# A genetic system to detect mitotic recombination between repeated chromosomal sequences in Drosophila Schneider line 2 cells

**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**

**ID** 998188
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**Year** 1997
**Title** A genetic system to detect mitotic recombination between repeated chromosomal sequences in Drosophila Schneider line 2 cells
**Journal** Mutation research
**Volume** 395
**Number** 1
**Pages** / **Article-Number** 9-27
**Mesh terms** Animals; Cells, Cultured; Chromosomes; Drosophila melanogaster, genetics; Drug Resistance, genetics; Escherichia coli, genetics; Ethyl Methanesulfonate, toxicity; Flow Cytometry; Genes, Reporter; Gentamicins, pharmacology; Methyl Methanesulfonate, toxicity; Mitomycin, toxicity; Mitosis; Mutagenicity Tests, methods; Mutagens, toxicity; Polymerase Chain Reaction, methods; Recombination, Genetic, drug effects; Repetitive Sequences, Nucleic Acid; Transgenes; beta-Galactosidase, metabolism
In order to study mitotic homologous recombination in somatic Drosophila melanogaster cells in vitro and to learn more on the question how recombination is influenced by mutagens, a genetic system was developed where spontaneous and drug-induced recombination could be monitored. Two recombination reporter substrates were stably introduced in multiple copies into the genome of established D. melanogaster Schneider line 2 cells: one plasmid (pSB310) contained the 5' and 3' deleted neomycin phosphoribosyltransferase alleles neoL and neoR as direct repeats; the other (pSB485) contained similar deletions (lacZL and lacZR) of the beta-galactosidase gene (lacZ). Restoration of a functional neo gene upon mitotic recombination between homologous sequences allowed direct selection for the event, whereas recombination in single cells harbouring the integrated lacZ-based reporter plasmid was detected by histochemical staining or flow cytometric analysis (FACS). The neo-based construct in the clonal transgenic cell line 44CD4 showed a spontaneous recombination frequency of 2.9 x 10(-4), whereas the 485AD1 cell line harbouring the lacZ-based construct exhibited a frequency of 2.8 x 10(-4). The alkylating agents EMS and MMS and the clastogen mitomycin C were able to induce recombination in the 485AD1 cell line in a dose-dependent manner. The results obtained from these studies suggest that the transgenic cell lines are potentially useful tools for identifying agents which stimulate direct repeat recombination in somatic Drosophila cells.
**Publisher** Elsevier Science
**ISSN/ISBN** 0027-5107
**edoc-URL** http://edoc.unibas.ch/46814/
**Full Text on edoc** No;
**Digital Object Identifier DOI** 10.1016/s1383-5718(97)00138-1
**PubMed ID** http://www.ncbi.nlm.nih.gov/pubmed/9465910
**ISI-Number** WOS:000071412100002
**Document type (ISI)** Journal Article