

The biodiversity level in prion protein gene (PRNP) in sheep, goat and dromedary rearing in Algeria.

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Prion disease is characterized by degeneration of the central nervous system caused by the formation of aggregates of a specific protein. The lack of effective preventive and therapeutic approaches represents a serious problem in their management. This is especially true for animal prion diseases which behave like infectious and contagious diseases. This disease has been identified in different ruminant species such as cattle with bovine spongiform encephalopathy (BSE), scrapie in sheep, goat and chronic wasting disease (CWD) in deer. In camelids, Camel prion disease (CPrD) was identified for the first time in 2018 by Dr Baaissa Babelhadj in a slaughterhouse in Ouargla in Algeria with a collaboration with Prof. S.B. Suheil. The well-known role of variations of the prion protein gene (PRNP) in conferring resistance / susceptibility represents an opportunity which has been exploited to select populations genetically resistant to the disease. Here, we studied the variability of PRNP in two hundred and thirteen Algerian sheep of eight breeds (Ouled Djellal, Rembi, Hamra, Berbere, Barbarine, Sidaou, Taadmit and Tazegzawt) without any clinical manifestation of scrapie having been analyzed. Sequencing of the entire PRNP coding sequence showed four main alleles (ARQ, ARR, AHQ and ARH) based on codons 136, 154 and 171 with different frequencies among the races studied. In addition, 14 additional non-synonymous polymorphisms (Q101R, N103K, M112T, A116P, M137I, L141F, I142M, H143R, N146S, R151G, Y172D, N176K, H180Y and S240P) as well as two synonymous polymorphisms at codons 231 and 237 were found. in the PRNP gene. Interestingly, the

N103K, M137I and I142M polymorphisms were not previously described in sheep. The ARQ, ARR and ARH haplotypes were present in all races with the highest frequency of ARQ in Barbarine. ARH was absent in the Barbarine race and the VRQ haplotype was absent in all Algerian races studied. The ARQ and ARR alleles were the most common with frequencies ranging from 30 to 65% and 8 to 26%, respectively, in different breeds. These results represent the first study on the variability of PRNP in Algerian sheep and may serve as a basis for the development of breeding programs to make national sheep breeds resistant to scrapie. PRNP polymorphisms were also analyzed in the four main Algerian goat breeds (Naine de Kabylie, Arbia, Mozabite, Mekatia), and in two breeds indigenous to southern Italy (Aspromontana from Calabria and Cilentana from Campania). The results were also compared with two indigenous Sicilian breeds previously described (Girgentana and Rossa Mediterranea). Seven amino acid substitutions were detected in the Kabylean Dwarf goat which represents the original native Berber breed. All other races did not show more than six variants and common polymorphisms were present at codons, 154 and 240. Isoleucine at position 137 was present in Algerian races only. The Italian Cilentana breed shared more variants with the Algerian breeds while the Aspromontana breed was the only one to present a serine at position 127. New exclusive variants were not detected because all polymorphisms were already described in others. goats in the world. The protective allele of the scrapie encoding lysine (K) at the level of codon 222 was detected in the races Dwarf of Kabylie and M'zabite at low frequency whereas it is present at frequencies higher than 10% in all Italian breeds reared in regions with a high incidence of scrapie. The overall results showed a substantial number of polymorphisms in PRNP, particularly in the Kabylean Dwarf race, which also carried unique genotypes. Also, 232 animals from six populations of dromedaries (Azawad, Hybrid, Naili, Rguibi, Sahraoui, Targui) reared in Algeria in summer analyzed. A Gly69Ser mutation was observed in a single animal from the Targui population and a Gly134Glu polymorphism in the Azawad, Hybrid and Rguibi populations, with a frequency of the 134Glu allele of 2.6%, 7.7% and 7.1% , respectively. Although our work highlights a low variability of PRNP in Algerian dromedaries, as a possible indication of a recent evolutionary history of CPrD, they also provide evidence for PRNP variants whose role in resistance / susceptibility to prion diseases. deserves to be deepened.

Key words : Sheep, goat, camel, prion, genetic, Algeria.