Cardiovascular Research Funding: European Molecular Biology Organization Awards

Encouraging “A Combination of Cutting-Edge Science and an Open-Minded Attitude Towards People From Other Countries and Cultural Backgrounds”

Recipients of European Molecular Biology Organization funding for cardiovascular research describe their awards and their work to Jennifer Taylor, BSc, MSc, MPhil.

The European Molecular Biology Organization (EMBO) awards EMBO Long-Term Fellowships for postdoctoral research visits of up to 2 years to labs in European Molecular Biology Conference Member States and worldwide. The European Molecular Biology Conference is an intergovernmental organisation comprising 27 Member States. It includes most of the European Union and some neighbouring countries. The EMBO Young Investigator Programme supports young group leaders in European Molecular Biology Conference Member States for 3 years to establish a reputation as excellent scientists.

EMBO Long-Term Fellowships

Carola Rintisch, PhD, Cardiovascular and Metabolic Science, Max-Delbrück-Center for Molecular Medicine, Berlin-Buch, Germany

Dr Rintisch is a postdoctoral researcher in the group headed by Professor Norbert Hubner, MD. In 2009, she was awarded her PhD in biomedical research from the University of Lund, Sweden, for which she characterised arthritis-regulating genetic loci in rats. This research resulted in the positional cloning of the immunoglobulin lambda light chain locus as 1 locus controlling rheumatoid factor production in rats. Her work was published in the Proceedings of the National Academy of Sciences.1 Dr Rintisch says, “I intended to continue with the study of genetic influences on complex diseases and successfully applied for the EMBO Long-Term Fellowship Programme.” Her fellowship, which started in August 2010, is providing funding for her research for 2 years plus a Laboratory Management Course at the end of the 2 years.

“New Insights Into How Epigenetic Modifications Contribute to Heart Disease”

Dr Rintisch’s current research is focused on the identification of genetic determinants influencing epigenetic modifications in a panel of 30 recombinant inbred rat strains.

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European Meetings Update, May 2012

European meetings for the cardiovascular clinical and research communities in May 2012.
These strains represent 1 of the largest rodent recombinant inbred panels to date and are a permanent resource for genetic analysis of cardiometabolic traits, including insulin resistance, hypertension, and left ventricular hypertrophy.

Epigenetic modifications play a crucial role in genome organisation and stability and the control of gene expression, and they have been implicated as a key regulatory mechanism in complex disease aetiology. However, little is known about the interaction between genetic variation and chromatin status and its heritability.

Dr Rintisch carries out chromatin immunoprecipitation sequencing of various histone modification marks in cardiac tissue and genetic linkage analyses using the recombinant inbred strains. The results are used to determine DNA sequence-dependent effects on histone modification marks and explore the relationship between DNA variation and chromatin state. She says, “Our goal is to provide new insights into how genetic variation and epigenetic modifications constitute and contribute to the regulatory gene expression networks that result in phenotypic diversity and contribute to complex disease aetiology, with a special focus on heart disease.”

Reference

Sonia Stefanovic, PhD, postdoctoral scientist, Heart Failure Research Center, Academic Medical Center, University of Amsterdam, the Netherlands

Dr Stefanovic received an EMBO Long-Term Fellowship in March 2011. It is providing her salary for 2 years. “This prestigious award is an invaluable asset at the start of my career as a young independent researcher,” she says. During her PhD in the group of Michel Pucéat, PhD, Dr Stefanovic helped develop a protocol to generate cardiac progenitors derived from human embryonic stem cells. The selected population acquires an epigenetic signature characteristic of cardiovascular progenitors and gives rise to cells with the characteristics of cardiomyocytes, smooth muscle, and endothelial cells. Dr Stefanovic demonstrated that Oct4 transcription factor regulates self-renewal versus cell-lineage specification in a gene dosage-dependent manner. At increased levels of expression above those required to maintain embryonic stem cell pluripotency, Oct4 transactivates the mesendodermal gene Sox17, which in turn activates expression of cardiac marker genes.1 Collectively, these results help to explain how cardiac progenitors are specified at early stages of postimplantation development in a human context.

