

mainly European grants has increased, but in the case of cardiovascular research this has been limited by a very low number of applications for grants, by far below the social importance of the disease. A glance at the projects funded in the first calls of the H2020 will remove any doubt about the low applications for grants. The result may be devastating and will contribute in many ways to further increase the differences among countries of the EU.

Many young talents have left the EU for wealthier countries or left research entirely. The competitiveness for poorly funded research may diminish and thereby reduce the success rate in EU grant programs, which reallocates funds contributed to the EU by less wealthy countries compared to richer countries. The lack of large research institutions and campuses is less attractive for biomedical companies producing agents and other research tools, and a large proportion of

research funds goes to imported goods instead of generating work and wealth locally.

Failing to increase cardiovascular R&D funding in EU countries that have low funding levels is a terrible error that can be dramatically aggravated by cuts in public health expenditure. Cardiovascular scientists and cardiologists should commit themselves to combat and correct these errors which may have severe health and economic costs.



doi:10.1093/eurheartj/ehw588

Cardiac centre of excellence

Cardiocentro Ticino in Lugano, Switzerland

A young cardiology centre with an ambitious agenda in basic and clinical research

Created 16 years ago with the support of a private donation, the Cardiocentro Ticino is located in Lugano, a small town in the Italian speaking region of Switzerland, south of the Alps, 80 km north of Milan.

The Cardiocentro Ticino is a non-profit medical centre for the treatment of patients with heart disease. It is the only existing centre of interventional cardiology and cardiac surgery in the region. The Cardiocentro currently has 400 collaborators. Since 2012, it has been an associate institute of the department of cardiology of the University Hospital of Zurich.

Prof. Tiziano Moccetti the medical director of Cardiocentro Ticino also leads the department of cardiology together with Dr Giovanni Pedrazzini. Prof. Stefanos Demertzis is head of the department of cardiac surgery and Dr Tiziano Cassina is head of the department of cardiac anaesthesiology and intensive care unit.

Dr Marco Moccetti leads the Division of Interventional Cardiology. Beyond percutaneous coronary interventions, this team routinely performs percutaneous heart valve procedures including transcatheter aortic valve implantation (TAVI) and the Mitra-Clip device implantation for severe mitral valve regurgitation, as well as percutaneous closure of patent foramen ovale, and hybrid interventions involving

both interventional cardiology and cardiac surgery teams. The recent opening of a 'radial lounge' has increased the rate of coronary angiography procedures using a radial arterial approach up to 50%.

Dr Francesco F. Faletra leads the Division of cardiac imaging which includes 2D/3D echocardiography, coronary CT, and cardiac magnetic resonance units.

Prof. Angelo Auricchio leads the Division of Cardiac Electrophysiology, which is a leading centre for cardiac resynchronization therapy (CRT). New technologies including the leadless Micra pacemaker, S-ICD, and ICS's telemetric control have recently been introduced. In collaboration with the Institute of Computational Sciences of the University of Southern Switzerland (USI), which is also located in Lugano, this Division has created the Centre for Computational Medicine in Cardiology, which develops new computational approaches to cardiac electrophysiology.

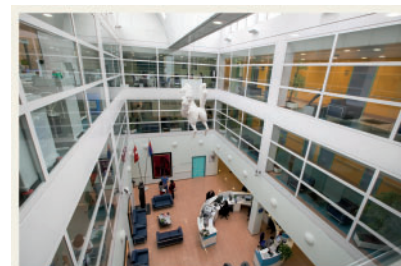
Dr Elena Pasotti leads a clinical research unit that participates in many industry-based clinical trials testing new drugs and cardiovascular devices (e.g. ISCHAEMIA, COMFORTABLE AMI, BIOFLOW II and IV, EXCEL, and LEADERS free trials). Moreover, this unit is responsible for referring all eligible patients to nationwide and interna-



Cardiocentro Ticino



Cardiocentro Ticino staff



Cardiocentro Ticino reception hall

tional registries (e.g. MITRA Swiss, of which Cardiocentro Ticino is the leading centre, Swiss TAVI, AMIS plus-Acute Myocardial infarction in Switzerland and CAPIRE GISSI Outliers).

Dr Daniel Sürder leads a team working on clinical trials of cell therapy for heart disease. This group participated in the randomized multi-centre phase-II Swiss-AMI trial of intracoronary autologous bone marrow cell transplantation in patients after acute myocardial infarction. This trial enrolled 200 patients and compared bone marrow cell transplantation at two different time points after myocardial infarction, namely 5–7 days and 3–4 weeks. There was no statistically significant effect of cell therapy administered early or late post-infarction on left ventricular ejection fraction at 4th and 12th months. However, cell therapy seemed to be beneficial in the subgroup of patients who were treated by PCI very early after the onset of chest pain. More recently, this group completed the Phase-I METHOD trial of percutaneous catheter-based NOGA-guided intramyocardial autologous bone marrow cell injection in patients with chronic heart failure.

