

Avalanche Biotechnologies 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 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i.e. where the development status for the drug(s) is one of the following: No Development Reported, Discontinued, or Withdrawn.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.

TABLE OF CONTENTS

Company Overview	5
Company Profile	6
Product Portfolio Summary	7
Product Portfolio Drug Pipeline Detail	9
Phase 2 Clinical	10
Discovery	15



Avalanche Biotechnologies Inc

COMPANY OVERVIEW

Company Name	Avalanche Biotechnologies Inc
Parent Company Name	Avalanche Biotechnologies Inc
Website	http://www.avalanchebiotech.com/
Country	US
Number of Drugs in Active Development	6
Number of Inactive Drugs	0
Number of Patents as Owner	3
Number of Patents as Third Party	0
Number of Deals	7
Key Indications	Wet age related macular degeneration, Color vision defect, Diabetic macular edema, Glaucoma, Retinal venous occlusion, Retinoschisis, Unidentified indication, Diabetic retinopathy, Retinitis pigmentosa, Stargardt disease
Key Target-based Actions	RS1 gene modulator,VEGF-1 receptor antagonist,Angiostatin gene modulator,CNTF gene modulator,FLT1 gene modulator,GDNF gene modulator,RPE65 gene modulator,TIMP3 gene modulator,VEGF receptor
Key Technologies	Virus recombinant,Biological therapeutic,Parenteral formulation unspecified,Injectable formulation,Ophthalmic formulation,Small molecule therapeutic,Gene transfer system viral,Gene expression regulation,Monoclonal

COMPANY PROFILE

SUMMARY

Avalanche Biotechnologies is developing technologies and products for the sustained delivery of therapeutic proteins in patients with ocular diseases, with a focus on wet AMD.

COMPANY LOCATION

In September 2011, the company opened new office and research facilities in San Francisco, CA.

FINANCIAL

In January 2015, the company filed a registration statement on Form S-1/A with the Securities and Exchange Commission relating to a proposed public offering of 2,000,000 common stock shares. The offering was expected to consist of 1,762,500 shares by Avalanche and 237,500 shares to be offered by existing stockholders. At that time, the underwriters were granted a 30-day option to purchase up to an additional 300,000 shares from the selling shareholders and Avalanche, and agreed for lock-up agreements for a period of 90 days following the follow-on offering; Later that month, the company priced the public offering of 2,399,457 shares of \$141.6 million of common stock, each at a price of \$59.00 per share. At that time, the underwriters were granted a 30-day option to purchase up to an additional 359,918 shares of common stock. The follow-on offering was expected to close on January 13, 2015, which was subjected to customary closing conditions.

By September 2014, the company had completed a \$10 million private placement of common stock to Regeneron Pharmaceuticals Inc.

In July 2014, the company priced its initial public offering of 6 million shares of its common stock, at \$17 each and planned to raise \$102 million. The underwriters were granted a 30-day option to purchase up to 0.9 million additional shares of common stock. The offering was expected to close on August 05, 2014. At that time, the company's common stock began trading on the NASDAQ Global Market under the ticker symbol "AAVL". By September 2014, the company had raised net proceeds of approximately \$106.5 million from the placement of 6.9 million shares of its common stock, which included the full exercise of the underwriters' over-allotment option.

In April 2014, the company raised \$55 million in a series B financing round.



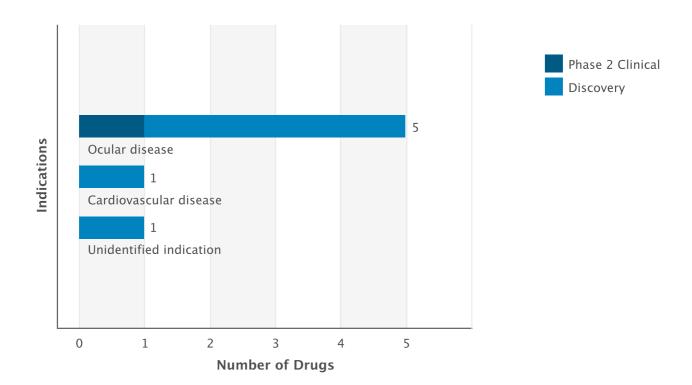
In September 2012, the company completed a series A financing. In November 2013, Avalanche raised additional financing in a follow-on round consisting of both new and existing investors. The financing included both preferred stock and convertible debt.

