

## Celladon Corp

### COMPANY AND PIPELINE OVERVIEW REPORT

Coverage of the company and a summary of the drug pipeline portfolio.

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i.e. where the development status for the drug(s) is one of the following: No Development Reported, Discontinued, or Withdrawn.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

## COMPANY OVERVIEW

Company Name	Celladon Corp
Parent Company Name	Celladon Corp
Website	<a href="http://www.celladon.net/">http://www.celladon.net/</a>
Country	US
Number of Drugs in Active Development	4
Number of Inactive Drugs	0
Number of Patents as Owner	8
Number of Patents as Third Party	1
Number of Deals	3
Key Indications	Cardiac failure, Congestive heart failure, Diabetes mellitus, Pulmonary artery hypertension, Pulmonary hypertension, Cancer, Restenosis, Urinary incontinence, Alzheimers disease, Asthma, Cardiovascular disease, Heart arrhythmia, Heart transplant rejection, Ischemia, Myocardial infarction
Key Target-based Actions	Sarco endoplasmic calcium ATPase 2a stimulator, Sarco endoplasmic calcium ATPase 2b stimulator, ATP2A2 gene stimulator, Sarco endoplasmic calcium ATPase 2 modulator, Sarco endoplasmic calcium ATPase 2a modulator, Calcium channel modulator, Cardiac phospholamban modulator, NAD-dependent deacetylase sirtuin-1 stimulator, NFAT gene stimulator, NFkB gene stimulator, SUMO1 gene stimulator, Sarco endoplasmic calcium ATPase 2b modulator, Sarco endoplasmic calcium ATPase modulator, Small ubiquitin related modifier 1 modulator, TP53 gene stimulator, Zinc finger protein gene stimulator
Key Technologies	Small molecule therapeutic, Gene transfer system viral, Drug screening, Assay, Fluorescence, Gene transfer system, Immunodetection, Labeling system, Peptide, Polynucleotide sequence, Protein fusion, Vector expression, Virus recombinant

## COMPANY PROFILE

### SUMMARY

Celladon Corp, based in La Jolla, CA, develops molecular therapies for congestive heart failure. The company's first generation product enhances calcium cycling in the heart, delivered via a recombinant adeno-associated viral (rAAV) vector.

### LOCATION

In May 2012, the company was to establish a subsidiary in The Netherlands to manage its European-based activities.

### LICENSING AGREEMENTS

In November 2009, Celladon acquired exclusive rights to a technology from University of Minnesota to develop molecular therapies for cardiovascular diseases. The technology, measured by Fluorescence Resonance Energy Transfer (FRET), provides increased screening efficiency of compounds able to disrupt protein interactions that is implicated in cardiovascular disease. University of Minnesota received undisclosed funding from Celladon to refine the assay further.

In January 2005, Targeted Genetics entered an agreement with Celladon to develop AAV-based gene therapy targeting the SERCA2a pathway for the treatment of congestive heart failure. Targeted Genetics agreed to commit \$2 million towards the development, manufacture and preclinical development of the therapy, and Celladon would cover all other development, manufacture and preclinical development costs. Targeted Genetics would receive milestone payments and royalties. In March 2009, the agreement was amended where Celladon could use AAV in an expanded field. The company could use contract manufacturing organizations to manufacture Mydicar.

### FINANCIAL

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In February 2012, Celladon completed a \$43 million equity financing. In May 2012, the company announced additional capital proceeds from a second close of the financing, bringing the total capital proceeds to \$53 million.

