

# A study of chromosomal instability and HPRT mutagenesis in Chinese hamster cells after $^{60}\text{Co}$ $\gamma$ -irradiation

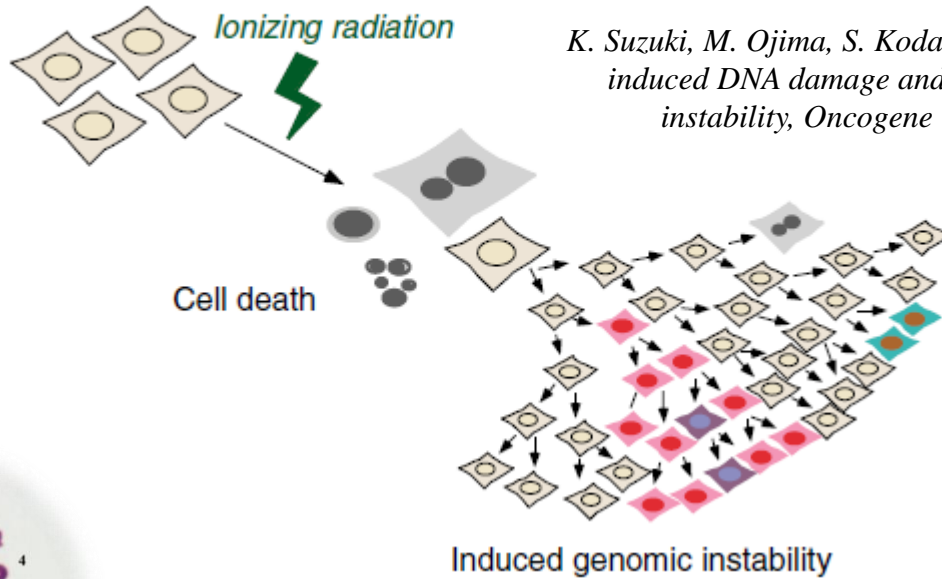
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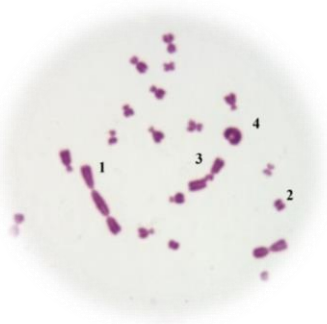
<sup>2</sup> *Czech Technical University in Prague, Prague, Czech Republic*

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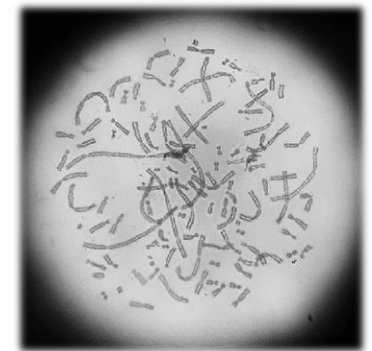
# Genomic instability



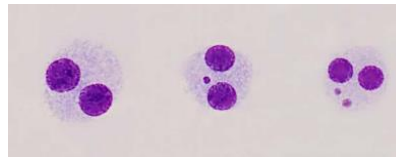
*K. Suzuki, M. Ojima, S. Kodama, M. Watanabe, Radiation-induced DNA damage and delayed induced genomic instability, Oncogene (2003) 22, 6988–6993*



Chromosomal aberrations in Chinese hamster cells: 1-Dicentric; 2-Chromosomal fragment; 3 – Isodeletion; 4–Centric ring