PRODUCT PORTFOLIO SUMMARY

DRUGS

Drugs by Indication

Active Drugs by Indication Chart

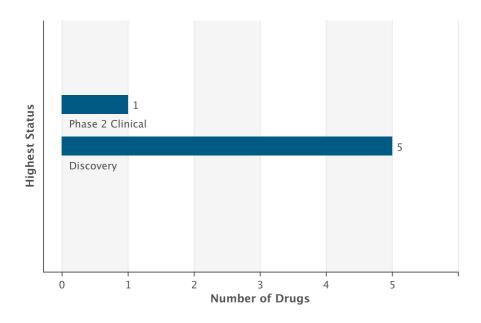


Drugs by Indication Table

Indication	Active	Inactive	Total
Ocular disease	5	0	5
Unidentified indication	1	0	1
Cardiovascular disease	1	0	1

Drugs by Highest Status

Active Drugs by Highest Status Chart



Drugs by Highest Status Table

Development Status	Number of Drugs
Phase 2 Clinical	1
Discovery	5

DEALS

Deal Type	Prin	cipal	Par	tner	Total
	Active	Inactive	Active	Inactive	
Patent - Exclusive Rights	0	0	1	0	1
Drug - Funding	2	0	0	0	2
Drug - Early Research/Development	0	0	1	0	1
Drug - Development/Commercialization License	1	0	1	0	2
Technology - Delivery/Formulation	1	0	0	0	1



CLINICAL TRIALS

Trials by Condition Studied

Condition Studied	Ongoing	All
Ocular disease	0	1

Trials by Phase

Phase	Ongoing	All
Phase 1	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	2	0	2
Ocular disease	3	0	3
Otorhinolaryngological disease	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.

PRODUCT PORTFOLIO DRUG PIPELINE DETAIL

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

VEGF-1 (Flt-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western

ALGETIA(HB-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western Australia SNAPSHOT

Drug Name	VEGF-1 (Flt-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western Australia
Key Synonyms	
Originator Company	University of Western Australia
Active Companies	Avalanche Biotechnologies Inc;Lions Eye Institute of Western Australia Inc;University of Western Australia
Inactive Companies	Merck Sharp & Dohme Corp
Highest Status	Phase 2 Clinical
Active Indications	Diabetic macular edema; Wet age related macular degeneration; Retinal venous occlusion
Target-based Actions	VEGF-1 receptor antagonist
Other Actions	Ophthalmological agent;Adeno-associated virus based gene therapy;Ocular antineovascularisation agent
Technologies	Injectable formulation;Ophthalmic formulation;Biological therapeutic;Parenteral formulation unspecified;Virus recombinant;Sustained release formulation
Last Change Date	06-Mar-2015

VEGF-1 (FIt-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western Australia DEVELOPMENT PROFILE

SUMMARY

Avalanche Biotechnologies, in collaboration with Lions Eye Institute of the University of Western Australia, is developing a sustained-release, subretinal formulation of AVA-101 (rAAV.sFLt-1), a recombinant adeno-associated virus (AAV)-based therapy delivering Flt-1 (VEGF-1 receptor antagonist), for the potential treatment of wet age-related macular degeneration (AMD) ,. Avalanche is also investigating the program for diabetic macular edema (DME) and retinal vein occlusion (RVO). In December 2011, a phase I/II trial began ; in May 2012, preliminary data were presented ; in May 2013, further data were presented. In July 2014, top-line phase IIa data was expected mid-2015, and an IND-filing was expected in the second half of 2015. In May 2014, it was stated that upon completion of the phase IIa trial, Regeneron would have a time-limited right of first negotiation for certain rights to AVA-101 .

Merck Sharpe & Dohme was originally developing the drug; however, by November 2011, rights were licensed to Avalanche.

VEGF-1 (FIt-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western Australia DEVELOPMENT STATUS

CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date



Company	Indication	Country	Development Status	Date
Avalanche Biotechnologies Inc	Wet age related macular degeneration	Australia	Phase 2 Clinical	14-Dec-2011
Lions Eye Institute of Western Australia Inc	Wet age related macular degeneration	Australia	Phase 2 Clinical	14-Dec-2011
University of Western Australia	Wet age related macular degeneration	Australia	Phase 2 Clinical	14-Dec-2011
Avalanche Biotechnologies Inc	Diabetic macular edema	US	Discovery	10-Sep-2012
Avalanche Biotechnologies Inc	Retinal venous occlusion	US	Discovery	08-Jul-2014
Merck Sharp & Dohme Corp	Wet age related macular degeneration	US	Discontinued	01-Nov-2011

