FACTS about HEART DISEASE

Biotechnology is Providing Promising New Treatments for Cardiovascular Disease

None of our cells and tissues can function without the adequate oxygen and blood supply the heart provides. If there are any problems with the heart, the rest of the body suffers. It is the vital sign we check as an indicator of good health.

- **Two million Californians** live with some form of cardiovascular disease, including congenital heart disease, coronary heart disease and high blood pressure. Heart disease is the number one killer in California, and the leading cause of mortality in the nation. Heart disease does not discriminate, killing men and women—young and old.

- **There are many factors** that can increase the risk of cardiovascular disease, including genetics, obesity, tobacco use, physical inactivity, high blood pressure and cholesterol, and diabetes. Biotechnology is being applied in a variety of ways to combat this deadly disease.

California's Biotechnology Companies are Committed to Preventing Heart Disease

California's biotechnology companies are constantly researching techniques to treat cardiovascular disease, correct genetic defects, moderate heart disease progression and even cure heart disease. A prime example of a breakthrough treatment is biotech's introduction of clot-buster drugs, or ***thrombolytics***, which revolutionized the treatment of a heart attack. ***Thrombolytics*** work by dissolving a clot that blocks a coronary artery and restoring blood flow to the heart. Hundreds of other therapies have been discovered and mass produced that detect heart disease, lower cholesterol, treat hypertension, stabilize heart rhythms and lessen the damage of a heart attack.

Thanks in large part to the new drug treatments developed by biotech companies, death rates from heart disease are falling. More than 30 California biotechnology companies have more than 50 potential new treatments in development to help fight heart disease. These new medicines promise to continue the already extraordinary progress against heart disease and raise the quality of life for patients suffering from this potentially life-threatening disease.

California Biotechnology Foundation

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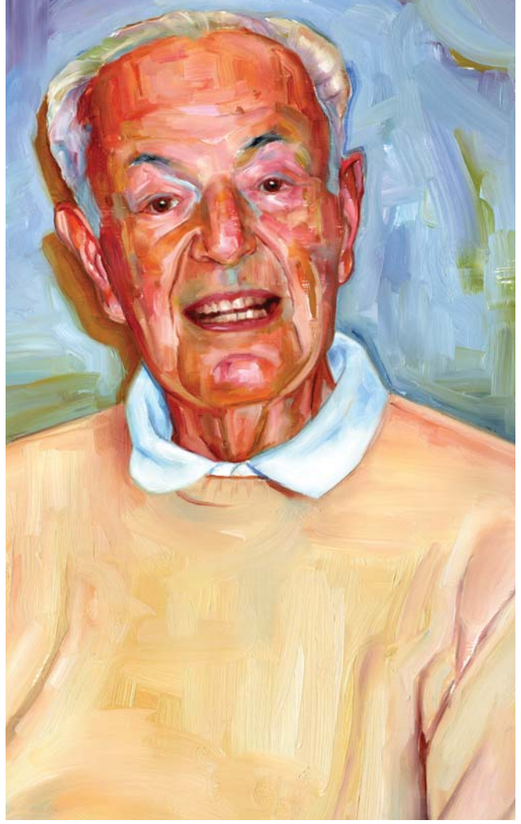

After experiencing shortness of breath, Dr. Rottenberg went for an echocardiogram which found that he had aortic valvular stenosis, an advanced cardiovascular disease. A few months later, he had his first heart attack, and a local cardiac surgeon told him that he should have his aortic valve replaced. However, at 94 years old, his surgeon did not want to perform the high-risk surgery.

Dr. Rottenberg's activity was very limited by his aortic valvular stenosis, and he could not do many of the things he loved to do such as play golf. It was very discouraging for him to live under these conditions and he said, "I had really nothing more to look forward to except keeping my wife company." Living in his poor condition with severely restricted activity was unacceptable for Dr. Rottenberg, so he contacted another doctor who suggested that he might be a good candidate to participate in a clinical trial of the Edwards SAPIEN Transcatheter Heart Valve from Edwards Lifesciences.

Louis Rottenberg, M.D.
(retired), Palm Springs, California

The Edwards SAPIEN Transcatheter Heart Valve is used to replace a failing native aortic heart valve by a procedure performed through the femoral artery in the leg rather than traditional, invasive open-heart surgery. This procedure is done on a "beating heart" without cardiopulmonary bypass, and has the potential to shorten recovery times. It provides a treatment option for patients considered to be high-risk or non-operable for open-heart surgery.

The valve was implanted successfully and Dr. Rottenberg was discharged just three days later. Within a few weeks after his heart valve replacement, Dr. Rottenberg was able to play several holes of golf without any shortness of breath. He says, "[My wife and I] look forward to having a good life together. We have a lot of plans and things we want to do."

