



Cardiovascular

Advancing cardiovascular innovation

There are many different kinds of cardiovascular disease, which affect over 17 million people worldwide¹. The global cardiovascular disease (CVD) pharmaceutical market alone is forecast to grow to some US\$ 107 billion by 2018², while the US\$ 200 billion³ medical device market (diagnostic, therapeutic and monitoring) is led by CVD sales. Of the new therapeutic pharmaceuticals being developed, the highest proportion is for CVD⁴.

Within this global market, companies and researchers in the BioAlps cluster have contributed significantly to the market. The first stents and the worldwide first balloon dilatation of a coronary artery to treat coronary artery disease were invented and developed in our

THE FIRST STENTS AND THE WORLDWIDE FIRST BALLOON DILATATION OF A CORONARY ARTERY TO TREAT CORONARY ARTERY DISEASE WERE INVENTED AND DEVELOPED IN OUR REGION

region. The innovations in technology and design of cardiovascular devices such as artificial hearts, bioresorbable stents, tissue heart valves and heart rhythm devices with wireless telemetry features are driving the cardiovascular devices market. Surgery has become less and less invasive, driven by such centres of excellence as the Geneva University Hospitals (HUG) and the Bern University Hospital (Inselspital).

As the burden of CVD grows with ageing populations and more sedentary lifestyles, research continues apace. AtheroRemo⁵, a 7th Framework Collaborative Project based in Geneva, is carrying out basic and clinical research focused on inflammatory processes of and immunity in atherosclerotic cardiovascular diseases. Uniquely poised to draw on the multidisciplinary expertise in the region, ARTORG Cardiovascular Engineering (ACE)⁶ is a joint research organisation in which expertise in biomedical engineering research, clinical research and clinical medicine converge to find new ways to diagnose and treat CVD. ACE is part of the newly founded Artificial Organ (ARTORG) Center for Biomedical Engineering Research at the University of Bern. The Departments of Cardiovascular Surgery and Cardiology (Inselspital, University Hospital Bern) and the Medical Faculty of the University of Bern are the clinical partners of ACE.

Two of the major multinational players in the CVD field chose the region to house their European headquarters, Medtronic and Edwards Lifesciences. Several dynamic start-ups have profited from the interdisciplinarity available in the region, notably Endosense, which has developed the first force-sensing catheter for atrial fibrillation ablation.

¹ www.worldheart.org

² www.transparencymarketresearch.com/cardiovascular-drugs-market.html

³ www.lucintel.com/medical-device-market-2018.aspx

⁴ IFPMA, The pharmaceutical industry and global health, 2011

⁵ www.artorg.unibe.ch

⁶ www.artorg.unibe.ch/content/research_units/cardiovascular_engineering/index_eng.html



SYMETIS

Symetis is a privately held Swiss company developing new transcatheter aortic valve implantation (TAVI) solutions for all access: transapical, transfemoral and transaortic. TAVI is recommended for high-risk patients with severe aortic stenosis and not eligible for conventional open-heart surgery.

Led by serial entrepreneur Jacques Essinger, Symetis is targeting the ca. \$2 billion TAVI market. The company's products, ACURATE TA™ and ACURATE TF™, are composed of a porcine biologic valve attached to a self-expandable nitinol stent which features a unique self-seating, self-sealing design, realising straightforward implant procedures, better results and fewer TAVI complications. In post market studies, ACURATE TA™ has demonstrated a high procedure success rate, superior safety profile and minimal PV leak. Symetis' ACURATE TA™ Transapical Aortic Bioprosthesis has been granted CE Mark in 2011 and the ACURATE TF™ transfemoral device, is currently in CE Mark trial phase and is expected to receive approval by the end of 2013.

LINKING CARDIOLOGY WITH OTHER DISCOVERIES

As cardiovascular disease is often linked to other pathologies, cardiology benefits from cutting edge research in related diseases, as well as from the array of micro- and nanotechnologies in the BioAlps region. The combined strength of the region’s research institutions, teaching and research hospitals, and technology centres, provide an environment conducive to research and development, resulting in world premières such as stents.