VEGF-1 (Flt-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western Australia DRUG NAMES

Names	Туре
AVA-101	Research Code
rAAV.sFLt-1	Research Code
adenovirus-based therapy (wet AMD), Avalanche Biotechnologies/Lions Eye Institue	
VEGF-1 (FIt-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western Australia	

VEGF-1 (Flt-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western Australia CLINICAL TRIALS

Trials by Phase and Condition Studied

	se 4 lical		se 3 iical		se 2 iical		se 1 nical	Pha Unspe		То	tal
On- going	All	On- going	All	On- going	All	On- going	All	On- going	All	On- going	All
Wet age	related ma	acular deg	eneration								
0	0	0	0	0	0	0	1	0	0	0	1

Total Trials by Phase and Status

	se 4 nical		se 3 nical		se 2 nical		se 1 nical		ase ecified	То	tal
On- going	All	On- going	All								
Total by	Phase an	d Status									
0	0	0	0	0	0	0	1	0	0	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)

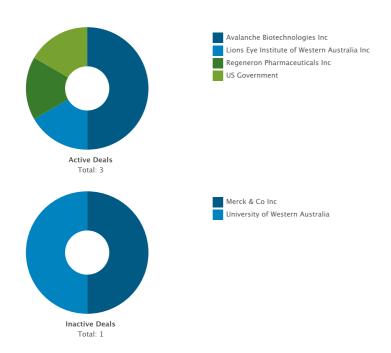
Phase 1 Clinical

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

VEGF-1 (Flt-1) receptor antagonist (adenovirus vector, wet AMD), Avalanche Biotechnologies/Lions Eye Institue/ University of Western Australia DEALS AND PATENTS

DEALS

Deals by Parent Company Chart

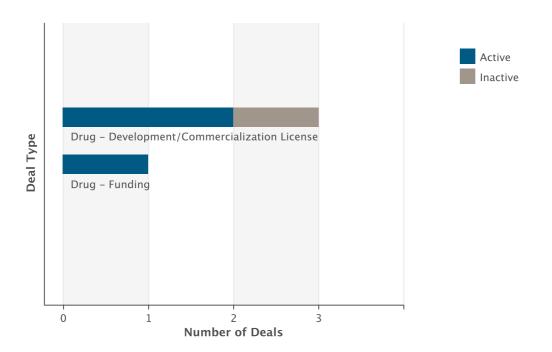


Deals by Parent Company Table

Company Name	Prin Active	ncipal Inactive	Par Active	tner Inactive	Total
Avalanche Biotechnologies Inc	2	0	1	0	3
US Government	0	0	1	0	1
Merck & Co Inc	0	0	0	1	1
University of Western Australia	0	1	0	0	1
Regeneron Pharmaceuticals Inc	0	0	1	0	1
Lions Eye Institute of Western Australia Inc	1	0	0	0	1



Deals by Type Chart



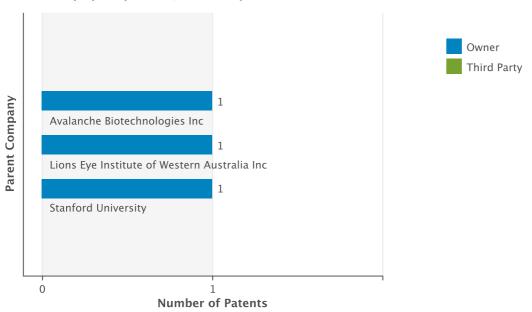
Deals by Type Table

Deal Type	Active	Inactive	Total
Drug - Development/Commercialization License	2	1	3
Drug - Funding	1	0	1

PATENTS

Patents by Parent Company Chart

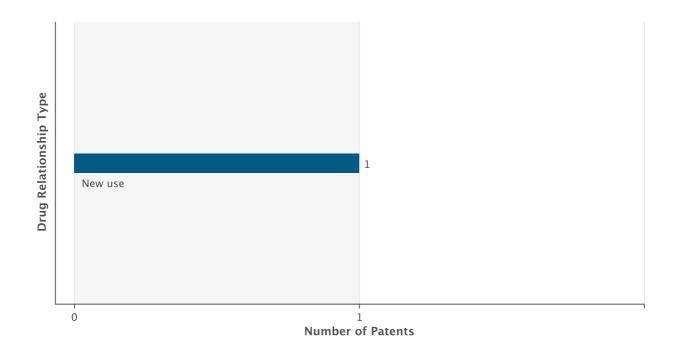
Chart displayed by Owner/Third Party



Patents by Parent Company Table

Company Name	As Owner	As Third Party	Total
Stanford University	1	0	1
Lions Eye Institute of Western Australia Inc	1	0	1
Avalanche Biotechnologies Inc	1	0	1

