conferenceseries LLC Ltd

Journal of AIDS & Clinical Research

Vol.2 No.3

Sindbis virus replicon DNA vector expressing Crimean-Congo hemorrhagic fever virus nucleoprotein antigen induces humoral and cell mediated immune responses in mice.

T Tipih

Division of Virology, Faculty of Health Sciences, University of the Free State, Bloemfontein

Abstract

Crimean-Congo hemorrhagic fever virus (CCHFV) infrequently causes a hemorrhagic fever in humans with a case fatality rate of up to 30%. Currently there is neither an internationally approved antiviral drug nor vaccine against the virus. The aim of the study was to investigate immunogenicity of Sindbis replicons encoding CCHFV nucleoprotein for future development of an efficacious vaccine. Replicons based on the Sindbis virus vector encoding the complete open reading frames of the CCHFV nucleoprotein of South African strains were prepared using recombinant molecular technology. Sanger sequencing was carried out to confirm gene sequences. Gene expression was demonstrated by transfecting mammalian cells and assaying recombinant protein production. Groups of three NIH mice were immunized with 100 µg of vaccine constructs three times intramuscularly three weeks apart. Pairwise comparisons between groups were assessed with the Kruskal-Wallis test. Statistical significance was set at $p < 0.05$. Analysis were performed with the SAS software Version 9.3. Vaccine constructs expressing the CCHFV nucleoprotein, designated pSinCCHF-52S and pSinCCHF-31S, were prepared and nucleotide sequences confirmed. Protein expression was detected by fluorescence microscopy in transfected baby hamster kidney cells assays using serum from CCHF survivors and Western blot analysis yielded bands approximately 52kDa, the expected size of CCHFV NP. Mice immunized with pSinCCHF-52S generated CCHFV IgG specific antibodies, notably higher levels of IgG2a compared to IgG1. Immunizing with pSinCCHF-31S did not elicit detectable nucleoprotein specific antibodies. Splenocytes from mice immunized with pSinCCHF-52S secreted higher levels of Th1-type cytokines; IL-2 ($p = 0.0495$), IFN-γ ($p = 0.0369$) and TNF-α ($p = 0.0495$) compared to the mock vaccine while there was no significant difference in cytokine secretion by cells from mice

Vaccinated with pSinCCHF-31S. The study demonstrated expression of CCHFV nucleoprotein by a Sindbis virus vector. Vaccination of mice with pSinCCHF-52S construct elicited a predominantly Th1-type immune response. Further studies in CCHFV susceptible animals are necessary to determine whether the induced immune responses are protective. However, this study shows the utility of Sindbis replicons in vaccine development against CCHFV.

Acknowledgements & Funding

Polio Research Foundation
South African Research Chairs Initiative, National Research Foundation
National Health Laboratory Service Research Trust Pathology Grant
School of Medicine, University of the Free State
Prof Mark Heise for supplying DNA-launched Sindbis replicons
Supervision
Prof FJ Burt.

References

Ergonul O: Crimean-Congo haemorrhagic fever. Lancet Infect Dis. 2006, 6 (4): 203-214

15th International Conference on Virology, Emerging Diseases & Vaccines, July 20-21, 2020, Montreal, Canada

Abstract Citation: T Tipih, Sindbis virus replicon DNA vector expressing Crimean-Congo hemorrhagic fever virus nucleoprotein antigen induces humoral and cell mediated immune responses in mice, Virology 2020; July 20-21, 2020; Montreal, Canada.