CALIFORNIA COMPANY	LOCATION	FDA-APPROVED TREATMENTS
Abraxis BioScience	Union City	**Piccolo**® Express tests / individual tests including CLIA-waived lipids, liver enzymes and glucose monitoring
Berlex Laboratories (Bayer Healthcare)	Richmond	**Betapace AF**™ for the treatment of cardiac arrhythmia
Biogen Idec	San Diego	**Angiomax**®, an anticogulant currently approved in the U.S. for the use in patient undergoing coronary intervention
CV Therapeutics	Palo Alto	**Ranexa**® is indicated for the treatment of chronic angina
Genentech	South San Francisco, Oceanside	**Activase**® is indicated for use in the management of acute myocardial infarction, stroke, and pulmonary embolism
Genzyme	LA, Orange, Monrovia, San Diego	**Fabrazyme**® for the treatment of Fabry disease, which can cause heart disease
Gilead Sciences	Foster City	**Flolan**® for the treatment of primary pulmonary hypertension **Letairis**™ for the treatment of pulmonary arterial hypertension
PDL BioPharma	Fremont	**Cardene**® I.V. for the treatment of hypertension; **Retavase**® for the treatment of heart attack
Scios, Inc.	Mountain View	**Natrecor**® for the treatment of acutely decompensated congestive heart failure
CALIFORNIA COMPANY	**LOCATION**	**IN DEVELOPMENT**
Biogen Idec	San Diego	**Lixivaptan**® for acute heart failure with hyponatremia. **Adentri**® for acute and chronic heart failure. **Aviptadil**® for the treatment of pulmonary arterial hypertension
Cardium Therapeutics	San Diego	**Generx**™, **Corgentin**™, **Genvascor**™ for the treatment of angina, acute coronary syndrome, and ischemia respectively
Cytokinetics	South San Francisco	CK-1827452 for the treatment of heart failure
Cytori Therapeutics	San Diego	Stem-cell based therapies for chronic ischemia; trial on heart attack patients to follow
Geron	Menlo Park	Cell based research for coronary artery disease; controlled activation of telomerase and stem cell programs for the treatment of atherosclerosis, and congestive heart failure
Gilead Sciences	Foster City	**Darusentan** to treat resistant hypertension
Isis Pharmaceuticals & Genzyme	Carlsbad	**Mipomerson** to lower LDL and VLDC, the bad cholesterols
Neurobiological Technologies, Inc.	Emeryville	**Viroprinex**™ for the treatment of ischemic stroke
NovaCardia	San Diego	KW-3902 to treat acute congestive heart failure; K201 (JTV-519) in IV and oral formulations to address acute and chronic atrial fibrillation

CALIFORNIA COMPANY	LOCATION	IN DEVELOPMENT
PDL BioPharma	Fremont	Ularitide for the treatment of acute decompensated heart failure
Portola Pharmaceuticals	South San Francisco	**Betrixaban** and **PRT060128** for the treatment of acute and chronic cardovascular disease
CALIFORNIA COMPANY	**LOCATION**	**DIAGNOSTICS, TOOLS, DEVICES**
Abraxis BioScience	Union City	**Coroxane**™ for use with bare metal stents
Bacchus Vascular	Santa Clara	**Trellis® 8** – a catheter for the treatment of thrombus within a targeted vessel
Biosense Webster	Diamond Bar	Various products for cardiac arrhythmia
Boston Scientific	Mountain View	Implantable defibrillators, cardiac devices, pacing systems, clampless surgery system, beating heart surgery system, endoscopic vessel harvesting – for arrhythmia, cardiac surgery, atherosclerosis
Cardima	Fremont	**Revelation Pathfinder®** and **Tracer**™ to diagnose heart arrhythmia
CardioNet	San Diego	Mobile cardiac outpatient telemetry to diagnose heart arrhythmia
CardioVasics	Palo Alto	ELISA tests to predict arteriosclerosis and acute coronary events
Cholestech	Hayward	**Cholestech LDX** blood testing for cholesterol and heart attack biomarkers
diaDexus	South San Francisco	**PLAC®** test approved for coronary heart disease and ischemic stroke
Edwards Lifesciences	Irvine	Heart valves (#1 maker)
Evalve	Menlo Park	Valve repair system; the open surgical Edge-to-Edge (E2E) technique for open-heart surgery
Genzyme	LA, Orange, Monrovia, San Diego	**N-geneous®** LDL Linearity Verifiers for LDL cholesterol testing
HemoSense	San Jose	**INRatio®** system to measure a patient's blood clotting time
Intuitive Surgical	Sunnyvale	**da Vinci®** Surgical System for open-heart surgery
Medtronic	LA, Palo Alto, Goleta, Santa Ana, Santa Rosa, additional CA locations	Defibrillators, pacemakers, replacement valves, surgical products for atrial fibrillation, heart valve replacement, revascularization; heart failure
Novare	Cupertino	**Enclose®** II anastomosis assist device for coronary artery bypass procedures; **RealHand**™ high dexterity instruments for minimally invasive surgery
Singulex	Hayward	**Erenna**™ Immunoassay System to detect cardiac Troponin I, a biomarker of a heart attack
Thoratec Corporation	Pleasanton	**HeartMate®** Left Ventricular Assist Sytem; **Thoratec®** Ventricular Assist Device System, Implantable Ventricular Assist Device (IVAD™)

Sources: US Government Agency for Healthcare Research and Quality; California Department of Health Services; California Health Interview Survey.

List is not comprehensive. Visit our web site at www.CaBiotech.org for more information.