

Recent Advances on Biology and Genetics of White, Black and Brown Coat Color in Alpaca

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In order to characterize white, black and brown coat color in alpaca, an experimental trial was made in Peruvian INIA Quimsachata Experimental Station. One hundred forty five offspring born from the following matings: 4 white rams x 36 white dams, 4 white rams x 39 pigmented dams, 9 pigmented rams x 70 pigmented dams, and, among the last mating, 4 black rams x 25 black dams, 2 black rams x 20 brown dams, and 3 brown rams x 25 brown dams. Melanin type and content and melanosome structure were determined for black and different shades of brown. The inheritance of white is defined by a single gene; it is independent and completely dominant on pigmented animals, without any modifying effect and without difference in segregation on black and brown patterns. Differently, the relation of dominance between black over brown does not seem fully supported by clear cut evidences. The whole coding region (CDS) of *Asip* and *MC1R* cDNA in 35 colored Peruvian alpacas were characterized. Seven single point mutations in the CDS of alpaca *Asip* cDNA, three silent and four missense, were described. *MC1R* analysis unveiled a total of ten mutations in the CDS: one 4bp frameshift, four silent and five missense mutations. The analysis of the *Asip* 3'UTR showed three mutations, one transversion and two transition mutations. Similarly, three transition mutations were also identified in the 3'UTR of *MC1R*. Furthermore, two different 5'UTRs were characterized for *MC1R*. Three different *Asip* alleles for recessive black color, a^H , $a^{\Delta 57}$ (deletion) and a^{hT} , were validated by segregation analysis.