The Development of Zika Virus Pseudoparticles: A Novel Model for the Future

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The recent rapid emergence of Zika Virus (ZIKV) infection in geographically diverse areas and its link to microcephaly and other neurological disorders have brought ZIKV to the front of global public health concerns. Since the global ZIKV epidemic in 2016, many efforts have been made to protect people against ZIKV. However, there is currently no specific cure or treatment for ZIKV. Therefore, it is crucial to study ZIKV infection in hopes of uncovering a method of prevention. The purpose of this research experiment is to develop Zika Virus Pseudoparticles which are artificially-created ZIKV cells that can enter host cells via the normal ZIKV entry pathway but cannot infect host cells. To create ZIKV pseudoparticles, the DNA sequence of the ZIKV structural proteins, along with packaging plasmids, were inserted into a lentiviral expression vector. Given the outward characteristics of real ZIKV cells, these pseudoparticles serve as a novel model for testing drugs and treatments against ZIKV infection. The experimental data supports the successful development of ZIKV pseudoparticles. The gel electrophoresis results show that the structural proteins were successfully isolated from the ZIKV genome and inserted into the expression vector. Furthermore, analysis of the GFP signal of the cultured cells supports the ZIKV pseudoparticles' successful entry into the host cell. The successful development of ZIKV pseudoparticles can help research efforts in finding a cure to ZIKV. By replicating the normal molecular mechanisms of ZIKV entry, ZIKV pseudoparticles can be used as a model to test the effects of drugs and treatments against ZIKV transfection, without harming the host cells used. This project presents the first-ever, working drug-testing model against ZIKV infection.

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