



Editorial: Neuroimmunology



Not a long time ago (maybe even now?), it was said that immunology is very distant from neuroscience. In fact, immunologists did not want to hear jargon in neuroscience, whereas neuroscientists did not like to remember the functions of each cytokine or chemokine. Although neuroimmunology was expected to bridge the gap between these major scientific disciplines, many people misunderstood neuroimmunology as being a small field of neurology for those who are interested in multiple sclerosis (MS). As time goes by, it has become evident that the immune and nervous systems use a large number of same molecules in common. Furthermore, the role of the immune system in the neural development or maintenance of cognitive functions has been recognized. More recently (perhaps, in the last decade), a number of very basic immunologists or neuroscientists have started to work in the field of neuroimmunology, whether or not they are clearly aware of it.

This issue of Neurochemistry International focuses on the “neuroimmunology”, for which leading experts have contributed 11 review articles on emerging topics, including neuroimmune cross-talk, immunotherapies, autoantibodies, pathogenic or regulatory T cells, and gut microbiota. Now that neuroimmunology is the primary interests for very basic immunologists, and that the scope of it has greatly expanded, every one would accept that neuroimmunology is not a small division of neurology.

Application of immunotherapies for neurological diseases is an exciting area, wherein neuroimmunologists and clinical neurologists are working together. In this issue, successful applications of B cells or IL-6 receptor drugs for neuromyelitis optica spectrum disorder (NMOSD) have been reported. With regard to preclinical or phase I studies for development of new therapies, this issue also provides important information. It is now widely recognized that immune cells are not always hazardous but may be protective for neurodegeneration. Promotion of

myelin repair by regulatory T cells is a good example (de la Vega Gallardo et al., 2018). Boosting such protective immunity or transferring neuroprotective lymphocytes may lead to the cure of intractable neurological disorders. In fact, a recent trial of regulatory T cell transfer for human ALS (Thonhoff et al., 2018) or blocking PD-1/PD-L1 pathway by antibody in Alzheimer's disease models (Rozenzweig et al., 2019) indicates the growing hope for immunotherapy in neurological disorders.

Identification of a new autoantibody linked with a specific neurological condition is another major topic in this issue. As has been noted after discovery of anti-aquaporin 4 (AQP4) autoantibody, a biomarker for NMOSD, the potential value of autoantibodies as a diagnostic or pathophysiological biomarker is so obvious that many collaborative efforts are being pursued. In addition to the serum or cerebrospinal fluid, studies using blood lymphocytes or even fecal samples may provide some useful biomarkers in the future.

Finally, we would like to thank all the authors and greatly appreciate continuous help by the journal for giving us the opportunity to edit this issue.

References

- de la Vega Gallardo, N., Dittmer, M., Dombrowski, Y., Fitzgerald, D.C., 2018. Regenerating CNS myelin: Emerging roles of regulatory T cells and CCN proteins. *Neurochem. Int.* <https://doi.org/10.1016/j.neuint.2018.11.024>.
- Rozenzweig, N., et al., 2019. *Nat. Commun.* 10 Article number: 465.
- Thonhoff, J.R., et al., 2018. *Neuroimmunol. Neuroinflammation* First published May 18. <https://doi.org/10.1212/NXI.0000000000000465>.

Takashi Yamamura
National Institute of Neuroscience, NCNP, Kodaira, Tokyo, Japan
E-mail address: yamamura@ncnp.go.jp