Abstract

The properties of embryonic hybrid cells obtained by fusion of embryonic stem (ES) or teratocarcinoma (TC) cells with differentiated cells are reviewed. Usually, ES-somatic or TC-somatic hybrids retain pluripotent capacity at high levels quite comparable or nearly identical with those of the pluripotent partner. When cultured in vitro, ES-somatic- and TC-somatic hybrid cell clones, as a rule, lose the chromosomes derived from the somatic partner; however, in some clones the autosomes from the ESCell partner were also eliminated, i.e. the parental chromosomes segregated bilaterally in the ES-somatic cell hybrids. This opens up ways for searching correlation between the pluripotent status of the hybrid cells and chromosome segregation patterns and therefore for identifying the particular chromosomes involved in the maintenance of pluripotency. Use of selective medium allows to isolate in vitro the clones of ES-somatic hybrid cells in which the pluripotent chromosome can be replaced by the somatic counterpart carrying the selectable gene. Unlike the TCsomatic cell hybrids, the ES-somatic hybrids with a near-diploid complement of chromosomes are able to contribute to various tissues of chimeric animals after injection into the blastocoel cavity. Analysis of the chimeric animals showed that the somatic chromosome undergoes reprogramming during development. The prospects for the identification of the chromosomes that are involved in the maintenance of pluripotency and its cis- and trans-regulation in the hybrid cell genome are discussed.

Keywords

ES cells, EG cells, hybrid cells, pluripotency, reprogramming.