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Editorial

Vascular biology: New mechanisms and pathways

Vascular biology is at the forefront of basic and translational research due to its interdisciplinary significance. The interest in the mechanisms of blood vessel formation, physiology and pathology of the cardiovascular system is exemplified by the countless number of publications appearing every year. Therefore, one can imagine the difficulties in selecting the most important subjects to present in a single journal issue; every choice has its limitations.

The current special issue of *Vascular Pharmacology* is such a selection of papers prepared on the basis of presentations delivered during the joint meeting of the European Vascular Biology Organisation and the European Society for Microcirculation, held in Pisa, Italy, from June 3 to 6th, 2015. This was the first joint conference of both societies, and corresponded to the 28th ESM and 8th EVBO meeting.

More than a year has passed since that unforgettable time in the beautiful Tuscan city of Pisa; therefore many of the results presented during the meeting have been published already in the form of original research papers in numerous journals. However, EVBO also chose to prepare a special issue of *Vascular Pharmacology*, to summarise, mostly in the form of review papers, selected topics discussed during the meeting. This special issue is the second association between EVBO and *Vascular Pharmacology*, the first one published after the 6th EVBO Meeting (Krakow, 21–24 September 2011) [1,2]. This issue is of particular significance, as *Vascular Pharmacology* is currently the EVBO official journal, a decision that was ratified at the AGM held during Pisa meeting.

In this special issue, the first two reviews concern basic aspects of vascular development and angiogenesis. The molecular mechanisms that control endothelial homeostasis, vascular development and angiogenesis, and the role of the transcription factor ERG in these processes, are discussed by Shah and co-workers [3]. A brief update on the VEGF receptor signal transduction pathways, crucial to multiple aspects of endothelial biology, is delivered by Lena Claesson-Welsh [4], the plenary speaker who closed the Pisa meeting. The role of VEGF in limb ischemia and vessel regeneration is discussed by Jazwa et al. in a review [5] addressing the subject with a new perspective, calling into the question the role of this protein in experimental and clinical limb ischemia.

Inflammation is the critical event in the pathogenesis of vascular disease. In this context the role of cytochrome P450-derived lipid mediators in physiological and pathological vascular signalling is discussed by Ingrid Fleming [6]. Next the cytoprotective pathways in the endothelium, with particular relevance to atherogenesis, are extensively elucidated by Justin Mason [7]. Both those reviews focus mainly on the endothelium. However, maturation and proper functioning of blood vessels is also dependent on mural cells. Microvascular pericytes control angiogenesis, blood flow and vascular permeability. The review by Avolio and Madeddu [8] concentrates on elucidating the origin of those cells, their pathophysiological mechanisms, the understanding

of which is crucial for the potential therapeutic applications in ischemic heart diseases.

Communication between vascular cells is executed by innumerable mediators. The mode of communications can be variable; in recent years particular interest has focussed on extracellular vesicles (ECVs). Some of these ECVs can be released as the result of cell death (apoptosis), while those involved in active exchange of information between the cells are usually classified as smaller exosomes (40–100 nm in diameter) and larger microparticles (0.1–1 μM). The role of extracellular vesicles as a new player of angiogenesis is discussed by Kholia et al. [9], while McCarthy et al. present their views on the pathogenic or passive role of endothelial microparticles in endothelial dysfunction in autoimmune rheumatic diseases [10]

The pathological changes in the vessel wall can lead to vascular calcification, a topic not often discussed at vascular biology meetings. The EVBO special issue fulfils this need by providing a comprehensive review and an original paper. An overview of numerous mechanisms underpinning vascular calcification and the links with bone loss in a bi-directional interplay is presented by Cristina Vassalle and Annamaria Mazzone [11]. In their research paper, Zhu et al. [12] discuss the novel role for mineralocorticoid receptor in glucocorticoid-driven vascular calcification, and the evidence for their role in calcification of vascular smooth muscle cells.

The final paper in the special issue is an original study by Kachamakova-Trojanowska et al. [13] in which the angiogenic capacity of functional murine iPSC-derived ECs are directly compared to bone marrow derived mesenchymal stromal cells (MSCs), which are claimed to possess similar features. The study demonstrates that, in contrast to iPSC-derived ECs, murine MSCs do not reveal efficient blood vessel-forming capacities.

As mentioned, any selection will inevitably leave out deserving topics. Despite being aware of insightful omissions, we however believe that the papers collected in this issue may generate new ideas for the readers and remind the participants of the conference of the hot scientific (and otherwise!) atmosphere of the Pisa meeting. For those who did not attend the meeting, this themed issue aims at providing an overview of several topical subjects which are the focus of exciting new research, at elucidating existing doubts and at filling the gaps in our knowledge. We propose that this special issue could also be the seed for a similar one to follow the upcoming next joint meeting of EVBO and ESM (<http://esm-evbo2017.org/>), to be held in Geneva, Switzerland, from 29th May to 1st June in 2017. We look forward to seeing you all there to share our interest and enthusiasm for vascular biology research.

Jozef Dulak – President of EVBO.

Yvonne Alexander – EVBO councillor.

Anna Randi – Secretary of EVBO.

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