptide, for the potential sc treatment of Parkinsons disease (PD). In January 2015, positive preclinical data were reported.

### MIN-301 analog (sc, Parkinsons disease), Minerva Neurosciences DEVELOPMENT STATUS

#### CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Minerva Neurosciences Inc	Parkinsons disease	US	Discovery	05-Jan-2015

### MIN-301 analog (sc, Parkinsons disease), Minerva Neurosciences DRUG NAMES

Names	Type
MIN-301 analog (sc, Parkinsons disease), Minerva Neurosciences	

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## MIN-301

### MIN-301 SNAPSHOT

Drug Name	MIN-301
Key Synonyms	
Originator Company	ProteoSys AG
Active Companies	Minerva Neurosciences Inc
Inactive Companies	Mind-NRG;ProteoSys AG
Highest Status	Discovery
Active Indications	Parkinsons disease
Target-based Actions	Neuregulin ligand;ErbB3 tyrosine kinase receptor modulator;ErbB4 tyrosine kinase receptor stimulator
Other Actions	Neuroprotectant;Antiparkinsonian;Nootropic agent
Technologies	Injectable formulation;Biological therapeutic;Parenteral formulation unspecified;Peptide
Last Change Date	27-Mar-2015

### MIN-301 DEVELOPMENT PROFILE

#### SUMMARY

Minerva Neurosciences following acquisition of Mind-NRG (previously under license from ProteoSys), is investigating MIN-301, a recombinant neuregulin 1beta1 peptide as ErbB4 tyrosine kinase receptor activator, for the potential injectable treatment of Parkinsons disease. In April 2014, the drug was listed as being in preclinical development and at that time, a phase I trial was planned to be initiated in the first half of 2015. In March 2015, the company planned to file an IND and Investigational Medicinal Product Dossier (IMPD) in 2016 .

Mind-NRG was investigating NRG-101, an injectable neuregulin peptide for the potential iv or sc treatment of Alzheimer's disease and schizophrenia . In October 2010, the company planned to conduct in vitro and in vivo studies to further explore the mechanism of action and activity of the compound. In July 2012, development of the drug was ongoing. However, no further development had been reported since July 2012.

### MIN-301 DEVELOPMENT STATUS

#### CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Minerva Neurosciences Inc	Parkinsons disease	US	Discovery	28-Feb-2014
ProteoSys AG	Alzheimers disease	Germany	Discontinued	27-Oct-2010
ProteoSys AG	Parkinsons disease	Germany	Discontinued	27-Oct-2010
ProteoSys AG	Schizophrenia	Germany	Discontinued	27-Oct-2010

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Company	Indication	Country	Development Status	Date
Mind-NRG	Alzheimers disease	Switzerland	No Development Reported	28-Feb-2014
Mind-NRG	Schizophrenia	Switzerland	No Development Reported	28-Feb-2014

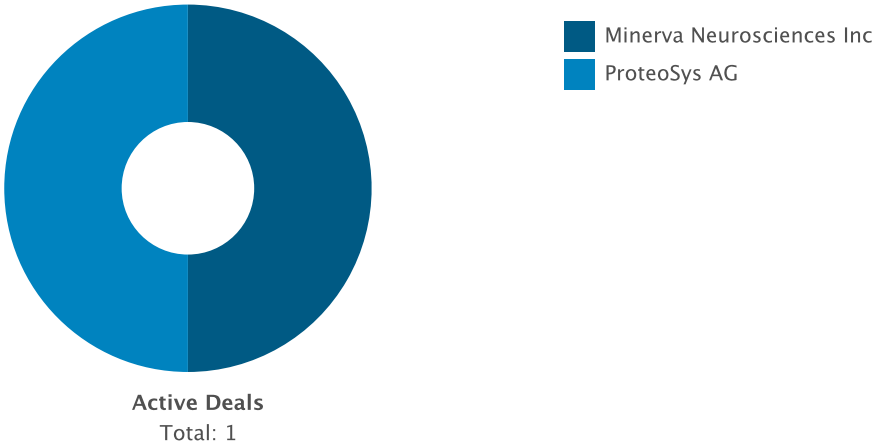
### MIN-301 DRUG NAMES

Names	Type
MIN-301	Research Code
NRG-101	Research Code
neuregulin ligand (Parkinsons/Alzheimers/schizophrenia), Mind-NRG	

