S11-1 Humanized model mice containing human gene(s) or gene cluster using chromosome engineering technology for medical application

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Employing natural chromosomes as vectors for delivering large stretches of human genomic loci into mice can circumvent the size limitations of conventional vector and facilitate the functional studies of human genome. The chromosome vector system has several advantages: 1) it exists independently from the host genome and can avoid insertional mutagenesis; 2) the complete genomic loci, including the upstream and downstream regulatory elements, are used as transgenes, which can mediate complex and multiple transcripts of transgenes in vivo; and 3) in some cases, such vectors can be transmitted through the mouse germline. The successful introduction of human chromosome-derived fragments into mouse embryonic stem cells and the generation of chimeric mice have opened a new venue to animal transgenesis. Using this chromosome-cloning technique, various human chromosome regions can be cloned into a minichromosome vector by the Cre/loxP-mediated chromosome translocation and telomere-mediated chromosome truncation. Performance of trans-chromosomic technology in producing humanized animals and its prospects will be discussed.

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