

**AN IMPROVED CYTOGENETIC MAP IN SHEEP (*OVIS ARIES*, 2N=54)
CHROMOSOMES: ASSIGNMENT OF 80 NEW LOCI BY FISH-MAPPING
AND R-BANDING**

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Cytogenetic maps are a very useful tool for studying complex animal genomes, such as those of domestic bovids. Indeed, it is possible to use these maps in evolutionary studies among bovids and between bovids and humans revealing more conserved chromosome segments than those achieved with specific chromosome painting probes, as well as complex rearrangements differentiating humans and bovids. Other practical application of these maps are in clinical cytogenetics for the possibility to better identify not only the chromosomes involved in the chromosome abnormalities, but also the chromosome regions interested in the rearrangements. Finally, cytogenetic maps are also useful to anchor both linkage and RH-maps to specific chromosome regions allowing more detailed comparisons among different genomes using the human one as point of reference to get advances in livestock genomics. Although thousands of loci have been assigned to cattle, sheep and goat genomes, a relatively low number of loci have been located on single chromosome regions or bands. This discrepancy is essentially due to different methods for mapping animal genomes. Indeed, most loci were mapped by somatic cell hybrid techniques, linkage- and RH-mapping. Unfortunately, very few studies used both RH- and FISH-maps to better physically anchor linkage and RH-maps to specific chromosome regions, so to extend the cytogenetic maps and give a better knowledge in the physical organization of animal genomes.

In sheep the only available cytogenetic map is that reported on the SheepBase. This map is not only dated with few markers reported in specific chromosome regions, but the ideogram used, as a physical support, differs from that reported in the latest standard chromosome nomenclature.

Both bovine and caprine BAC-clones were hybridised by FISH on R-banded chromosome preparations obtained from synchronized blood cell cultures. An improved cytogenetic map of sheep with 450 loci assigned to specific chromosome regions or bands and covering almost all chromosome bands is reported on the basis of the published data and assignments of 80 new loci, mostly of type I. This map has been constructed using as a physical support, the latest standard R-banded ideogram (ISCNDB2000, 2001). The present cytogenetic map noticeably extends our

knowledge on sheep physical genome and represents an useful tool for further studies in clinical, evolutionary and molecular cytogenetics. Examples of cytogenetic map applications in comparative studies among bovids and between bovids and humans are shown.