Dengue viruses and envelope protein domain III-based vaccine candidates

Hossein Fahimi, Department of Genetics, Faculty of Advanced Science and Technology, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran

Abstract

Dengue viruses are mosquito-borne pathogens belonging to Flaviviridae family which are transmitted to human via the bites of infected mosquitoes. More than 2.5 billion people are living in the area with risk of dengue infection. This virus cause dengue fever, dengue hemorrhagic fever, and dengue shock syndrome. Although, all four serotypes of dengue virus are infectious for humans, but the manifestations are slightly diverse depending on the virus serotype. Primary immunity with one serotype is life-long immunity against the same serotype but is not cross-protective against the other serotypes, even may boost the severity of a secondary heterotypic infection via antibody-depended enhancement (ADE) mechanism. Envelope protein (E protein) of dengue virus is essential for binding to host cell receptors and fusion to and entry into host cells. E protein whit three domains, enhances host immunity responses by inducing neutralizing antibodies and domain-III of protein plays a fundamental role in this process. Hence, domain-III of the E protein is a useful antigen for design and production of recombinant proteins for development new vaccines and diagnostic kits. Here, I have presented a brief review of dengue vaccine strategies with emphasizing on a newly developed envelope domain III-based dengue vaccine candidate (ED3-tetravalent protein). Design, expression, and immunogenicity of ED3-tetravalent protein are explained and the results suggested that this tetravalent antigen can enhance neutralizing immunogenic response against all four dengue serotypes.

Recent Publications

1. Sadaf Noavar, Samira Behroozi, Taraneh Tatarcheh, Farshid Parvini, Majid Foroutan, Hossein Fahimi. A novel homozygous frame-shift mutation in the SLC29A3 gene: a new case report and review of literature. BMC Medical Genetics. 2019; 20 (1):1-7
2. Abolfazl Dehkohneh, Parvaneh Jafarie, Hossein Fahimi. Effects of probiotic Lactobacillus paracasei TD3 on moderation of cholesterol biosynthesis pathway in rats. Iran J Basic Med Sci 2019; 22:1-6
3. Seyedeh Hanieh Eshaghi Zadeh, Hossein Fahimi, Fatemeh Fardsanei and Mohammad Mehdi Soltan Dallal. Antimicrobial Resistance and Presence of Class 1 Integrons Among Different Serotypes of Salmonella spp. Recovered From Children With Diarrhea In Tehran, Iran. Infectious Disorders - Drug Targets, 2019, 19, 1-7
4. Hossein Fahimi, Majid Sadeghizadeh, Zuhair M. Hassan, Heidi Auerswald, Michael Schreiber. Immunogenicity of a novel tetravalent dengue envelope protein domain iii-based antigen in mice. EXCLI Journal 2018;17:1054-1068
5. Hossein Fahimi, Mahshid Mohammadipour, Hamed Haddad Kashani, Farshid Parvini, Majid Sadeghizadeh. Dengue viruses and promising envelope protein domain III-based vaccines. Appl Microbiol Biotechnol (2018) 102: 2977. https://doi.org/10.1007/s00253-018-8822-y
6. Hamed Haddad Kashani, Hossein Fahimi, Yasaman Dasteh Goli, Rezvan Moniri. A Novel Chimeric Endolysin with Antibacterial Activity against Methicillin-Resistant Staphylococcus aureus. Front. Cell. Infect. Microbiol. 7:290.doi: 10.3389/fcimb.2017.00290
7. Hossein Fahimi,Majid Sadeghizadeh, Mahshid Mohammadipour. In silico analysis of an envelope domain III-based multivalent fusion protein as a dengue vaccine candidate.Clinical and Experimental Vaccine Research 2016, 5(1) 41-49
8. Hossein Fahimi, Hossein Allahyari, Zuhair Hassan Sarraf, Majid Sadeghizadeh. Dengue virus type-3 envelope protein domain III; expression and immunogenicity.Iranian Journal of Basic Medical Sciences 2014; 17:553-559



Biography

Hossein Fahimi completed his PhD in Molecular Genetics at Tarbiat Modares University, Tehran, Iran. He is a lecturer and researcher at the department of genetics at Islamic Azad University of Medical Sciences, Tehran, Iran. His research interests are Molecular basis of genetic diseases and production of recombinant proteins for different applications in medical biotechnology.

Email: h.fahimi@iaups.ac.ir