Patents by Drug Relationship Type Chart



Patents by Drug Relationship Type Table

Drug Relationship	Total
New use	1

AVA-322/AVA-323 (undisclosed indication), Avalanche

AVA-322/AVA-323 (undisclosed indication), Avalanche SNAPSHOT

Drug Name	AVA-322/AVA-323 (undisclosed indication), Avalanche
Key Synonyms	
Originator Company	Avalanche Biotechnologies Inc
Active Companies	Avalanche Biotechnologies Inc
Inactive Companies	
Highest Status	Discovery
Active Indications	Unidentified indication
Target-based Actions	
Other Actions	Unspecified drug target
Technologies	Small molecule therapeutic
Last Change Date	09-Jul-2014

AVA-322/AVA-323 (undisclosed indication), Avalanche DEVELOPMENT PROFILE

SUMMARY

Avalanche Biotechnologies is investigating a program including AVA-322 and AVA-323, for the potential treatment of an undisclosed indication. In July 2014, the program was in research, and IND-enabling studies were planned for 2015.

AVA-322/AVA-323 (undisclosed indication), Avalanche DEVELOPMENT STATUS

CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Avalanche Biotechnologies Inc	Unidentified indication	US	Discovery	08-Jul-2014

AVA-322/AVA-323 (undisclosed indication), Avalanche DRUG NAMES

Names	Туре
AVA-322/AVA-323 (undisclosed indication), Avalanche	



AVA-311

AVA-311 SNAPSHOT

Drug Name	AVA-311
Key Synonyms	
Originator Company	Avalanche Biotechnologies Inc
Active Companies	Avalanche Biotechnologies Inc;Regeneron Pharmaceuticals Inc
Inactive Companies	
Highest Status	Discovery
Active Indications	Retinoschisis
Target-based Actions	RS1 gene modulator
Other Actions	Adeno-associated virus based gene therapy;Ophthalmological agent
Technologies	Injectable formulation;Ophthalmic formulation;Biological therapeutic;Parenteral formulation unspecified;Virus recombinant
Last Change Date	08-Jul-2014

AVA-311 DEVELOPMENT PROFILE

SUMMARY

Avalanche Biotechnologies in collaboration with Regeneron, is investigating an intravitreal formulation of AVA-311, an adeno-associated virus (AAV)-based gene therapy delivering RS1 gene, using Avalanche's directed evolution technology, for the potential treatment of juvenile X-linked retinoschisis (XLRS). In July 2014, the drug was in preclinical development.

AVA-311 DEVELOPMENT STATUS

CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Avalanche Biotechnologies Inc	Retinoschisis	US	Discovery	05-May-2014
Regeneron Pharmaceuticals Inc	Retinoschisis	US	Discovery	05-May-2014

AVA-311 DRUG NAMES

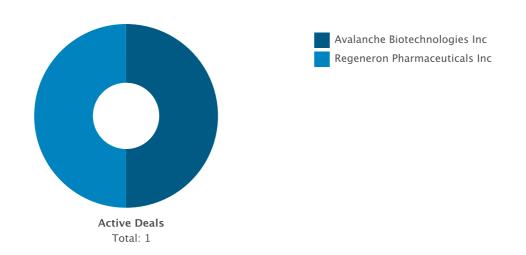
Names	Type
AVA-311	Research Code



AVA-311 DEALS AND PATENTS

DEALS

Deals by Parent Company Chart



Deals by Parent Company Table

Company Name		cipal Inactive		tner Inactive	Total
Avalanche Biotechnologies Inc	1	0	0	0	1
Regeneron Pharmaceuticals Inc	0	0	1	0	1

Deals by Type Chart



Deals by Type Table

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

Shh10.GDNF

Shh10.GDNF SNAPSHOT

Drug Name	Shh10.GDNF
Key Synonyms	
Originator Company	Avalanche Biotechnologies Inc
Active Companies	Avalanche Biotechnologies Inc
Inactive Companies	
Highest Status	Discovery
Active Indications	Glaucoma
Target-based Actions	
Other Actions	Ophthalmological agent;Neuroprotectant;Antiglaucoma agent
Technologies	Biological therapeutic;Parenteral formulation unspecified;Virus recombinant
Last Change Date	04-Aug-2014

Shh10.GDNF DEVELOPMENT PROFILE

SUMMARY

Avalanche is investigating Shh-10.GDNF, a novel muLler glia cell-specific adeno-associated viral vector expressing glial cell line-derived neurotrophic factor (GDNF), for the potential treatment of glaucoma. In May 2012, preclinical data were presented. In March 2013, development was ongoing.

