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5. Maintenance mode of the B chromosomes in Apodemus peninsulae from four areas bordering on the Sea of Japan: Susumu SAWAGUCHI[1], Yoshitaka OBARA[1], Irina V. KARTAVTSEVA[2], Galina ROSLIC[2], Hyun E. SHIN[3] and Sang H. HAN[4] ([1]Fac. Agr. Life Sci., Hirosaki Univ., [2]Inst. Biol. Soil Sci., Russian Acad. Sci., [3]Nat. Inst. Health, Korea and [4]Ecosyst. Conserv. Div., Minist. Environ., Korea)

The B chromosomes of A. peninsulae from Primorskii and Sakhalin (Russia), Gyeonggi Do (Korea) and Hokkaido were examined in detail by conventional staining and G-, C- and fluorochrome-banding, paying special attention to the maintenance mode in each of their populations. The B chromosomes, identified by deeply C-stained properties, were observed in the bone marrow cells of all specimens from three of the areas, but not Sakhalin, where no B chromosome was detected at all. Interestingly, four of seven specimens from Sakhalin showed an ordinary response to the in vitro growth of the tail tissues, and the growing fibroblasts (mostly diploid) had no B chromosome. On the contrary, the remaining three specimens showed a markedly delayed response to the same in vitro system, and the growing fibroblasts were all polyploid even in the primary cultures, and always carried B chromosomes.

6. The relative frequency of induced inversions and the formation of derivatives in heterozygotes for inversions: Shin-ichi SONTA and Takayuki KAWAMOTO (Dept. Genet., Inst. Develop. Res., Aichi Hum. Serv. Ctr.)

By crossing X-irradiated males and non-treated females, we obtained many strains of Chinese hamsters with balanced chromosomal rearrangements, including inversions. The rate of animals with inversions and those with reciprocal translocations was 1:6.6. There was no significant difference from the expected value estimated by the frequencies on the assumption that the rearrangements randomly occurred in each chromosome. Using male and female Chinese hamsters heterozygous for inversions 1, 2, 4 and X, we examined segregation and meiotic crossing-over on the inverted segments. Chromosomal analysis of MII cells revealed that the number of cells with an inversion and that with normal homologues are almost equal. The crossing-over on the inverted segments of inversion chromosomes caused the appearance of a marker chromosome with unequal-length chromatids at MII. Analysis using such markers revealed that the frequency of cells with crossing-over on the inverted segments was 6.2-18.2% in inv(1)/+, inv(2)/+, and inv(4)/+ animals. The frequency of cells with crossing-over was 1.2% in inv(X)/+ females. These frequencies were significantly lower than that on the same segments of normal chromosomes. Further electron microscopic analysis of surface-spreading preparations indicated that inverted segments do not form frequently synaptonemal complexes in MI cells of inversion heterozygotes. These findings suggest that the reduced frequency of derivatives in heterozygotes for inversions occurs by unformed synaptonemal complexes among inverted segments.