

Structure-based design of engineered proteins towards diagnostics and therapy of flavivirus infections

Roberto Lins¹

¹*Aggeu Magalhães Institute, Oswaldo Cruz Foundation, Recife, Brazil*

Abstract: Protein engineering is a process to develop or tune synthetic proteins towards a desired molecular-level function. Using a combination of *de novo* design and molecular simulations, we engineer immunoreactive proteins inspired by their specific antigen-antibody interactions. Showcases include i. a highly specific synthetic antigen for disease prognosis of ZIKV severity from serum samples of 4+ weeks pregnant women, ii. antibody mimetics with the potential to neutralize ZIKV and DENV viruses infections *in vitro*, and iii. a ZIKV DNA vaccine capable of sustained immune response in mice.

Key-words: Protein design, Zika, Dengue.

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