Symington Bequest Conference Report

I recently attended an international scientific meeting on Three Dimensional (3D) Cell Culture entitled ‘Advanced Model Systems, Applications, and Enabling Technologies’ held in Freiberg Konzerthaus, Germany (June 2014). This was a busy 3-day event comprised of oral and poster presentations focused on different technologies and their applications. The overall emphasis of the meeting was dedicated to the ability to use technology to advance the ability to grow cells in vitro in a more appropriate manner such that their structure and function more closely align to that of their native counterparts in vivo. The creation of tissue-like constructs in the laboratory has multiple benefits in terms of advancing basic research, drug discovery and safety assessment. This in turn impacts on increasing the efficiency of the research and development process as well as having 3Rs benefits and reducing the numbers of the animals used. It is for these reasons this meeting attracted significant attention from academics and industrialists from many different countries. There were many excellent presentations using such technologies across a range of different disciplines. Some of these were sub-divided into dedicated sessions on disease specific areas, complex models, cancer and stem cell biology.

My interests are in the basic biology behind such models and their attempt to recapitulate the structure and function of tissues in the body. This draws on many years experience of studying tissue structure during development and in normal health and disease and developing cell culture technology. This meeting was exceptionally useful to provide an up to date perspective on new and exciting ways to create such tissue-like constructs in vitro. I gave a poster presentation focused on the ability to create 3D culture systems comprising alternative layers of cell types, to study their interactions, and create novel cell-based assays. The poster complemented other 3D approaches presented at the meeting that were primarily focused on 3D cell aggregate approaches. It was also well received from the perspective that our model more closely represents real tissue structure since many tissue types in the body are anatomically comprised of layered structures. This is a distinct advantage over aggregate-based methods. This event has provided valuable further insight into how researchers are thinking about creating tissue mimetics in the laboratory. However, it is essential that the fundamental principles behind the formation of tissues is understood and upheld regardless of the technological approach used. In depth validation and characterization of such models in direct comparison to real tissue is required to demonstrate the anatomy of the tissues of interest. It was clear during the meeting that this aspect was becoming more widely recognized.

Overall, the conference was exceptionally useful and is in-line with modern developments in tissue engineering and cell biology. The value of such 3D systems depends heavily on under-pinning basic science, in particular, the basic anatomical arrangement of different cell types within these primitive tissue models. This is one of topical themes we are continuing to develop within the Anatomical Society and have recently organized a dedicated symposium in collaboration with the American Association of Anatomists (AAA) to be held in Boston April 2014. This will further demonstrate the importance of basic anatomical science in cutting edge modern technologies.