

MOLECULAR DETERMINANTS OF HUMAN NEUTRALIZING ANTIBODIES ISOLATED FROM A ZIKA PATIENT

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The 2015-2016 outbreak of Zika virus (ZIKV) disease has affected many countries and is a major public health concern. ZIKV is associated with fetal microcephaly and neurological complications, and medical countermeasures are needed to treat and prevent ZIKV infection. Here, we report the isolation of 13 specific human monoclonal antibodies from a single imported patient infected with ZIKV in China. Two of the isolated antibodies (Z23 and Z3L1) demonstrated potent ZIKV-specific neutralization in vitro without binding or neutralizing activity against dengue virus (DENV) 1-4, the closest relative to ZIKV, and provided complete post-exposure protection to mice in vivo. Structural studies revealed that Z23 and Z3L1 bound to tertiary epitopes covering envelope protein domains I, II and/or III, indicating potential targets for ZIKV-specific therapy. Our results suggest the potential of antibody-based therapeutics and provide a structure-based rationale for the design of future ZIKV-specific vaccines.