

Detection and genetic diversity of water buffalo astrovirus in Guangxi province of China reveals neurotropic, genetic recombinant and possible interspecies transmission

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Abstract

Astroviruses (AstVs) are major causative agents of gastroenteritis in children and had been detected worldwide. Recently, the novel neurotropic AstV associated with encephalitis and meningitis has been found in different species including human, bovine and ovine. However, little is known about the prevalence of neurotropic AstVs in water buffalo of China. In this study, we examined fecal samples from water buffalo in the Guangxi province of China and found different lineages of Water Buffalo Astrovirus (BufAstV) infections. In addition, we confirmed that the BufAstV infection of the brain tissues of a dead calf by immunohistochemistry technology in this study. Based on the 3'RACE and next-generation sequencing technologies, 2 full-length genomes (BufAstV-NNA-14 and BufAstV-NNA-12) and 2 ORF2 genes (BufAstV-NND-s2 and BufAstV-NNA-17) of AstVs from this source were sequenced. Phylogenetic analysis of the ORF2 indicated 3 major lineages of BufAstVs including a novel neurotropic BufAstV, a BufAstV which is related to Bovine Astrovirus (BoAstV) and a classical BufAstV. Moreover, the occurrence of genomic recombination between BufAstV and BoAstV strains have been identified. This is the first report to found a BufAstV infected in brain of water buffalo in China and details of the epidemiology, genetic diversity and possible interspecies transmission of BoAstV and BufAstV in water buffalo from the Guangxi province of China are described. KEYWORDS: astrovirus, water buffalo, bovine, neurotropic, genetic diversity, Guangxi province

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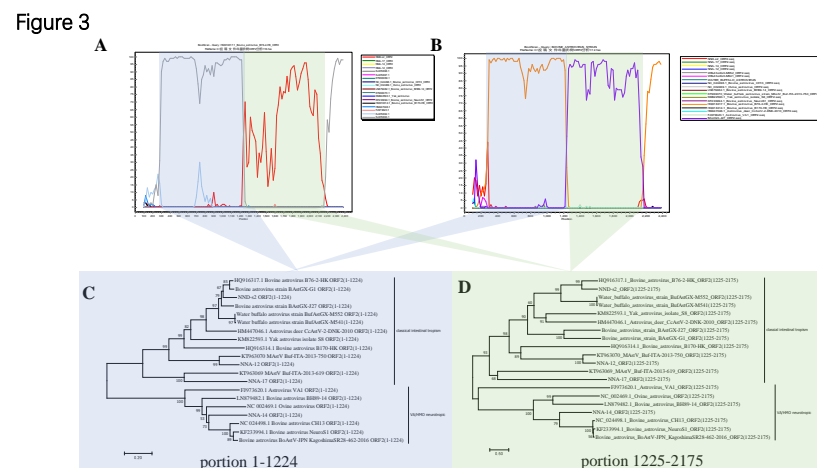
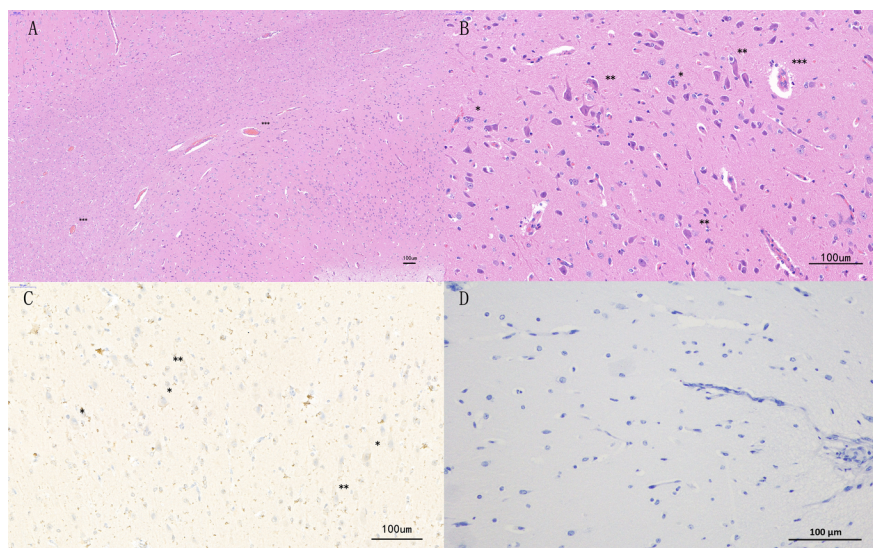
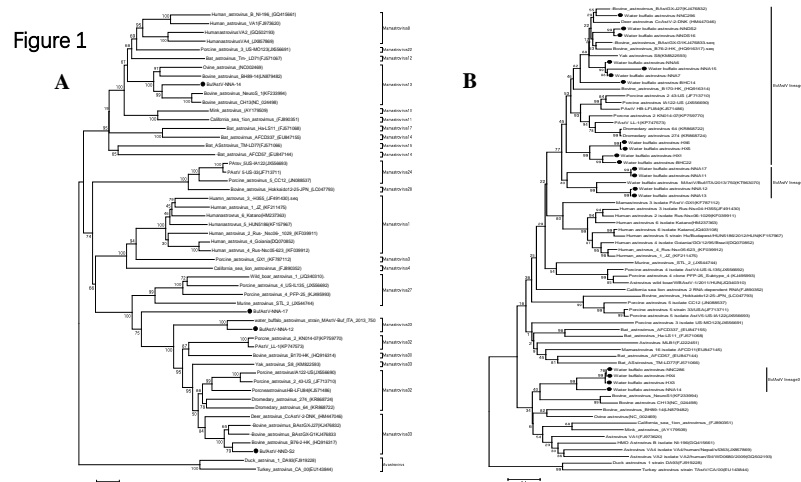


