

Comparison of potency and immunogenicity of ERA and PV virus strain based cell culture anti-rabies vaccine produced in Ethiopia

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Two rabies vaccine strains (PV and ERA) used to produce virus suspension were propagated on Vero cell lines in Ethiopia. The titer of the viral suspension was determined by titrating on cell lines and confirmed to be greater than 10⁶ virus/ml. Potency and immunogenicity of the vaccine studied after inactivation of the virus with formalin. Potency test performed using National Institutes of Health (NIH) test which determines the degree of protection conferred by the vaccine in immunized mice challenged with challenge virus strain. Mice were immunized at day 0 and 7 with five different concentrations of test vaccine and four different concentrations of control vaccine, 16 mice in each dilution for both vaccines. VeroRab produced by Sanofi Pasteur was used as control vaccine. Mice were challenged on 14th day of immunization with challenge virus strain (CVS-11) of 25 MLD₅₀/0.03 ml intra-cerebrally. The mice were observed for 14 days and death recorded for each dilution separately. Relative potency calculated and 8.32 IU/ml for ERA and 2.5 IU/ml for PV were obtained. Immunogenicity of the vaccine was determined by immunizing a group of dogs. Eighteen experimental dogs from local common breed were assigned to three groups randomly. Group I and II were vaccinated subcutaneously with 1 ml of ERA and PV based vaccines. Group III left as non-vaccinated controls. To determine immunogenicity of the vaccines, sera were collected and analyzed using Fluorescent antibody Virus Neutralization (FAVN) test. Serum neutralizing antibody titers to rabies virus was determined at days 7, 15, 21, 30, 60 and 90 and mean titers for ERA based vaccine was 1.55, 1.73, 2.02, 3.45, 3.57 and 3.17 IU/ml respectively. Mean titers for PV based vaccine was 1.59, 1.73, 2.19, 3.58, 3.17 and 3.35 on day 7, 15, 21, 30, 60 and 90 respectively. On day 90th after immunization, all control and vaccinated dogs were challenged by 1ml of rabies virus clinical isolate intracranially. All dogs observed for 30 days and 80% of control group dead of rabies; where as all ERA and PV based vaccine immunized dogs were survived. In immunogenicity test, all dogs showed rabies neutralizing antibody titer higher than 0.5 IU/ml of WHO recommended threshold for both vaccines. ERA vaccine immunogenicity test shows slight difference from PV vaccine but, high potency value of three times greater when compared to PV strain and can be produced at lower cost for mass production. Such low cost anti-rabies vaccine production could be suitable for developing country like Ethiopia where rabies is an important health.

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