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Transcriptomic Profiling of Borna Disease Virus 1 Infection in Adult Rat Organotypic Hippocampal Slice Cultures

Inhalt

Borna Disease Virus 1 (BoDV1) is a neurotropic zoonotic pathogen that causes fatal non-suppurative encephalitis in humans and various livestock. While the white-toothed shrew (*Crocidura leucodon*) acts as a natural reservoir hosting persistent, asymptomatic infections, the adult rat serves as a well-established model for studying the inflammatory response.

In this study, we utilized established organotypic hippocampal slice cultures (OHCs) from adult rats to investigate the transcriptomic landscape during acute BoDV1 infection. Building on previous findings that BoDV1 shows distinct intracellular distribution and viral loads between 3 and 7 days post-infection, we employed nCounter technology to identify differentially expressed genes.

Our results reveal significant regulation in pathways related to apoptosis, tissue/cellular growth and maturation, and inflammatory modulation indicating multifaceted modulation of cellular function of brain cells. Whether comparable regulatory effects in brain cells are also evident during acute infection of reservoirs such as shrews needs to be further investigated as well as effects of invading immune cells. This can be analyzed by hippocampal tissue from in vivo infection studies of rat and shrew models.

Ultimately, this study demonstrates that OHCs are a powerful tool for analyzing and modeling viral neuroinflammation, offering a high-throughput approach to refine experimental directions and reduce the reliance on live animal models.

Keywords

transcriptomics, neuroinflammation, BoDV1

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Professional Status of the Speaker

PhD Student

Junior Scientist Status

No, I am not a Junior Scientist.

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