

Evidence for Replication of an Unusual G8P[14] Human Rotavirus Strain in the Feces of an Alpine Goat: Zoonotic Transmission from Caprine Species

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Abstract : Background: Rotavirus group A (RVA) strains with G8P[14] specificities are usually detected in calves and goats. However, these strains have been reported globally in humans and have often been characterized as originating from zoonotic transmissions, particularly in area where ruminants and humans live side-by-side. Whether human P[14] genotypes are two-way and can be transmitted to animal species remains to be established. Here we describe VP4 deduced amino-acid relationships of three Moroccan P[14] genotypes originating from different species and the receptiveness of an alpine goat to a human G8P[14] through an experimental infection. Material/methods: the human MA31 RVA strain was originally identified in a four years old girl presenting an acute gastroenteritis hospitalized at the pediatric care unit in Rabat Hospital in 2011. The virus was isolated and propagated in MA104 cells in the presence of trypsin. Ch_10S and 8045_S animal RVA strains were identified in fecal samples of a 2-week-old native goat and 3-week-old calf with diarrhea in 2011 in Bouaarfa and My Boussehham respectively. Genomic RNAs of all strains were subjected to a two-step RT-PCR and sequenced using the consensus primers VP4. The phylogenetic tree for MA31, Ch_10S and 8045_S VP4 and a set of published P[14] genotypes was constructed using MEGA6 software. The receptivity of MA31 strain by an eight month-old alpine goat was assayed. The animal was orally and intraperitoneally inoculated with a dose of 8.5 TCID₅₀ of virus stock at passage level 3. The shedding of the virus was tested by a real time RT-PCR assay. Results: The phylogenetic tree showed that the three Moroccan strains MA31, Ch_10S and 8045_S VP4 were highly related to each other (100% similar at the nucleotide level). They were clustered together with the B10925, Sp813, PA77 and P169 strains isolated in Belgium, Spain and Italy respectively. The Belgian strain B10925 was the most closely related to the Moroccan strains. In contrast, the 8045_S and Ch_10S strains were clustered distantly from the Tunisian calf strain B137 and the goat strain cap455 isolated in South Africa respectively. The human MA31 RVA strain was able to induce bloody diarrhea at 2 days post infection (dpi) in the alpine goat kid. RVA virus shedding started by 2 dpi (Ct value of 28) and continued until 5 dpi (Ct value of 25) with a concomitant elevation in the body temperature. Conclusions: Our study while limited to one animal, is the first study proving experimentally that a human P[14] genotype causes diarrhea and virus shedding in the goat. This result reinforce the potential role of inter- species transmission in generating novel and rare rotavirus strains such G8P[14] which infect humans.

Keywords : interspecies transmission, rotavirus, goat, human

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