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Autophagy regulation and Herpes simplex virus infection

Herpes simplex virus-1 (HSV-1) is a double-stranded DNA virus that causes life-long infections. HSV-1 infections may lead to herpetic stromal keratitis that may advance to corneal blindness. Similarly, genital infections by HSV-2 can result in painful sores and blisters. HSV-1/-2 infections can also cause fatal conditions, such as herpes encephalitis, meningitis or neonatal disease. A major defense mechanism of HSV infection is the control of autophagy, an innate immune defense strategy that would normally degrade the HSV virions. Here, to understand how autophagy controls HSV infection, we tested the effects of various autophagy inducers and inhibitors (physiological and pharmacological) on autophagy modulation in key HSV target cells and progression of infection. While a basal level of virus-controlled autophagy is needed for optimal infection, autophagy stimulation or suppression was confirmed to significantly inhibit HSV infection in various cell types without affecting cell viability. Similar findings were made using HSV corneal infection in mouse models. Our findings are of high significance especially since the cornea is an immune privileged tissue and intrinsic mediators of immunity are the key to controlling the infection. This study establishes the importance of autophagy for regulating HSV infection and provides a proof-of-principle evidence for a novel antiviral control mechanism.

Biography

Deepak Shukla has received his PhD in Microbiology and Immunology from the University of Illinois at Chicago (UIC) during 1990-1996. Currently, he is working as the Marion Schenk Esq. Professor of Ocular Virology in the Departments of Ophthalmology & Visual Sciences and Microbiology & Immunology at UIC College of Medicine in Chicago, IL. He is also the Director of Ocular Virology Laboratory at UIC. He serves on the Editorial Boards of prestigious journals, has been a regular Reviewer for over a dozen reputed scientific journals and has authored over 50 peer-reviewed papers including publications in top rated journals such as *Cell, Journal of Clinical Investigation, Journal of Cell Biology, Journal of Biological Chemistry*, etc. He has also written two book chapters and holds two international patents for his discoveries. He was the lead discoverer of 3-O sulfated heparan sulfate as the host cell membrane receptor for herpes simplex virus. He has received outstanding research awards from many organizations including American Herpes Foundation, Research to Prevent Blindness Inc.

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