

Editorial

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This issue of *Neurotherapeutics* is focused on viral infection of the nervous system. From arboviruses to Zika virus, this issue compiles reviews well within domain of the journal. It emphasizes the cross-disciplinary approach of translational neuroscience that discusses our up-to-date understanding of basic biological mechanisms associated with neuroinfectious diseases and how this may translate into neurotherapeutic strategies to ameliorate both common infections such as Epstein–Barr virus (EBV), HIV, and varicella zoster virus (VZV) and emerging viral infections such as Ebola virus and Zika virus.

It is fitting that this issue is dedicated to the memory of Richard Johnson, one of the founding fathers of the relatively nascent field of neurovirology and one of its brightest luminaries. Some of Dr. Johnson's past fellows are contributors to this issue, including Diane Griffin, who discusses alphavirus encephalomyelitis, and Avi Nath and colleagues who discuss the neurologic complication of ebola virus and share their recent first-hand accounts in Africa of this highly contagious and emerging virus infection. NeuroAids (infection of the brain with HIV) has been well studied, and Ron Ellis and Scott Letendre provide an insightful update on treatment of the neurological complications of HIV infection. Neurotropic viruses that we have known for years to infect humans are

discussed in the review by Anita Mahadevan in her perspectives in diagnosis and treatment of rabies viral encephalitis. The human herpes viruses are also well represented in this issue by the knowledgeable discussion by Arun Venkatesan on herpes simplex virus-1 encephalitis in adults, and Peter Kennedy's, issues in the treatment of neurological conditions caused by reactivation of. Dr. Kennedy has a longstanding interest in VZV research, primarily on VZV gene expression during human ganglionic latency and also phenotypic differences between VZV obtained from patients with or without postherpetic neuralgia. In light of the recent emergence of mosquito-borne virus illness, Robyn Klein's review on encephalitic arboviruses is timely and highly informative.

All these excellent reports set the biological and mechanistic stage for rational and novel approaches to intervene in these viral diseases of the nervous system. Fatah Kasanchi and colleagues discuss recent observations on small microvesicles and exosomes in their review on exosomes in viral disease, and how these recently discovered particles may not only be biomarkers of viral disease, but also contribute to the pathogenesis of these disorders by shuttling of viral antigens and/or microRNAs to distal regions in which viruses may not be detected. Kamel Khalili and colleagues explain recent developments in a powerful technique for gene editing and its impact on neuroinfectious disease in their review on gene editing for treatment of neurological infections, and the impact this may have for novel therapeutic options. As a hallmark of many virus infections is an aggressive and sometimes pathologic immunological response, Shila Azodi and Steve Jacobson discuss cytokine therapies in neurologic disease. While this issue presents some of these new and exciting emergent technologies to combat virus infections, old standby vaccinations programs to these agents are also beautifully reviewed by Liebovitch in her article on vaccinations for neuroinfectious disease. Here we get a nice synopsis of the

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current state-of the art of vaccines, vaccine design, and the global impact from common, ubiquitous agents such as EBV to highly lethal emerging public health concerns such as Ebola and Zika viruses. With an appreciation for the variety of viral agents that are associated with neurologic diseases and novel approaches to intervene, Dietrich Haubenberger nicely wraps this all up in how to apply these therapies practically in human trials.

Collectively, this timely and informative issue of *Neurotherapeutics* will hopefully leave the reader with a better

understanding of how the interplay of neurovirology, neuroimmunology, and basic neuroscience of viruses can (either directly or indirectly) infect and cause disease in the nervous system. This will be of interest to both the basic scientist and practicing clinician who can use this information to gain a deeper perspective of neuroinfectious disorders and the approaches to treating them.

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