“To Gain Better Insight Into the Molecular Mechanisms of Gene Regulation in the Conduction System of the Heart”

While using the human embryonic stem cells model, Dr Stefanovic became aware of the inherent limitations of cell culture approaches for studying heart morphogenesis and describing cardiac cell lineages. As a postdoctoral scientist, she wanted to address the same developmental question (ie, how signalling pathways and subsequent downstream genetic pathways govern cell specification and behaviour and how this contributes to building up a functional organ), but using the mammalian embryo. She decided to join the Heart Failure Research Center, which is directed by Professor Antoon Moorman, PhD, and is working in the group of Professor Vincent Christoffels, PhD, who has studied the transcriptional regulation of compartment-specific gene expression in the developing heart for 10 years.

“I am aiming to gain better insight into the molecular mechanisms of gene regulation in the conduction system of the heart,” says Dr Stefanovic. “The origin of many congenital heart diseases, including those affecting the conduction system, remains obscure. My current work is likely to contribute to better insight into the molecular regulatory mechanisms underlying normal or pathological heart development.”

Reference
Jaakko L. O. Pohjoismäki, PhD, research fellow, Department of Cardiac Development and Remodelling, Max Planck Institute for Heart and Lung Research, Bad Nauheim, Germany

Dr Pohjoismäki received an EMBO Long-Term Fellowship in 2009. It provided income for 2 years, most of his moving costs, pension contributions, and a family allowance.

“To Contribute to Basic Understanding of Mitochondrial Biogenesis in the Heart”

Dr Pohjoismäki’s PhD research investigated mitochondrial DNA maintenance in the human heart. He became interested in mitochondrial DNA maintenance in the human heart and carried out a project with the forensic medicine group at Tampere led by Professor Pekka Karhunen, MD, PhD. “Besides acquiring hands-on experience on human heart physiology and disease, the position gave me time to refine my ideas, apply for ethical permission, and collect material to work with,” he says. “I knew that my proposal for a project was exciting, and it was great that EMBO thought the same.” He adds, “I am truly grateful for the open mindedness of our director, Professor Thomas Braun, MD, PhD, because my project was outside his research focus.” Dr Pohjoismäki’s topic deals with deciphering the physiological significance of the specialised mitochondrial DNA maintenance mechanisms in the human heart. He is using a couple of transgenic mice lines to test his ideas of oxidative stress and mitochondrial DNA replication. He has also used protein mass spectrometry to identify new candidate proteins involved in mitochondrial DNA maintenance in the human heart, and he is studying mitochondrial biogenesis in postnatal development of the heart.

“What struck me initially was that many authors working on heart mitochondria base their studies on information gathered from other tissues or cultured cells,” he says. “Yet we have an almost perfect model system for mitochondrial biogenesis in the growing mammalian heart that needs to reorganise its oxidative metabolism and increase its mitochondrial mass accordingly. I believe that my work will make an important contribution to the basic understanding of mitochondrial biogenesis in the heart and hopefully change some prevailing perceptions in the field.”

Reference


EMBO Young Investigator Programme

Cédric Blanpain, MD, PhD, FNRS, Welbio Investigator, Interdisciplinary Research Institute, Université Libre de Bruxelles, Brussels, Belgium

Dr Blanpain received an award from the EMBO Young Investigator Programme in January 2010. It provides €15,000/year for 3 years, travel expenses for international scientific meetings, and the possibility of applying for competitive small grants. The programme stimulates scientific interactions through its annual meeting, joint lab meetings, student exchanges, and more specialised meetings. Young investigators’ labs have access to the European Molecular Biology Laboratory Core Facilities, with its groundbreaking technologies that are not always available in local institutions.

During his doctoral training, Dr Blanpain studied how chemokine receptor type 5, which is critical for HIV infection, interacts with its natural ligands and how chemokine receptor type 5 trafficking influences its function. He undertook postdoctoral training on skin stem cell biology in the lab of Professor Elaine Fuchs, PhD, at Rockefeller University, New York, NY.

