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Chromosomal instability in a cat mammary cancer cell line

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Genomic instability appears to be a fundamental trait in the development of cancer cells. Most tumours exhibit this instability at the chromosome level, resulting in numerical and structural alterations. A hypermutability state, induced by the generation of breakage–fusion–bridge cycles and/or aneuploidy, leads to an altered gene expression and to the evolution of the cancer phenotype. A direct consequence of chromosomal instability is an imbalance in the number of chromosomes per cell (aneuploidy), resulting in the gain or loss of chromosomes during cell division. There are two mechanisms involved in aneuploidy in somatic cells: nondisjunction of chromosomes during anaphase and chromosome loss. In the first process, one daughter cell becomes trisomic and the other monosomic due to an aberrant segregation; in the second process, the lagging chromosome may be lost, form a micronucleus, or be randomly incorporated into either of the daughter nuclei. We analysed a cat cancer cell line stipulated from a mammary carcinoma to spontaneously immortalized. This cancer cell line was cultivated until the 115th passage and analysed every five passages. At a certain point, this cell line revealed a great chromosomal instability (CI) that was analysed in the present study: micronuclei, mitotic strings and chromatin decondensation were some of the features that could be observed. Once the cell line stabilized after this point, we examine the impact of this CI in this particular cell line.

Keywords: Chromosome instability, Cancer, Cat cell line