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Immunoregulation of bacterial-induced keratitis

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Pseudomonas aeruginosa-induced keratitis is one of the most common and destructive of bacterial diseases, ultimately culminating in blindness. This opportunistic, Gram-negative organism is best known to cause bacterial keratitis in extended contact lens wearers. In the United States alone the incidence of microbial keratitis is 25,000-30,000 cases annually with cost of treatment estimated at $15-30 million. This sight-threatening disease is in large part a consequence of the inflammatory response invoked by the host, which depends on the regulation of immune cells, balance between pro- and anti-inflammatory factors released by these cells and the microenvironment, and effective restoration of tissue homeostasis. In this regard and in light of increasing incidence of antibiotic resistance, vasoactive intestinal peptide (VIP), a 28-amino acid neuropeptide, has been implicated as a potent endogenous immunomodulator that affects the immune response in an anti-inflammatory manner. Our studies examine the VIP-induced pro-resolving mechanisms of inflammation and innate immunity using a murine model of corneal infectious disease. Data from our laboratory indicate an essential role for VIP in the resolution of ocular infection and subsequent preservation of the visual nervous system and visual acuity.

Biography

Elizabeth Berger earned her Ph.D. in Anatomy & Cell Biology from Wayne State University School of Medicine (2007), where she focused on immunoregulatory mechanisms of ocular infectious disease, including the role of vasoactive intestinal peptide (VIP), a potent anti-inflammatory neuropeptide. Beth continued to characterize the immune response following P. aeruinosa-induced keratitis as a postdoctoral fellow (2007–2009). At this time, she also sought to expand her studies into the field of traumatic brain injury and subsequent effects on the visual system. In 2010, Beth joined the faculty at the WSU School of Medicine and currently holds a joint appointment with the Departments of Anatomy & Cell Biology and Ophthalmology. Presently, her laboratory uses models of both bacterial keratitis traumatic brain injuries to study the events of the innate immune response, inflammation and disease pathogenesis. Her work is currently supported by a RO1 from the National Eye Institute and a Midwest Eye Bank grant.

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