It also looks forward to soon participating in the ongoing multinational large-scale BAMI trials assessing the effect of intracoronary reinfusion of bone marrow-derived mononuclear cells on all-cause mortality in acute myocardial infarction. Active patient enrolment was started for the Congestive Heart failure Cardiopoietic Regenerative Therapy (CHART 1) trial. Finally, a cell therapy trial of peripheral artery disease has been launched at the Cardiocentro Ticino. Dr Lucia Turchetto leads the Lugano cell factory that produces the cells used in the clinical trials.

Clinical research carried out at the department of cardiac surgery is aimed at developing novel minimally invasive procedures. The department of anaesthesiology is developing a teaching activity on using a computerized simulation system in fibre-bronchoscopy, and a research activity on therapeutic hypothermia after cardiac arrest.

The Swiss Institute for Regenerative Medicine (SIRM) was created 3 years ago as a research spinoff from the Cardiocentro Ticino. This multidisciplinary institute hosts research groups in basic cardiac biology, neurosciences, and bioengineering.

The molecular and cellular cardiology laboratory, led by Prof. Giuseppe Vassalli and co-ordinated by Dr Lucio Barile, has developed a research program on exosomes (nanometre-sized extracellular membrane vesicles). Work by these researchers showed that exosomes secreted by adult human cardiac progenitor cells mediate the cardioprotective and regenerative effects of these cells via paracrine mechanisms, and improved cardiac function in an animal model of myocardial infarction; microRNAs enriched in such exosomes have been identified as molecular mediators of these beneficial effects (Dr Elisabetta Cervio). In addition, the laboratory has developed a research program on inducible pluripotent stem (iPS) cell-derived cardiomyocytes (Dr Claudia Altomare).

Additional research work focuses on anthracycline and trastuzumab-induced cardiotoxicity (Dr Giuseppina Milano). Two

PhD students from the Integrative Molecular Medicine graduate school of the University of Zurich are currently carrying out their PhD thesis projects in this laboratory under the supervision of Dr Giovanni G. Camici, within the context of the academic affiliation of Cardiocentro Ticino with the University of Zurich.

Dr Silvana Bardelli is working on human c-kit⁺ cardiac cells derived endomyocardial biopsy samples for ex vivo expansion and reinfusion into the heart in patients with congestive heart failure.

Most recently, Prof. Piero Anversa and Prof. Annarosa Leri from Harvard University have joined the group of researchers at Cardiocentro Ticino and are starting their own research projects, mainly in the fields of heart physiology and regenerative medicine.

A research cooperation of the Cell Therapy Unit with Dr Yury Gurfynkel (research clinical centre of JSC Russian Railways) aims to develop a so called 'endocap device', a complex, multi-parameter device that automatically monitors standard clinical parameters, endothelial function, nail fold capillaroscopy, and pulse wave velocity. The project was funded by the Swiss commission of technology and innovation.

Furthermore, Cardiocentro Ticino collaborates closely with the University of Applied Sciences and Arts of Southern Switzerland (SUPSI).

In the educational field, the Cardiocentro Ticino organized two international symposia on stem cell biology and regenerative medicine, the first one on 9–10 May 2016, and the 5th Lugano Stem Cell Meeting on 20–21 June 2016, along with Meet the Experts (MTE) meeting on interventional cardiology on 21–23

June 2016. Recently, our institute was designated a cardiology undergraduate educational centre within the future Medical School at the Università della Svizzera italiana (USI) in Lugano.

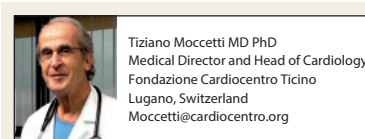
Finally, the Cardiocentro Ticino has promoted a public health program on cardio-pulmonary resuscitation in patients with sudden cardiac death. The program includes both a high frequency of implantable cardioverter-defibrillator devices (ICD) on the territory and training courses for a large number of persons as 'first responders'.

This program has resulted in the achievement of a 55% survival rate in patients with out-of-hospital cardiac arrest, which places the Cardiocentro amongst the best centres worldwide.

In conclusion, the Cardiocentro Ticino is a young cardiological centre with large ambitions in the fields of clinical cardiology and cardiac surgery, as well as in basic and translational research. Its collaborators strongly believe that clinical excellence can only be achieved with an improved understanding of the molecular and cellular mechanisms of cardiac physiology and pathophysiology, along with a strong commitment to exploring novel avenues for treating heart disease.



Cardiocentro Ticino cath lab



Tiziano Moccetti MD PhD
Medical Director and Head of Cardiology
Fondazione Cardiocentro Ticino
Lugano, Switzerland
Moccetti@cardiocentro.org