Zika virus induces the destruction of cancer cells and enhances survival in dogs bearing brain tumors

Malignant brain tumors are among the most aggressive cancers with poor prognosis and no effective treatment. Recently, we reported the oncolytic potential of Zika virus (ZIKV) infecting and destroying human CNS tumors in vitro and in immunodeficient mice model. However, translating this approach to humans requires pre-clinical trials in another immunocompetent animal model. Here, we analyzed the safety and effectiveness of anti-tumoral therapy of ZIKVBR intrathecal injections in three dogs bearing spontaneous CNS tumors. We further evaluated some aspects of the innate immune and inflammatory response during the ZIKVBR administration.

For the first time, we showed that intrathecal ZIKVBR injections reduced tumor size in immunocompetent dogs bearing spontaneous intracranial tumors, improved significantly their neurological clinical symptoms and extended their survival by inducing the destruction specifically of tumor cells and triggering an immune response. The presence of ZIKVBR modulated local pro-inflammatory cytokines and recruited immune cells to the tumor microenvironment. Most importantly, there were no negative clinical side effects following ZIKVBR CNS injections in three dogs confirming the safety of the procedure. These results open new perspectives for upcoming virotherapy using ZIKV to destroy and induce an anti-tumoral immune response in CNS tumors for which there are currently no effective treatments.

Keywords: Virotherapy, ZIKA virus, CNS tumors, canine pre-clinical study, immune cytokine profile.

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Biography

Completing 10 years of experience in cancer biology research, the academic training at Institute of Bioscience, University of São Paulo, has provided an excellent background in multiple biological disciplines including CNS tumor research and advanced therapies. During her MsC, the work with miR-367 as a biomarker and potential therapeutic target led to the 2015 Award of Scientist and Entrepreneurial of the Year, by Nanocell Institute. The PhD Thesis, resulted in several patents applications and preclinical findings that open opportunities for future translational studies to evaluate new putative biomarkers in refining diagnosis, patient stratification, and early detection of relapsed disease, while also revealing novel therapeutic approaches, using the miR-367 inhibitor and the oncolytic Zika virus. Recently, as postdoctoral she continues to investigate alternative immunotherapies with a focus on oncolytic viruses and is coordinating a veterinary clinical trial using the oncolytic Zika virus in dogs with advanced brain tumors.

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