

Comparative analysis of the karyotype of new human cell line 4BL at long-term cultivation: Ploidy of the chromosomal set

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Abstract:

Long-term cultivation of human cells, including stem cells, can lead to essential transformations of the karyotype and genetic instability. The aim of this research was a comparative cytogenetic study of the karyotype of new human stem cell line 4BL at 160 and 205 passages. During a standard cytogenetic examination, the nullisomy and monosomy of chromosomes 10 and 13, monosomy of chromosomes 4, 8, 11, 15, 17, 21, and X; and t(1, 11), t(5, 15), t(12, 15), and t(16, 21) were observed; also, six regular marker chromosomes were detected. At 160 and 205 passages, the modal class of the karyotype was 42–43 chromosomes. While passaging increased frequency of polyploidy cells (from 2.8 to 36%), disappearance of nearhaploid cells (22.1% at the 160th passage) and a decreased level of early division of chromatids (from 5 to 1.5%) were observed. We assume the stabilization of the karyotype of cell line 4BL at 205 passages and consider that it is necessary to conduct an additional molecular and cytogenetic study for the objective identification of the number of chromosomes of the modal class, as well as the number of chromosomal anomalies, and for forecasting the direction of the karyotype evolution of human cells 4BL in vitro.

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