The lists below are non exhaustive and showcase some examples of the work being done in the region
Find more information in our extensive database: bioalps.org/community/ and, for the six alpine regions, alpslifesciencesearch.com

ACADEMIC INSTITUTIONS AT THE FOREFRONT OF CARDIOLOGY IN WESTERN SWITZERLAND

Geneva University UNIGE	Department of Medicine, Cardiovascular	Heart rhythm, atrial fibrillation, heart flutter	medecine.unige.ch
Geneva University UNIGE & Geneva University Hospitals HUG	Department of Pathology and Immunology	Inflammatory processes of and immunity in atherosclerotic cardiovascular diseases	unige.ch/medecine/pati/en
	Cardiovascular Centre	Biodegradable prostheses, atherosclerosis and heart attack research, clinical research, ablation techniques, cardiac imaging	hug-ge.ch/centre-cardiovasculaire
Ecole Polytechnique Fédérale de Lausanne EPFL	Biomedical Imaging Group	Multiscale motion mapping, positron tomography, stress echocardiography	bigwww.epfl.ch
	Embedded Systems Lab	Miniaturisation of heart monitoring systems	esl.epfl.ch
University of Bern UNIBE & University Hospital Bern (Inselspital)	ARTORG Centre for Biomedical Engineering and Research	Cardiovascular engineering research, functional diagnostics, interventional treatment of cardiovascular diseases. Ventricular assist devices	artorg.unibe.ch
	Swiss Cardiovascular Centre (CVRC)	Cardiac collateral circulation, cardiac transplant, cardiomyocyte biology, angiology, ion channels and channelology, ischemia, reperfusion	cvrc.dkf.unibe.ch
University of Lausanne UNIL & University Hospital of Lausanne CHUV	Faculty of Biology and Medicine (FBM) Cardiovascular Assessment Facility (CAF)	Animal and cellular models of CVD	unil.ch/caf
University Hospital of Lausanne CHUV	Cardiomet (Cardiovascular and Metabolism)	Cardiovascular disease, rhythm disorders, echocardiography, interventional cardiology, molecular cardiology, cardiac transplants	cardiologie.chuv.ch
University of Fribourg	Faculty of Science and Medicine	Cardiovascular physiology and vascular biology	unifr.ch

SAMPLE LIST OF LARGE AND SMALL CARDIOVASCULAR COMPANIES IN THE BIOALPS CLUSTER

ABCDX	Biomarkers panel for brain injury patients	abcdx.ch	HEMACORE	Monitoring of blood coagulation disorders	hemacore.ch
ACROSTAK	Interventional cardiology single use devices	acrostak.com	ITHETIS	Implantable pump for animals, arterial pressure and cardiovascular	ithetis.com
BIO SIG TECHNOLOGIES	Diagnosis and treatment of the electrical systems of the heart	biosigtech.com	MEDELEC MINIMECA	Marker bands, endoscope tubes, implantable alloys, diagnostic biopsies, breakable canulae	precision-metal-tubing.com
BIOSENSORS INTERNATIONAL	Drug-eluting stents, Drug-coated stents, bare metal stents and angioplasty catheters	biosensors.com	MEDTRONIC	Pacemakers, CABG stabilisation system, wire insulation	medtronic.com
BOSTON SCIENTIFIC	Transcatheter aortic valves for transapical, transfemoral and transaortic implantation	bostonscientific.com	NOVOSTIA	Artificial heart valve	novostia.com
EDWARDS LIFESCIENCES	Heart valves, annuloplasty, cannulae and hemodynamic monitoring	edwards.com	SANOFI	Anti-thrombotic, lipid lowering antibody, anit platelet therapy	sanofi.ch
EP SOLUTIONS	EP Workstation noninvasive activation cardiac mapping	ep-solutions.ch	SMART CANULA	Cannulae for cardiopulmonary bypass with innovative interfaces	smartcanula.com
GENKYOTEX	Selective NOX inhibitors for atherosclerosis and CVD	genkyotex.com	SMART CARDIA	Real time ECG monitoring and diagnosis	smartcardia.com

The fact sheet provides a view of the key players in the sector at any given time; it is not comprehensive and is subject to regular updates. This current edition was updated in Autumn 2019.