Shh10.GDNF DEVELOPMENT STATUS

CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Avalanche Biotechnologies Inc	Glaucoma	US	Discovery	08-May-2012

Shh10.GDNF DRUG NAMES

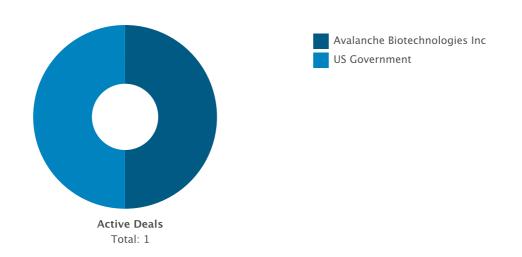
Names	Туре
Shh10.GDNF	Research Code
AAV-based therapy (glaucoma), Avalanche	



Shh10.GDNF DEALS AND PATENTS

DEALS

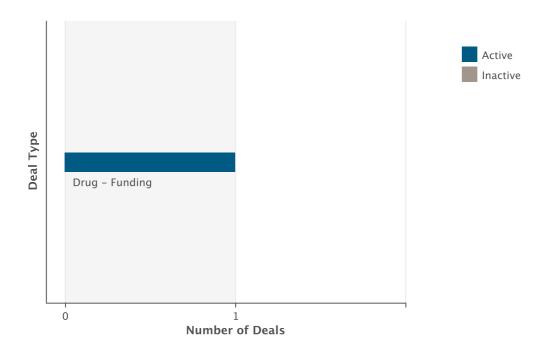
Deals by Parent Company Chart



Deals by Parent Company Table

Company Name		cipal Inactive		tner Inactive	Total
Avalanche Biotechnologies Inc	1	0	0	0	1
US Government	0	0	1	0	1

Deals by Type Chart



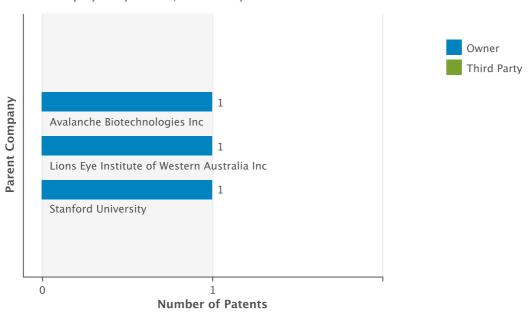
Deals by Type Table

Deal Type	Active	Inactive	Total
Drug - Funding	1	0	1

PATENTS

Patents by Parent Company Chart

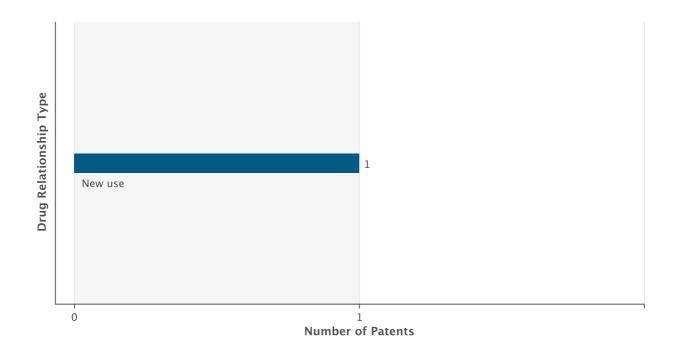
Chart displayed by Owner/Third Party



Patents by Parent Company Table

Company Name	As Owner	As Third Party	Total
Avalanche Biotechnologies Inc	1	0	1
Stanford University	1	0	1
Lions Eye Institute of Western Australia Inc	1	0	1

