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A Cytogenetic comparison between yak (Bos grunniens) and cattle (Bos taurus)

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A sample of 28 yaks (Bos grunniens) (9 males and 19 females), kept in the province of Teramo (Italy), was cytogenetically analyzed in order to investigate similarities or differences with cattle (Bos taurus). The results were as follows: (a) the chromosomal makeup of the yak was 2n060,XY, as for cattle; (b) n numerical as well as structural chromosomal abnormalities were found in the sample investigated; (c) the incidence of chromosome + chromatid breaks was 3.7 vs 3.0 % as for cattle; (d) the GTG- RBG- and RBA banded karyotypes were all similar to the cattle standard karyotypes; (e) the CBA-banding pattern was similar to that of cattle; (f) the mean rate of SCE/cell at 10 μg/ml (f.c.) of BrdU was 5.2±2,23 (range 1–13), similar to that of cattle; (g) silver staining revealed the presence of telomeric NORs on five pairs of autosomes n. 2,3,4,11 and 25, as for cattle; (h) Zoo-FISH with bovine painting probes derived from microdissected chromosomes 5-X-Xcen and Y- upon yak metaphase chromosomes showed complete hybridization; (i) FISH-mapping of bovine BAC-clones containing ZFY- and SRY- genes revealed the same location on the yak Y-chromosome. All these data demonstrate the close evolutionary relationships between yak and cattle. However, the fact that Bos taurus x Bos grunniens F1 male hybrids are sterile, while the females are normally fertile, would suggest that the genomes of the two species are not completely homologous and that minute structural differences might exist in the chromosomes of the two species which are worth to be further investigated.