

Fluorescent Isothiocyanate Dextran Evaluates the Permeability of Blood-Brain Barrier in Rabies Infected Mice Model

Waqas Ahmad^{1,2}, Liu Xinyue¹, Li Yingying¹, Xinyu Wang¹, Ming Duan¹, Zhenhong Guan¹ and Zhang Maolin¹

¹Key Laboratory of Zoonosis, Ministry of Education, Institute of Zoonosis, Jilin University, People's Republic of China

²Section of Epidemiology and Public Health, College of Veterinary and Animal Sciences, Pakistan

Rabies is primarily a horrifying viral zoonosis that annually accounts for 55,000 deaths worldwide. Acute encephalitis develops as the rabies virus (RABV) enters to the central nervous system by crossing the blood brain barrier (BBB) which is a tight junction of endothelial cells. In this study, three different molecular weights (70 kDa, 150 kDa and 200 kDa) of fluorescent isothiocyanate dextrans (FITC-Dextrans) were used to measure the extent of BBB damage and subsequent leakage patterns in brain tissues of rabies infected mice which were post-immunized with neutralizing antibodies to observe whether it has positive effect on infected mice by decreasing the death ratio. The brains were processed for immunofluorescence to observe the neutralizing antibodies and its relevant compatibility with the leakage of FITC- Dextrans.

Results showed that 70 kDa and 150 kDa FITC-Dextrans efficiently crossed BBB, and produced fluorescent illumination mainly in the cerebral cortex of brain. The enhancement of BBB permeability was significant at 5th day of post-immunization, while the neutralizing antibody neutralized some rabies virus particles by crossing BBB, but it did not present enough treatment effect to the dying mice. These findings suggest that FITC-Dextran is an important fluorescent marker to investigate the integrity of BBB permeability.

Keywords: Rabies virus, blood-brain barrier, Evans blue, FITC-Dextrans, neutralizing antibody.