“We Hope to Understand More Precisely the Mechanisms That Regulate Cardiovascular Specification”

As a group leader at the Université Libre de Bruxelles, Dr Blanpain demonstrated that mesoderm posterior protein 1 acts as a key regulatory switch for cardiovascular specification during embryonic stem cell differentiation.1 He has also discovered novel markers to isolate the earliest...
cardiovascular progenitors during embryonic stem cell differentiation. His group found that epidermal stem cells are resistant to DNA damage-induced cell death and demonstrated the cellular origin of Merkel cells, as well as the 2 most frequent skin cancers. Finally, they found novel types of mammary stem cells and a novel role for vascular endothelial growth factor in regulating cancer stem cells.

Currently, Dr Blanpain’s group, which includes PhD students, MDs, and postdocs from all over the world, is studying the role of stem cells during development, homeostasis, and cancer. He says, “We collaborate actively with various research groups located in Europe, North America, and Australia. Understanding these important questions will provide new insights into how cells choose a particular identity, how damaged cells are replaced during adult life, and how cancers arise. We hope to understand more precisely the mechanisms that regulate cardiovascular specification, epithelial homeostasis, and the early steps in tumour initiation.”

Reference


Dr Gerhardt worked as an EMBO Long-Term Fellow before embarking on his independent research career. He received the EMBO Young Investigator Programme award in 2007, 3 years into his junior group leader position.

“Our Findings Have Conceptualised the Field, Enabling Vascular Biologists to Look at Blood Vessel Growth With a New Resolution”

During his postdoctoral research, Dr Gerhardt discovered the endothelial tip cells, and his independent research programme has expanded this concept, focussing on mechanisms of endothelial guidance in vascular patterning. He explains, “My focus is on the specification and differential behaviour of individual endothelial cells and their response to signals from the surrounding environment led us (together with collaborators) to advance the understanding of tip/stalk cell formation and to establish key principles governing sprouting and branching of the developing vascular network.” The research aims to unravel the basic mechanisms governing vascular patterning in development and disease. Recent work, funded in part by EMBO, established mechanisms of tip cell selection, dynamic cell competition as a principle of cell rearrangement and specification, guidance by gradients and matrix components, and the role of Notch and Wnt signalling in regulating branching and regression of new vessels.

“Our findings have conceptualised the field, enabling vascular biologists to look at blood vessel growth with a new resolution, addressing single and collective cell behaviour, ultimately taking vascular cell biology into the in vivo setting,” says Dr Gerhardt. “The significance for the clinic is only emerging, and this translational aspect is 1 of the main areas for my integrated research at the London Research Institute and the Vesalius Research Center, VIB.”

Dr Gerhardt has funding from other sources and has been able to use most of the EMBO funding for networking, studentship extensions for collaboration, lab visits, and some consumables and urgent components. He adds, “It has also allowed me to finance unconventional activities, such as a Lab Vision Retreat, in which we explored as a team how we work together.”
Ralf H. Adams, PhD, Managing Director, Max Planck Institute for Molecular Biomedicine, Münster, Germany, and professor, Faculty of Medicine, University of Münster

Professor Adams initially held an EMBO Long-Term Fellowship and then joined the EMBO Young Investigator Programme in 2001 (the first selection round) for 3 years. “Many of the networking activities, which I see as the key advantages of the programme, are still accessible even today,” he says.

Professor Adams has participated in several lab management courses, and over the past 10 years, 4 PhD students from his lab have taken the EMBO Young Investigator Programme PhD course in Heidelberg, Germany, which offers an overview of biological sciences, technical approaches, and soft skills such as presentation techniques. Professor Adams has been an instructor on some of these courses. “A nice benefit was the establishment of networking interactions with other EMBO Young Investigator Programmes and their lab members, which reflects the spirit of EMBO,” he says.

As an EMBO young investigator working as a group leader at the Cancer Research UK London Research Institute, Professor Adams received top-up funds of £15 000 from the UK Medical Research Council. “It was unexpected extra funding and therefore an incentive for doing something special with it,” he says. “I spent all the funds on the generation of inducible, tetracyclin-regulated Delta-like 4 and Jagged1 gain-of-function mice.” The latter played a key role in an article published many years later in which Professor Adams and his colleagues reported an unexpected role of Jagged1 as an antagonist of Dll4-Notch signalling in the growing vasculature.1

Professor Adams adds, “With hindsight, spending the EMBO Young Investigator Programme award topping up funding for transgenic mice was not a bad move.”

