

**Scientists of Tomorrow at the Frontiers of Cardiovascular Biology 2016 in Florence:**

**Translating basic science into clinical practice is the next frontier**

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Basic science has always been the engine behind the technological evolution of the cardiovascular field. In the late 90s and early 2000s, cardiovascular research reached the peak of its productivity, with rapid translation of novel ideas from the bench to clinical practice, leading to an impressive enhancement in the quality of life and life expectancy of patients with cardiovascular diseases.<sup>1</sup> Although large pharmaceutical companies have tended to close their R&D departments, there has been a large influx of public investment for cardiovascular basic research in the last years. As reported by the ESC in Cardioscape, at least 876 million euros were awarded for cardiovascular disease research project grants under competitive open funding schemes in the EU over the 2010 – 2012 period (<http://www.cardioscape.eu/Final-Conference>).

Despite the progress in understanding and deciphering CV pathology, there has been a decline of successful translation of basic research into clinical practice, with most of the large scale randomized clinical trials providing negative results, disproving their original hypotheses born and bred in our basic science labs.<sup>2, 3</sup> These failures<sup>4</sup> underline the complexity of cardiovascular diseases and the need to develop new experimental models to filter the innovative concepts generated in the lab, allowing only the most promising ones to be tested in the clinical setting. It is our responsibility, as scientists, to ensure a successful translation from the lab to humans that, in turn, will realize real progress in clinical cardiovascular medicine;besides, basic research is the source of innovation that aims to benefit wellbeing of the population, therefore attention to the translation is essential. The new generation of scientists should now take the lead in basic cardiovascular research and come to the fore with original, ground breaking ideas to further advance the field and drive the identification and development of new therapeutic strategies. Young scientists are well positioned to adapt new technologies, to exploit the power of bioinformatics in –omics and other throughput technologies, to further advance the new fields of genomics and epigenetics, to apply newly developed imaging technologies, to translate cell-based regenerative therapies etc. It is the duty of the current generation of advanced researchers, who led the remarkable progress in the field 10 years ago, to train and support the new scientists to advance in the right direction.

The European Society of Cardiology (ESC) is in the forefront of the efforts for efficient translation from basic science to the clinic, and the ESC Working groups are committed in identifying better research strategies to facilitate translation in our field.<sup>5, 6</sup> The ESC meetings are gradually becoming more translational, and the main ESC scientific sessions are now including a large basic science track organized by the Council on Basic Cardiovascular Science (CBCS), while the Frontiers in Cardiovascular Biology (FCVB) meeting is encouraging submission of results from translational research. Through the group of Scientists of Tomorrow, the ESC and the CBCS give to the young cardiovascular research community a leading role in this effort, encouraging their participation in European research excellence.

**“Scientists of Tomorrow” of the ESC: How can young scientists become involved in planning the future of cardiovascular research in Europe?**

The CBCS of the ESC realized that the future of basic cardiovascular research depends upon young scientists within the European Research Area and, in 2013, created a platform that would allow young scientists to exchange their knowledge, express their scientific concerns, and, most importantly, evolve as researchers. A new group of basic and clinical scientists was created, and named “Scientists of tomorrow” (SoT) which currently includes more than 440 members.

The mission of the founders of SoT was to become the voice of young scientists in the decision-making forums of the ESC, and help the Council on Basic Cardiovascular Science to gauge the needs of young scientists in Europe and adapt its policies to encompass them. Importantly, the SoT aim to promote the participation of young basic scientists at the ESC meetings and educational activities.

*“Who are the SoT?....”* The group includes all young scientists working in the field of cardiovascular sciences, and registers as members young researchers who apply through an e-mail to [SoT@escardio.org](mailto:SoT@escardio.org) or who join the SoT LinkedIn network (441 members so far). More information on the SoT can be found in their website

(<http://www.escardio.org/communities/councils/CBCS/Pages/scientists-of-tomorrow.aspx> ). The members of the nucleus group have been renewed once (every two years) to allow new young scientists to get actively involved. The nucleus founders Dr. Charalambos Antoniades and Dr. Samuel Sosalla have been replaced on January 2016 by Dr. Konstantinos Stellos and Dr. Neils Voight, respectively, through a very successful open call and after a thorough internal debate and consensus within the group. .

### **FCVB 2016: the contribution of young scientists**

The next FCVB meeting that will take place in Florence this coming July, has an exciting programme, that brings together creative explorative science in cardiovascular biology with innovative translational science. The participation of young scientists to this upcoming meeting is remarkable, as more than 317 abstracts will be presented by scientists under 40 years old. In addition, many invited lectures and sessions will be delivered by the young cardiovascular community, confirming the increased interest of young scientists for the meeting. The SoT are actively involved in this meeting, by organizing a featured symposium under the “Sciences within European Young Researcher Community”, featuring cutting edge research performed in Europe by young Investigators. In addition, the SoTs are organising a featured symposium on “Dysfunctional adipocytes in cardiovascular biology”, which is sponsored by *Cardiovascular Research*, and the lectures will be featured as full length review articles in an upcoming issue of the journal.