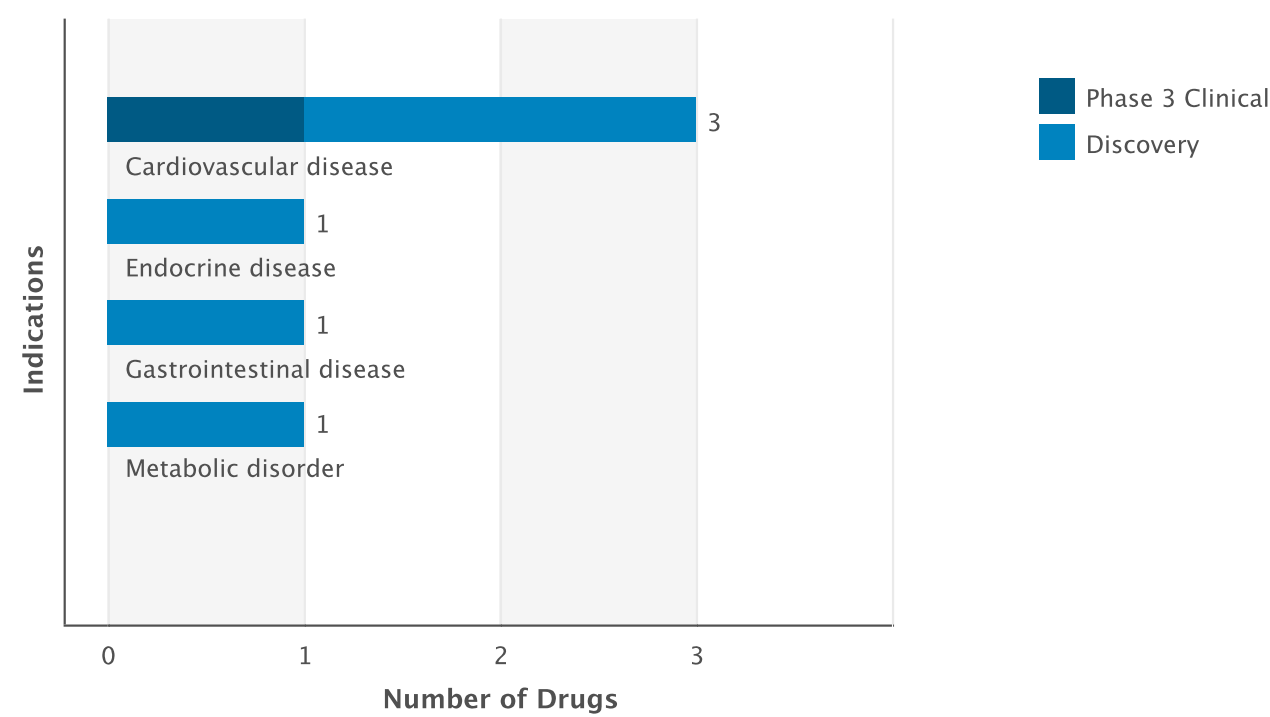
In December 2005, Celladon raised \$30 million in a series B venture financing.

PRODUCT PORTFOLIO SUMMARY

DRUGS

Drugs by Indication

Active Drugs by Indication Chart



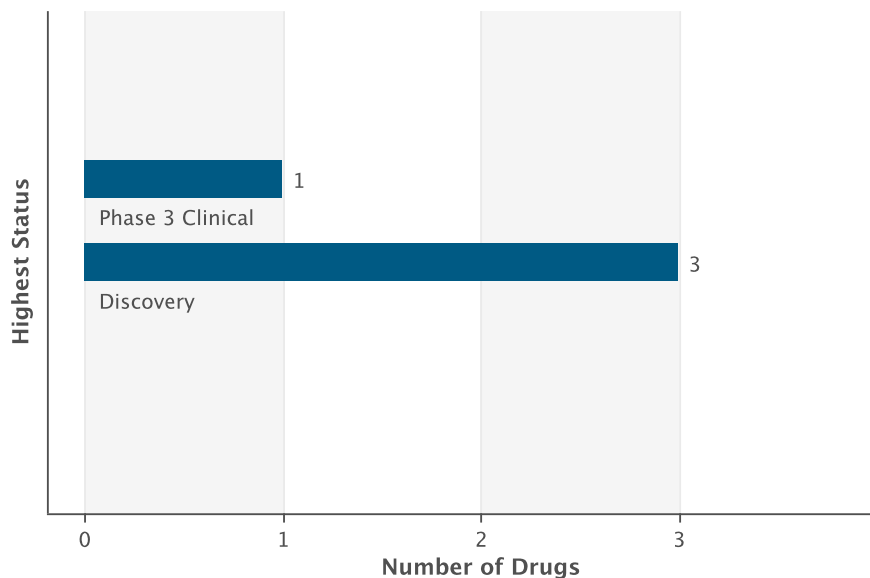
Drugs by Indication Table

Indication	Active	Inactive	Total
Cardiovascular disease	3	0	3
Metabolic disorder	1	0	1
Endocrine disease	1	0	1
Gastrointestinal disease	1	0	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 3 Clinical	1
Discovery	3