Professor Adams believes that the EMBO Young Investigator Programme was important in his early independent career. Besides the funding, activities, and networking opportunities provided by the programme, succeeding in a highly competitive process was encouraging and confidence boosting. He has now returned home to Germany, but his lab remains international. He says, “The combination of cutting-edge science and an open-minded attitude towards people from other countries and cultural backgrounds is 1 of the key messages propagated by the Young Investigator Programme and other EMBO activities.”

Reference

Jennifer Taylor is a freelance medical journalist.
European Meetings Update

May, 2012

3 to 5 May
EuroPrevent 2012
Dublin, Ireland
For further details, see:
http://www.escardio.org/congresses/europrevent-2012/

3 to 3 May
Master Class in Preventive Cardiology—Hypertension
Dublin, Ireland
For further details, see:
http://www.escardio.org/congresses/europrevent-2012/scientific-programme/Pages/master-class.aspx

4 to 5 May
XVII Annual Scientific Congress of the ISCP:
Advances in Cardiovascular Pharmacotherapy 2012
Bucharest, Romania
For further details, see:
http://www.iscpcardio.org/meetings-events/
17th-international-congress-of-iscp/

8 to 9 May
EAE Teaching Course on Clinical Imaging and Therapeutic Innovations in Valvular Heart Diseases
Milan, Italy
For further details, contact:
iscrizioni@arcamedica.com

9 to 12 May
Annual Meeting of the Hungarian Society of Cardiology 2012
Balatonfured, Hungary
For further details, contact:
tikarsag@mkardio.hu

10 to 12 May
Danish Society of Cardiology Annual Meeting
Nyborg, Denmark
For further details, contact:
dcs@daddlnet.dk

10 to 12 May
50th Annual Meeting of the Slovenian Society of Cardiology
Radenci, Slovenia
For further details, contact:
sasa.radelj@kclj.si

10 to 12 May
XVth Edition of the International Symposium on Ischemic Heart Disease
Oviedo, Spain
For further details, see:
http://www.cisquemica.es/

13 to 16 May
20th Annual Congress of the Czech Society of Cardiology
Brno, Czech Republic
For further details, contact:
cks@kardio-cz.cz

15 to 18 May
EuroPCR 2012
Paris, France
For further details, see:
http://www.escardio.org/congresses/EuroPCR/

17 to 19 May
EuroCMR2012
Vienna, Austria
For further details, see:
http://eurocmr2012.medconvent.at/

19 to 22 May
Heart Failure 2012
Belgrade, Serbia
For further details, see:
http://www.escardio.org/congresses/hf2012/

21 to 25 May
Hammersmith Echocardiography Conference 2012
London, United Kingdom
For further details, contact:
info@w12conferences.co.uk

23 to 25 May
27th Annual Meeting of the European Association of Cardiothoracic Anaesthesiologists
Amsterdam, Netherlands
For further details, contact:
eacta2012@mci-group.com

23 to 26 May
46th Annual Meeting of the Association for European Pediatric and Congenital Cardiology
Istanbul, Turkey
For further details, see:
http://www.aepc2012.org/

24 to 24 May
Certification Exam in Adult Transesophageal Echocardiography
Amsterdam, Netherlands
For further details, see:
http://www.escardio.org/communities/EAE/accreditation/TEE/

26 to 27 May
Cardiovascular Spring Meeting 2012
Vienna, Austria
For further details, contact:
kurt.stoschitzky@medunigraz.at

28 to 29 May
8th Course—Anatomy for Electrophysiologists
London, United Kingdom
For further details, contact:
Morphology@rbht.nhs.uk

28 to 30 May
British Cardiovascular Society Annual Conference 2012
Manchester, United Kingdom
For further details, see:
http://www.bcs.com/
European Perspectives

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