Frontiers in CardioVascular Biology 2012
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Frontiers in CardioVascular Biology (FCVB) is a biennial meeting organised by the European Society of Cardiology (ESC) Council on Basic Cardiovascular Science (CBCS) together with eight ESC Working Groups and six European basic science societies (Sister Societies). The 2012 Congress was held at Imperial College (South Kensington, London) on 30 March-1 April 2012. It was chaired by Prof. Sian Harding of Imperial College. I attended the conference as press delegate for Annals of Alquds Medicine.

The conference saw five keynote lectures delivered by experts in various fields. Prof. Salvador Moncada reviewed the history of discoveries of the mechanism of action of aspirin-like drugs as well as that of thromboxane A2, prostacyclin and nitric oxide. Prof. Moncada’s laboratory demonstrated in 1988 that the endothelium-derived relaxing factor, nitric oxide (NO), was synthesised from arginine. This allowed the development of molecular tools to regulate NO production. Prof. Moncada also discussed some of the lessons he learnt for the successful pursuit of discovery science, and offered some of his perspectives into the future of cardiovascular research and its applications.

Prof. Peter Carmeliet discussed whether targeting endothelial metabolism can be a possible alternative therapeutic strategy for anti-angiogenic (VEGF targeted) therapy.

Prof. Peter Davies described that in swine arteries, atherosclerotic lesions develop at localized sites of curvatures, branches, and bifurcations where fluctuating blood flow patterns are common and where athero-susceptible endothelium is located. He described the use of microarrays and deep sequencing combined with systems analyses to identify differential expression of genes, small regulatory RNAs and epigenetic modifications in athero-susceptible endothelium. He gave an example how the expression of chronic low-level endoplasmic reticulum (ER)-stress, a protective cellular adaptation to a stressful environment, is characteristic of endothelial cells located in athero-susceptible sites of the aorta, carotid, coronary and renal arteries in normal swine. ER-stress is associated with reactive oxygen species (ROS) fluctuations and linked to inflammatory pathways. He suggested a resilient nature of endothelial biology through adjusting the balance of cellular pathways, resulting in a dynamic adaptation to its physical and chemical environment.

Prof. Rone Heeren described a multimodal molecular imaging approach that combines a number of mass spectrometric imaging approaches with bright field imaging, and targeted immunohistochemistry images to refine understanding of cardiovascular diseases and present a new frontier in molecular imaging of the heart.

Finally, Prof. Deepak Srivastava described how it may be possible to re-program fibroblasts in scar tissue resulting from myocardial infarction (MI) into viable heart muscle cells. Heart tissue consists of beating myocytes and scaffolding fibroblasts. He had previously shown that introduction of only three genes (Gata4, Mef2c, and Tbx5) were required to transform fibroblasts into myocytes. He described how resident cardiac fibroblasts, e.g. ones generated through scaring of heart tissue, can be reprogrammed into induced cardiomyocytes in vivo using gene therapy approach that utilises viral vectors to deliver the required genes. Safety
aspects, such as the potential of re-entry arrhythmias, were also addressed. Prof. Michael Schneider of Imperial College, London, commented to our journal on such approaches by noting that: "Although there are interesting disagreements between groups as to the effectiveness of specific reagents, combinations of reprogramming factors, and viral versus non-viral systems, the general approach is an exciting one, a step-change, with potential for human application if safe and effective in large mammals."

One interesting talk by Prof. Claire Lewis during the session on macrophages, described a method for delivering a prostate cancer-specific oncolytic adenovirus to prostate tumours. The virus was delivered via host cells called macrophages which carried it deep into the (hypoxic) tumour mass and then released large quantities of it. The virus then infected, and replicated inside, neighbouring tumour cells and destroyed them. It also prevented lung metastasis in their prostate tumour model. Phase 0 clinical trials are anticipated to begin soon.

Prof. Jan Nilsson described new strategies injecting cardiovascular disease (CVD) patients with vaccines and monoclonal antibodies to combat atherosclerosis. People at high risk of myocardial infarction (MI) are likely to be the first candidates for such immune approaches. One protocol currently in phase 2a trials in the USA and Canada, utilises recombinant antibodies to target oxidised low density lipoprotein (LDL). Another vaccine (CVX-210), which utilises apolipoprotein (apo) B peptides to raise antibodies that reduces atherosclerosis, awaits FDA approval for Phase 1 clinical trials.

Two studies from Russia and Spain linked intrauterine growth restriction (IUGR) to cardiovascular disease. IUGR, defined as a birth weight below the 10th percentile for gestational age, currently has an estimated incidence of 8.1% of births in developed countries, and 6-30% of births in developing countries. Common aetiologies include chronically malnourished mothers, maternal health problems during pregnancy (such as diabetes) and inadequate transfer of nutrients from mother to foetus through the placenta. The link between IUGR and future heart disease was first recognised in 1989 when it was observed that the lower the weight of a baby at birth and during infancy, the higher the risk of developing cardiovascular disease (CVD) and other chronic conditions in later life.

Short sessions on thrombosis and antithrombotic therapy were delivered by various speakers. Anti-platelet treatment in acute coronary syndromes and coagulation and anti-coagulation therapies were discussed during these sessions. One talk described novel antidotes for new anticoagulants and another discussed why less intracranial haemorrhage is observed with new compared with old oral anticoagulants? New generations of anticoagulant drugs were described. Prof. Jeffrey Weitz of McMaster University, Canada, commented that: "for most patients with atrial fibrillation, the novel oral anticoagulants are preferred over warfarin".

Drug induced Cardiotoxicity and potential drugs shielding heart tissue from injury were the subject of several posters and presentations.

There were many other sessions and award presentations during the congress, which may be viewed on the website for the congress: http://www.escardio.org/congresses/cardiovascular-biology-2012/Pages/welcome.aspx.

The next FCVB congress will be held in 2014 in Barcelona-Spain.

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