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Molecular epidemiology of rabies virus in Nepal

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Rabies is en endemic and one of the priority Zoonoses in Nepal. Death of about 150 people and 200 animals annually has been reported due to rabies in the country. However its epidemiology remains largely unappreciated in Nepal, where limited information is available about the spatiotemporal dynamics of the main etiological agent, the rabies virus (RABV). In this study, the epidemiological data of rabies from 20008 to 2012 were collected from 75 districts of Nepal and analysed. Mean while a total numbers of 186 clinical samples were collected 128 from dogs, 15 goats, 14 cattle, 11 buffaloes, 4 cats, 3 rats, 2 pigs, 2 mongooses, 2 bats, 1 alpaka, and 1 rabbit. All samples were tested by Rapid Antigen Detection Test followed by Fluorescent Antibody Test. In parallel, a total of 24 rabies virus samples collected from 2003 to 2011 were sequenced at Institute of Pasteur and Australian Animal Health Laboratory for both the nucleoprotein and the glycoprotein genes in full length and, analysed using neighbor-joining and maximum-likelihood phylogenetic methods with representative viruses from all over the world.

During the period (2008-2012), a total of 238 outbreaks and 401 animals were found dead due to rabies. Out of 401 animals died, 35.16%, 33.1%, 21.95%, 7.23% and 2.4% were dogs, cattle, buffaloes, goats and pigs respectively. Outbreaks of rabies occurred thought out the year. Rabies has been prevalent in 44 districts. The percentages of test positive samples revealed 61.7 in dogs, 80 goats, 71.4 cattle, 54.5 buffaloes, 50 mongooses and 100 in alpaka. Out of 24 laboratory analysed samples 5 were identifyed as Indian Subcontinent and 19 were Arctic Like rabies clades. This study revealed the presence of a surprising wide genetic diversity of RABV, with the co-existence of three different phylogenetic groups: an Indian subcontinent clade and two different Arctic-like (AL) sub-clades (AL-1 and AL-3) within the Arctic-related clade. This is the first report of finding two new rabies virus clades (Indian subcontinent and AL-1) circulating in Nepal.

Key words: Indian subcontinent, Arctic related clades, and Rabies virus

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