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Editorial: The Cutting Edge of Cardiovascular Anatomy

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Anatomy has evolved, over several hundreds of years, into a complex discipline spanning from the nanoscale to the macroscopic. With that, cutting edge anatomical research now straddles several scientific fields including Bioengineering, Cell Biology, Developmental and Evolutionary Biology, as well as Clinical Disciplines. The *Journal of Anatomy* therefore is a versatile platform to convey more complex multidisciplinary research than what would in the past be traditionally considered descriptive classical anatomy. With this in mind, our special issue touches upon several aspects in which anatomical knowledge and research interfaces with neighbouring disciplines.

For this special issue we chose to focus on Cardiovascular Anatomy - one of the main topics of the 2021 Anatomical Society Summer Meeting: *Cutting Edge Anatomy*, hosted by the University of Glasgow. This meeting was originally planned for 2020, however COVID-19 resulted in postponement to the following year when the decision was ultimately made to host the conference virtually. Whilst disappointing at the time, this move to an online format resulted in a much larger audience than would typically be present at a physical Anatomical Society meeting, with over 500 delegates attending the live event. It also offered an opportunity for researchers, who otherwise would have been unable to attend, to present highly interesting and innovative research, with contributions from anatomists worldwide.

In this issue, we have succeeded in collating a wide variety of papers, including reviews, short communications, methods, and original research, in line with traditional special issues linked to Conferences of the Anatomical Society. We believe this particular special issue serves to reflect the diverse nature of the anatomical research being conducted in the cardiovascular field and hope that the wide range of techniques and results reported has the potential to enlighten the readership to new avenues of anatomical research and encourage multidisciplinary activity in the Anatomy community.

The issue opens with a historical review of experimental imaging of the microcirculation in the beating heart by **Kalia**. In this paper, Kalia describes how new advances in microscopy and the use of fluorescent antibodies are overcoming previous limitations in imaging some of the smallest vessels in the circulatory system. Staying with the theme of imaging but moving to the chambers of heart, **Church** and colleagues (*Stubbs et al*) review of the right ventricle aims to highlight the importance of the often-overlooked right side of the heart in both health and disease. It brings to the fore modern techniques employed to image and understand the right ventricle's function from a clinical perspective. **Hameed, Conway** and co-workers (*Malone et al*) continue our heart chamber focus but this time looking at the left ventricle and how left ventricular assist devices have evolved over time in order to prevent common adverse events like pump thrombosis. They also highlight anatomical challenges when implanting such devices surgically.

Conway and colleagues (*Antony et al*) complete our heart-focussed reviews with a European Update on Transcatheter Aortic Valve Implantation (TAVI) in the Covid era – a timely piece which aims to provide vital clinical and anatomical background to aortic valvular disease treatment guidelines, the complications of implanting TAVI devices and documents the interventional trials taking place in Europe.

The issue then looks to the future, where the diversity of current cardiovascular anatomical research comes to light with a methods paper by **Duffy** and colleagues (*O'Reilly et al*). In this proof of concept paper, they describe the creation of 3D models using microCT to faithfully recreate total vascular occlusions of the peripheral arteries in the hope of developing biomimetics for device testing.

Another paper looking to accurately recreate vascular geometries is that of **Weinberg** and colleagues (*Shih et al*) who in their brief communication demonstrate the limitations of Batson's #17 resin for arterial vascular casting in both rats and rabbits. Shrinkage of the resin during setting was calculated at physiological pressures and changes in branching angles and aortic curvature are also highlighted.

Our second brief communication leads us back to the heart but this time down to the nanoscale thanks to **Yeruva and Waschke's** effective study of desmosomes using transmission electron microscopy (TEM). Structure and regulation of desmosomal contacts in cardiomyocytes and epithelial cells are compared in the hope of better understanding disease pathogenesis.

Remaining at the cellular level and with TEM, the first of our original communication articles comes from **Mühlfeld** and colleagues (*Messerer et al*) who describe their work looking at the effect of spermidine on mitochondrial number and 3D ultrastructure in aged mouse hearts and whether there is an avenue for therapeutic potential using this naturally occurring polyamine.

The penultimate paper of our special issue is a cadaveric study by **Allardyce, Shepherd and Bailey**, who describe variations in the anatomy of both the aortic arch and the abdominal aorta in a population with a high cardiovascular disease burden. These are areas where complex multi-branch stents are often required, and this paper aims to provide geometric data to improve the design and deployment of such devices.

The final original article from **Cookson** and colleagues (*Mansell et al*) brings us back to the heart and imaging, but draws on the bioengineering background of some of this issue's other papers by highlighting how MRI-based strain measurements can reflect morphological changes following myocardial infarction.

We strongly hope you will enjoy reading this exciting and wide-ranging collection of papers and we look forward to future special issues of the Anatomical Society Meetings, which will hopefully resume as in person events.

Before concluding, we would like to wholeheartedly thank the Anatomical Society and the Editors in Chief of the *Journal of Anatomy*, in particular Professor Tom Gillingwater for his support and encouragement, Managing Editor Edward Fenton for his guidance, and Ms Catherine McRobbie for designing the front cover image. Despite ultimately being online, the Glasgow location is reflected on the cover image of this issue, and we hope delegates will come to visit our city one day soon.

Dr Eilidh Ferguson, Dr Emma Bailey, Prof Fabio Quondamatteo