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Epstein-Barr virus: an overlooked possible contributor to neurodegeneration associated with Alzheimer's disease

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Statement of the Problem: EBV infection in the neural milieu could lead to a number of pathophysiologies. Neurons subjected to the viral infection could either undergo abortive cell-cycle re-entry leading to neurodegeneration or die following another pathway. Whereas infection in the glial cells might incur inflammatory response causing aggravation of degenerative conditions, thereby facilitating neuronal insult. However, the association of EBV with Alzheimer's disease has been debated and remains an enigma to date.

Approach: Association of EBV infection with characteristic AD pathological markers such as amyloid beta aggregate deposition needs to be evaluated. We used a combination of in-silico and in-vitro techniques to examine the aggregation potential of viral proteins and peptides. Further, to determine the effect of indirect insult on neurons by infected glial cells, the aftermath of EBV infection on the biochemical profile of infected glial cells must be investigated. In our study, Raman spectroscopy was deployed to evaluate the same.

Conclusion and Significance: Our study aimed to address various aspects of EBV infection in the neural microenvironment, which could culminate in AD. We tried to address the effects of direct EBV infection in neurons and concluded that EBV proteins could give rise to amyloidogenic peptides, potentially initiating the aggregation cascade. Further, we evaluated the effects of EBV infection in glial cells that could incur indirect insult to neurons, ultimately resulting in neurodegeneration. We observed that EBV primarily modulates the cholesterol biochemistry in the microglial cells.

Biography

Dr. Deeksha Tiwari is a graduate research scholar at the Indian Institute of Technology Indore, India. She has recently submitted her thesis entitled "Exploring the role of Epstein-Barr virus in mediating neuroinflammation and neurodegeneration associated with Alzheimer's disease." She has an MSc from the University of Hyderabad, India, and is trained in biotechnology. She is currently looking for postdoctoral roles that suit her area of interest like neurovirology, neurodegenerative diseases, neuroinflammation, and related fields.

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