A session with particular interest is that of the Young Investigations Award Competition (YIA) in which selected scientists under 35 years old will present their outstanding work to a panel of renowned senior experts in the field. There are two YIA sessions this year: one focused on the Heart and another one focused on vascular biology. Topics related with the bioengineering of myocardial grafts, cardiac autophagy and drug cardiotoxicity, molecular mechanisms of myocardial non-compaction, the role of PITX2 in arrhythmogenesis and targeting microRNAs in regenerative medicine/autophagy and ageing, are the main topics in the Heart YIA session this year. The vascular

YIA session will include presentations on the role of microRNAs, long-non coding RNAs and stem cells in vascular biology and atherogenesis, the mechanisms controlling NO-mediated coronary blood flow reserve, the impact of perivascular adipose tissue in vascular biology and the role of endothelial cell deaminase in vascular development and homeostasis. These topics illustrate the commitment to taking novel ideas forward and into translation. The quality of the presentations is expected to be as always outstanding, especially given that the 12 presentations have been selected among more than 650 submitted abstracts.

The SoTs will actively participate in the organization of the poster sessions of the FCVB by acting as poster discussants, while members of the young community chair featured symposia in sessions covering a wide range of exciting topics like the role of high-density lipoproteins, vascular remodeling, and obesity in cardiovascular disease will be discussed.

*“FCVB is the main basic science meeting of the ESC, but that’s every 2 years. How can we include more basic science in the main ESC meeting?....”* The ESC annual scientific meeting has traditionally been a forum for clinical cardiologists, keeping the basic cardiovascular community separate from the clinicians. This detachment between basic and clinical cardiovascular science is one of the main factors that confounds the translation of basic science to clinical practice. Therefore the SoT group encourages the young generation to start participating in this annual meeting such that it becomes an inclusive platform for the exchange of ideas between scientists and clinicians, to develop translational cardiovascular medicine. Basic and clinical research should be approached as complementary strands of a unified research field, as integral parts of the same translational research cycle. Clinical researchers need ideas that originate from basic science while basic researchers need to improve their understanding of the true needs of clinical cardiovascular medicine in order to search for the answers to the right clinical questions! The evolving field of translational cardiovascular science should serve as a bridge to link and unify these two areas of cardiovascular research. Through the work of the Council on Basic Cardiovascular Science, coverage

of basic science at the congress has noticeably expanded, both in quantity and quality, over the past twelve years. The Council has a dedicated basic science track in the programme, delivering high quality basic science every year. Starting in 2014, the SoT have been organizing a number of scientific activities aimed at young basic scientists who attend the ESC meetings. In 2015 there was an SoT track in the programme, that included a wide range of outstanding lectures from invited speakers, with the participation of the young researchers. Special sessions on complementary skills, “how to sessions” and many others were very well received by the young cardiovascular research community. The SoT will follow the same successful model in the upcoming ESC 2016 Scientific Sessions in Rome, as they are organizing the SoT track, with many exciting lectures and educational sessions.

*“As a young scientist I need to learn before I start producing science....”* Education is one of the cornerstones of the SoT. In the context of the ESC main meetings over the last 2 years, the SoT have organized a number of educational activities to parallel the exposure to high quality science. “How to tackle manuscript revisions”, “how to write a successful research grant” “training: home or abroad?”, “how to make the transition from post doctorate to principal investigator” are only some of the topics addressed in the SoT sessions. Moreover, the SoT have organized and released [podcasts](#) aimed at education and training of young scientists in different research-related topics including podcasts on “Statistical considerations in designing, analyzing and interpreting basic science” and podcasts on “The secrets of FRET imaging”. In addition, the SoTs have been actively involved in the Basic Science Summer School, an educational activity organized by the CBCS every other year (<http://www.escardio.org/Congresses-&-Events/Courses/At-the-Heart-House/Basic-science-summer-school>).

The involvement of SoTs in planning the future of basic and translational cardiovascular science in Europe is becoming increasingly important, through their multilevel activity. The next FCVB meeting (as well as the next ESC scientific sessions) will be great opportunities for the young researchers to

present their research, attend high quality sessions by the world experts in cardiovascular science but also to meet the members of the SoT nucleus and get actively involved in planning the future of cardiovascular science in Europe and the globe.

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