### MIN-301 DEALS AND PATENTS

#### DEALS

#### Deals by Parent Company Chart

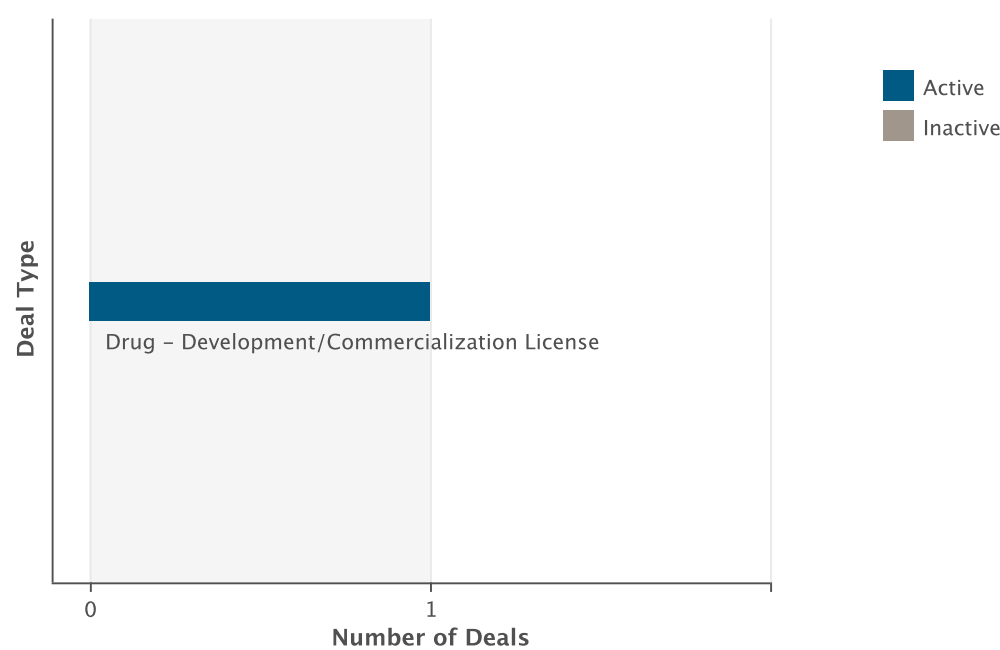


#### Deals by Parent Company Table

Company Name	Principal		Partner		Total
	Active	Inactive	Active	Inactive	
ProteoSys AG	1	0	0	0	1
Minerva Neurosciences Inc	0	0	1	0	1

