

Abstract

Holokinetic chromosomes are a specific type of chromosomes which differentiate from standard (monocentric) chromosomes especially by a diffuse form of domain which binds microtubules (holocentromere). It is related to changes on an ultrastructural and molecular level. These changes are shown in modifications in mitotic and meiotic division and in evolution of karyotypes. Holokinetic chromosomes don't have a primary constriction with a localized centromere and therefore neither an inner centromere domain which would connect sister chromatids. Kinetochore structure of holokinetic chromosomes seems to be simpler than kinetochore structure of monocentric chromosomes. Kinetochore covers most of the surface of mitotic chromosomes. There have been described several variants of meiosis of holokinetic chromosomes which differentiate by position of kinetochore on chromosomes. On a molecular level holokinetic chromosomes differentiate from monocentric chromosomes by a distribution of proteins of a centromere-kinetochore complex, which cover most of the surfaces of mitotic and meiotic chromosomes. This applies, for example, to centromeric histone H3 (CENH3), whose amount and distribution changes during interphase and nuclear division, which is unique in comparison to monocentric chromosomes. The distribution of epigenetic marks and repetitive sequences is also different.