Rosette-like structures (chromomerese) were identified in meiotic and interphase chromosomes of plants and animals. These structures consist of a protein core and radially diverging DNA loops formed by 30 nm chromatin fiber (up to 5 kb in size). Rosettes have been found to be a form of compactization of transcriptionally inactive tissue-specific genes. An introns and flank of genes are involved in rosette organization of chromosomal gene domains. Previously we have identified DNA topoisomerase II as one of the proteins of rosette core. Considering the properties of this enzyme, among which special attention should be paid to its recombination activity, we suggest that rosette organization of chromosomal domain of genes may be a structural basis of some of intragenic recombinations.

Using the in vitro recombination system, we have demonstrated that eukaryotic DNA topoisomerase II can promote recombination between two circular supercoiled plasmid substrates. Deleted derivatives obtained from pBR322 plasmid have been used as a recombination substrates, that are similar in size and topological states to individual DNA loops of rosette-like structures of eukaryotic chromosomes. The results obtained suggest that rosette organization of genes in eukaryotic chromosomes may be a structural basis of some intragenic recombinations which are promoted by DNA topoisomerase II. For example, this model explains our previous data on the organization of immunoglobulin κ genes in rosette-like structures. We have shown that exonsVk and Cκ-Jκ are located in different loops of a rosettes, while the rearranged genes are in same loop. In addition, recombination promoted by DNA topoisomerase II appears to cause some chromosomal rearrangements.