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Deals by Type Chart



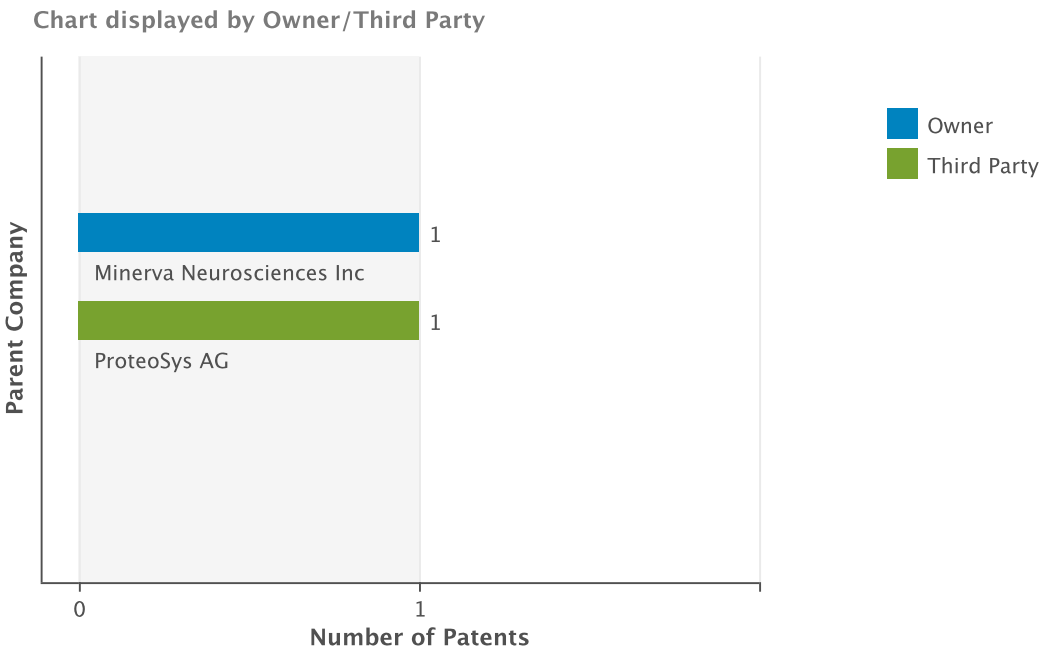
Deals by Type Table

Deal Type	Active	Inactive	Total
Drug - Development/Commercialization License	1	0	1

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PATENTS

Patents by Parent Company Chart

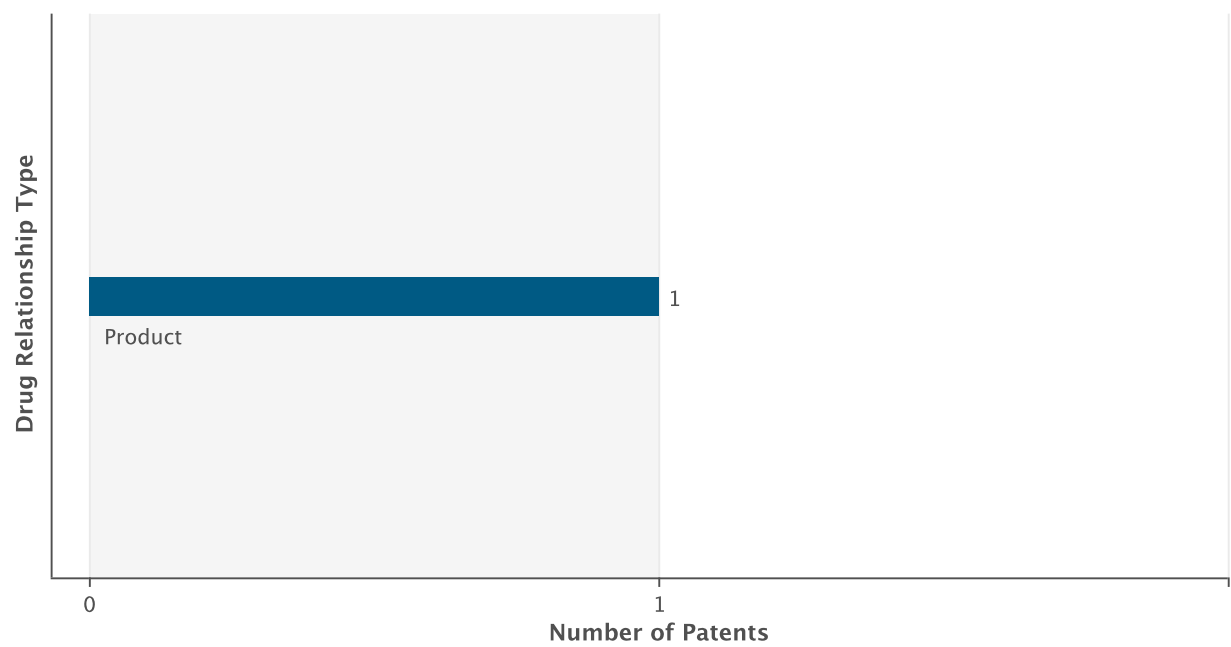


Patents by Parent Company Table

Company Name	As Owner	As Third Party	Total
Minerva Neurosciences Inc	1	0	1
ProteoSys AG	0	1	1

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Patents by Drug Relationship Type Chart



Patents by Drug Relationship Type Table

Drug Relationship	Total
Product	1

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