neuroglia

MDPI

Editorial

Neuroglia: A New Open-Access Journal Publishing All Aspects of Glial Research

Arthur Butt [1,*], Delia Mihaila [2] and Alexei Verkhratsky [3]

[1] Institute of Biomedical and Biomolecular Sciences, School of Pharmacy and Biomedical Science, University of Portsmouth, Portsmouth PO1 2DT, UK
[2] MDPI AG, St. Alban-Anlage 66, 4052 Basel, Switzerland; mihaila@mdpi.com
[3] Faculty of Life Sciences, University of Manchester, Manchester M13 9PT, UK; Alexej.Verkhratsky@manchester.ac.uk
* Correspondence: Arthur.butt@port.ac.uk; Tel.: +44-239-284-2156

Received: 4 December 2017; Accepted: 5 December 2017; Published: 15 December 2017

Today, we announce the new journal *Neuroglia*, which we see as an inclusive and innovative open-access forum for publishing all aspects of glial research. As editors-in-chief, Arthur Butt and Alexei Verkhratsky have over 50 years combined experience in glial research and are supported by an outstanding Advisory and Editorial Boards of international glial researchers. Why do we need a new dedicated journal for glial research? Since publishing our first textbook in 2007, "Glial Neurobiology: A Textbook", neuroglia has become one of the fastest growing areas of research in neuroscience. Ten years later, at the largest neuroscience meeting in the world—the Society for Neuroscience 2017—a "tweet" quipped "Why are there so many glia posters this year? It used to be a Neuroscience meeting". This unprecedented growth in glial research requires a new dedicated journal—*Neuroglia*. Until now, there is only a single journal dedicated to neuroglial research—*Glia*—which acquired a well-deserved reputation since its emergence in 1988, jumping from an Impact Factor of 4.8 in 2011 to 6.2 in 2016, overtaking the Journal of *Neuroscience*. However, over 35,000 papers have been published on neuroglia during this period, and less than 4% were published in *Glia* or in *Journal of Neuroscience*, and the majority of these papers were not open-access. There is a real need for a fresh open-access distribution platform and hence we joined with MDPI to launch *Neuroglia*. To ensure that high quality glial research has the greatest possible research impact, *Neuroglia* aims to be at the forefront of this growing area of research by publishing rigorously peer-reviewed papers that advance our understanding of all aspects of glial biology, physiology, and pathology.

The past years have seen exciting progress in neuroglial research, not least because of advances in the "modern" fields of genetics and molecular biology, but also because of developments in the "old sciences" of anatomy and physiology. New informatics-based methods are beginning to characterise glial cells in humans and model systems, with the identification of genes that regulate fundamental glial functions, such as homeostasis and myelination, generating enormous amounts of new data for data-mining and leading to new potential therapies. Equally, anatomy and physiology are being revolutionised by new imaging techniques in humans and animal models, enabling function to be studied at the whole-brain and even synaptic levels (the so-called connectome), and manipulating specific cells and genes now allows us to determine their effects on function and behaviour in vivo. The field is growing fast, and *Neuroglia* seeks to publish papers in all these aspects of glial cell biology and, through original papers and review articles, provide a link between fundamental research and these state-of-the-art developments.

Neuroglia welcomes submissions on morphology, function, and pathology in the central, peripheral, and enteric nervous systems, throughout the life-course, in invertebrates and vertebrates, in cell culture, in vivo, or using slices, and involving genetically amenable species, such as mice, Drosophila, and zebrafish. *Neuroglia* publishes on all facets of glial cell biology, such as structure,

homeostasis, and metabolism, and biophysical and biochemical aspects of ionic channel and receptor function and intra- and inter-cellular signalling. The journal recognises that it is inconceivable to consider glial cells or any other cells in isolation, and *Neuroglia* promotes studies on glial interactions with other cellular elements, such as neurones, blood vessels, and the immune system, to advance our understanding of long-standing questions concerning learning, cognition, and behaviour, and how these are altered in ageing and pathology. The journal addresses important issues of research focused on glial cells in ageing and disease, including systematic genetic studies and human clinical material. By publishing open-access research that advances our understanding of all aspects of glial cell biology, *Neuroglia* will be at the forefront internationally for disseminating and communicating glial research to academics and clinicians, and to the commercial and public sectors.

Neuroglia is a multidisciplinary open-access journal that aims to relate how glial cells assume every conceivable function aimed at maintaining nervous system function. Indeed, neuroglia oversee the birth and development of neurones, the establishment of inter-neuronal connections (the connectome), the maintenance and removal of these inter-neuronal connections, wiring of the nervous system components, adult neurogenesis, the energetics of nervous tissue, metabolism of neurotransmitters, regulation of ion composition of the interstitial space and many, many more homeostatic functions. From the very beginning of cellular neuroscience, little distinction was made between neural cell types, and the great minds of neuroscience regarded glia as an indispensable element of the neural architecture. *Neuroglia* will publish a special issue dedicated to the history of glial cell science, written by pioneers in the field, aiming to show the development of ideas and concepts of glial cells and their position in nervous system organisation. By doing this, we hope to prime the reader towards the notion that nervous tissue is not divided into more important and less important cells.