## DEALS

Deal Type	Principal		Partner		Total
	Active	Inactive	Active	Inactive	
Technology - Other Proprietary	0	0	1	0	1
Drug - Funding	1	0	0	0	1
Drug - Development/Commercialization License	0	0	2	0	2
Drug - Manufacturing/Supply	0	0	1	0	1

## CLINICAL TRIALS

Trials by Condition Studied

Condition Studied	Ongoing	All
Cardiovascular disease	1	2

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## Trials by Phase

Phase	Ongoing	All
Phase 2	1	1
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	6	1	7
Endocrine disease	1	0	1
Gastrointestinal disease	1	0	1
Genitourinary disease	2	0	2
Degeneration	1	0	1
Immune disorder	3	0	3
Neoplasm	2	0	2
Metabolic disorder	2	0	2
Neurological disease	1	0	1
Respiratory disease	1	0	1
Inflammatory 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.

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## PRODUCT PORTFOLIO DRUGS

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

### Mydicar

<b>Drug Name</b>	Mydicar
<b>Key Synonyms</b>	Mydicar
<b>Originator Company</b>	AmpliPhi Biosciences Corp
<b>Active Companies</b>	Celladon Corp
<b>Inactive Companies</b>	AmpliPhi Biosciences Corp
<b>Highest Status</b>	Phase 3 Clinical
<b>Active Indications</b>	Congestive heart failure
<b>Target-based Actions</b>	Sarco endoplasmic calcium ATPase 2a modulator
<b>Other Actions</b>	Adeno-associated virus based gene therapy, Cardioprotectant
<b>Technologies</b>	Intra-arterial formulation, Infusion, Biological therapeutic, Gene transfer system viral
<b>Last Change Date</b>	12-Dec-2012

### SERCA 2a activators (heart failure), Celladon

<b>Drug Name</b>	SERCA 2a activators (heart failure), Celladon
<b>Key Synonyms</b>	
<b>Originator Company</b>	Celladon Corp
<b>Active Companies</b>	Celladon Corp
<b>Inactive Companies</b>	
<b>Highest Status</b>	Discovery
<b>Active Indications</b>	Cardiac failure
<b>Target-based Actions</b>	Sarco endoplasmic calcium ATPase 2a stimulator
<b>Other Actions</b>	Cardiac agent
<b>Technologies</b>	Small molecule therapeutic
<b>Last Change Date</b>	13-Sep-2011

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### SERCA2b agonists (diabetes), Celladon

<b>Drug Name</b>	SERCA2b agonists (diabetes), Celladon
<b>Key Synonyms</b>	
<b>Originator Company</b>	Celladon Corp
<b>Active Companies</b>	Celladon Corp
<b>Inactive Companies</b>	
<b>Highest Status</b>	Discovery
<b>Active Indications</b>	Diabetes mellitus
<b>Target-based Actions</b>	Sarco endoplasmic calcium ATPase 2b stimulator
<b>Other Actions</b>	Hypoglycemic agent
<b>Technologies</b>	Small molecule therapeutic
<b>Last Change Date</b>	24-Jan-2013

### SERCA 2a gene therapy (inhalant, pulmonary artery hypertension), Celladon

<b>Drug Name</b>	SERCA 2a gene therapy (inhalant, pulmonary artery hypertension), Celladon
<b>Key Synonyms</b>	Mydicar
<b>Originator Company</b>	Mount Sinai School of Medicine
<b>Active Companies</b>	Celladon Corp
<b>Inactive Companies</b>	Mount Sinai School of Medicine
<b>Highest Status</b>	Discovery
<b>Active Indications</b>	Pulmonary artery hypertension
<b>Target-based Actions</b>	Sarco endoplasmic calcium ATPase 2a modulator
<b>Other Actions</b>	Antihypertensive, Adeno-associated virus based gene therapy
<b>Technologies</b>	Inhalant formulation, Biological therapeutic, Gene transfer system viral
<b>Last Change Date</b>	01-Aug-2013

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