Table 1: Details of samples information and detected results

Sampling Location	Date	Number of samples and the age	No. of positive	Positive rate	Partial ORF1b clone names and GenBank accession numbers
Nanning A	2019.4	10(>150 days)	6	80%	NNA-6 (MT492426) , NNA-7 (MT492425) , NNA-12 (MT492423) , NNA-14 (MT492439) , NNA-15 (MT492440) , NNA-17 (MT492438) , NNA-11 (MT492424), NNA-13 (MT492422),
		10(<150 days)	10		
Nanning B	2019.4	10(>150 days) 10(<150 days)	0	0	
Nanning C	2019.4	20(<150 days)	8	40%	NNC-286 (MT492437) , NNC-296 (MT492436)
Nanning D	2019.5	20(<150 days)	2	10%	NND-S2 (MT492435) , NND-S16 (MT492434)
Nanning E	2019.5	20(>150 days)	0	0	
Beihai A	2019.6	10(<150 days)	0	0	
		10(>150 days)	0		
Beihai B	2019.6	10(>150 days)	0	5%	BH-C14 (MT492433)
		10(<150 days)	1		
Beihai C	2019.6	10(>150 days)	0	5%	BH-C22 (MT492432)
		10(<150 days)	1		
Beihai D	2019.6	9(>150 days)	0	0	
		9(<150 days)	0		
Guigang	2019.10	20(>150 days)	0	0	
Guigang B	2019.10	25(>150 days)	0	0	
Hengxian A	2019.9	29(>150 days)	0	0	
Hengxian B	2019.9	24(<150 days)	5	20%	HX-1 (MT492431) , HX-3 (MT492430) , HX-4 (MT492429) , HX-5 (MT492428) , HX-6 (MT492427)
		21(<150 days)	0	0	
Lingshan A	2019.8	153(>150 days)	6	4%	
Total sample: 297		144(<150 days)	27	18%	Total positive rate: 11%