Patents by Drug Relationship Type Chart



Patents by Drug Relationship Type Table

Drug Relationship	Total
New use	1

AVA-201

AVA-201 SNAPSHOT

Drug Name	AVA-201
Key Synonyms	
Originator Company	Avalanche Biotechnologies Inc
Active Companies	Avalanche Biotechnologies Inc
Inactive Companies	
Highest Status	Discovery
Active Indications	Wet age related macular degeneration
Target-based Actions	VEGF-1 receptor antagonist
Other Actions	Adeno-associated virus based gene therapy;Ophthalmological agent;Ocular antineovascularisation agent
Technologies	Injectable formulation;Ophthalmic formulation;Biological therapeutic;Parenteral formulation unspecified;Virus recombinant
Last Change Date	08-Jul-2014

AVA-201 DEVELOPMENT PROFILE

SUMMARY

Avalanche Biotechnologies is investigating an intravitreal formulation of AVA-201, a recombinant adenoassociated virus (AAV)-based gene therapy delivering sFlt-1 (VEGF-1 receptor antagonist) using the company's next-generation AAV vector delivery technology, for the potential prevention of wet age-related macular degeneration (AMD). In July 2014, the drug was in research, and IND-enabling studies were planned for 2015.

AVA-201 DEVELOPMENT STATUS

CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Avalanche Biotechnologies Inc	Wet age related macular degeneration	US	Discovery	08-Jul-2014

AVA-201 DRUG NAMES

Names	Туре
AVA-201	Research Code



adeno-associated virus (AVV) vector based gene therapy (color vision deficiency), University of Washington/ Avalanche Biotechnologies

adeno-associated virus (AVV) vector based gene therapy (color vision deficiency), University of Washington/ Avalanche Biotechnologies SNAPSHOT

Drug Name	adeno-associated virus (AVV) vector based gene therapy (color vision deficiency), University of Washington/ Avalanche Biotechnologies
Key Synonyms	
Originator Company	University of Washington
Active Companies	Avalanche Biotechnologies Inc;University of Washington
Inactive Companies	
Highest Status	Discovery
Active Indications	Color vision defect
Target-based Actions	
Other Actions	Unspecified drug target;Adeno-associated virus based gene therapy
Technologies	Biological therapeutic
Last Change Date	26-Mar-2015

adeno-associated virus (AVV) vector based gene therapy (color vision deficiency), University of Washington/ Avalanche Biotechnologies DEVELOPMENT PROFILE

SUMMARY

University of Washington and licensee Avalanche Biotechnologies are investigating adeno-associated virus (AAV) vector based gene therapies, applying Avalanche's Ocular BioFactory technology, for the potential treatment of color vision deficiency. By October 2009, preclinical studies had been conducted.

adeno-associated virus (AVV) vector based gene therapy (color vision deficiency), University of Washington/ Avalanche Biotechnologies DEVELOPMENT STATUS

CURRENT DEVELOPMENT STATUS

Company	Indication	Country	Development Status	Date
Avalanche Biotechnologies Inc	Color vision defect	US	Discovery	25-Mar-2015
University of Washington	Color vision defect	US	Discovery	08-Oct-2009

adeno-associated virus (AVV) vector based gene therapy (color vision deficiency), University of Washington/ Avalanche Biotechnologies DRUG NAMES

Names	Туре
adeno-associated virus (AVV) vector based gene therapy (color vision deficiency), University of Washington/ Avalanche Biotechnologies	



adeno-associated virus (AVV) vector based gene therapy (color vision deficiency), University of Washington/ Avalanche Biotechnologies DEALS AND PATENTS

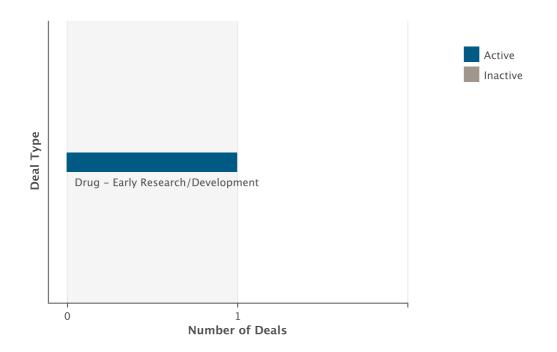
DEALS Deals by Parent Company Chart



Deals by Parent Company Table

Company Name		cipal Inactive		tner Inactive	Total
University of Washington	1	0	0	0	1
Avalanche Biotechnologies Inc	0	0	1	0	1

Deals by Type Chart



Deals by Type Table

Deal Type	Active	Inactive	Total
Drug - Early Research/Development	1	0	1

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