Nervous tissue functions properly because of the coherent and concerted action of all of its constituent components. This reaches its zenith in humans, with the creation of thoughts, underlying acquisition of knowledge, its analysis and synthesis, and contemplating the Universe and our place in it. Whilst neurons are clearly the primary signalling cells in the nervous system, being specialised for rapid action potential based transmission along axons and for neurotransmission between cells, it is now evident that astrocytes and microglia both play critical roles in the formation and removal of synapses, whereas the generation of oligodendrocytes is essential to myelinate connections formed in response to life experiences, and without this, the brain is less able to learn new skills. As this area of research grows, *Neuroglia* will provide an innovative route for publishing multidisciplinary research that expands our understanding of glial cells in complex cognitive functions and behaviour.

Previously, there was no dedicated forum for glial neuropathology and an important aim of *Neuroglia* is to help bridge this gap, with original clinical research and insightful reviews and commentaries that seek to integrate and cross-link fundamental glial research and clinical research. As fundamental research has advanced our knowledge of the diversity of glial cell functions and how they are essential for normal brain development and function, so has it become understood that glial cells are involved in every neurological disease. Although glial cells are not the primary targets in most neuropathologies, in its broadest sense, pathology is the loss of tissue homeostasis, which is the function of glia. Glia maintain a state of equilibrium in neural cells, in the nervous tissue and in the body as a whole, as well as psychologically within the individual. Hence, altered glial homeostatic function contributes to neurological disorders, sometimes as a principal element, but often secondary to neural or environmental changes. This concept is exemplified by a number of progressive and fatal neurodegenerative diseases in which glia are the primary target, e.g., the genetic disorders grouped under the leukodystrophies, including Alexander disease (caused by mutations in the astrocyte gene Gfap) and Pelizaeus–Merbacher disease (caused by mutations of the myelin gene Plp1), which result in myelin destruction with subsequent impairment of intellectual and motor functions. Multiple sclerosis (MS) is an example of a primary glial disease, where the autoimmune attack on oligodendrocytes and myelin is the cause of demyelination, resulting in the loss of neuronal function and debilitating clinical signs of the disease. The picture is rarely clear-cut and what are

most often considered neuronal diseases actually have a significant glial component. For example, Alzheimer's disease (AD) and Amyotrophic lateral sclerosis (ALS) are neurodegenerative diseases characterised by astrogliosis, but this may be preceded by astroglial degeneration and atrophy prior to overt neuropathology, indicating that astroglial dysfunction is at the very core of these diseases. Similarly, all neuropathologies result in microglial activation, but activation of microglia is a feature that precedes neurodegeneration in ALS, MS, and AD, and is critical for disease progression through mounting neuroinflammatory and neuroprotective responses. It is not meaningful to consider glia and neurons as functionally separate, and it is inconceivable that dysfunction in one element would not cause dysfunction in the other. *Neuroglia* provides an open-access platform for neuropathology research focused on glial cells, in model systems and humans.

There are numerous reasons why we chose the open-access model for this new journal, and the benefits for the authors are also important. Communicating glial research to academics, clinicians, as well as experts from the commercial and public sectors worldwide is the prime reason. Except for academics, all the other categories of experts do not usually enjoy a paid subscription access to research. Researchers in developing countries are in the same situation. Offering free access to research for such a wide range of specialists worldwide would also allow reproducibility, an important aspect in validating research. We find considerable benefits of the open-access model for the authors, who retain the copyright of their work and enjoy a higher number of readers and users of their results and, eventually, citations to their articles. To encourage authors worldwide to adopt the open-access model, the publication charges will be fully waived for papers submitted to the journal in 2018 and 2019. Another key reason why authors should choose *Neuroglia* to submit their articles to is the rapid dissemination that ensues; we aim to provide a first decision to authors in 14 days and the accepted papers will be published in their final form within 7 days maximum. This will be possible not only due to the team of academic editors, but also to the streamlined and efficient editorial and production processes ensured by the publisher. MDPI journals display some of the fastest turnaround times with an average processing time across all their journals of 45 days from submission to online publication.

We hope you will join us in welcoming the new open-access journal *Neuroglia* and we look forward to receiving your contributions to this new journal, be they original research articles, short papers, commentaries, or review articles. *Neuroglia* welcomes research that advances our understanding of all aspects of glial cell biology and will ensure that high quality glial research has the greatest possible reach and research impact.