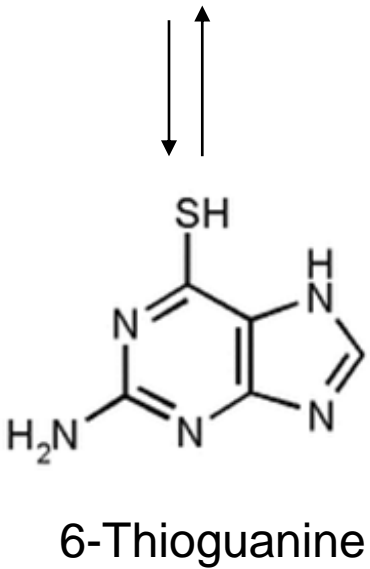
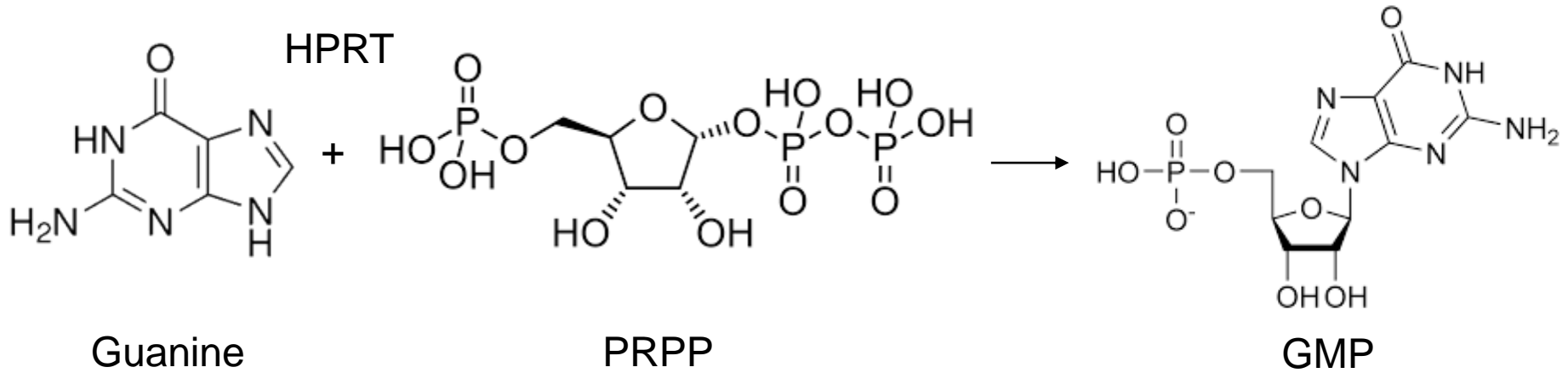


Polyploid cell



Micronucleus

# HPRT testing system

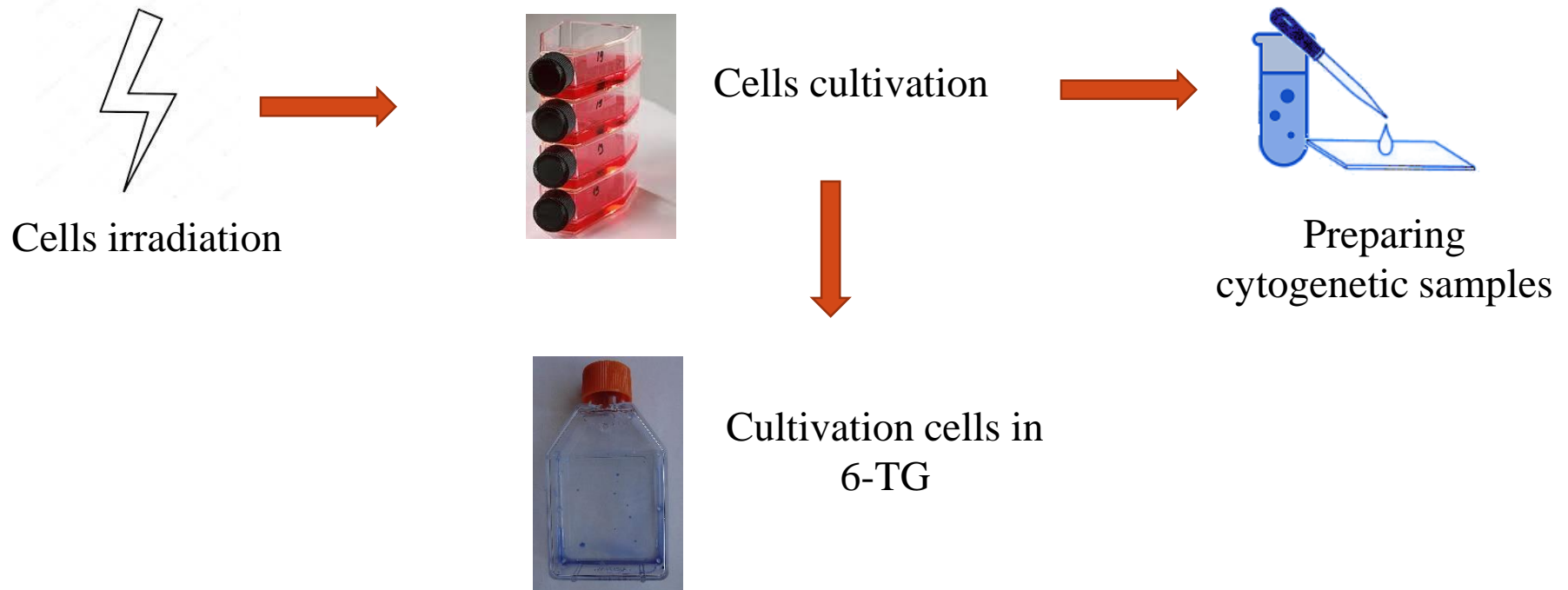


Only mutant cells survive

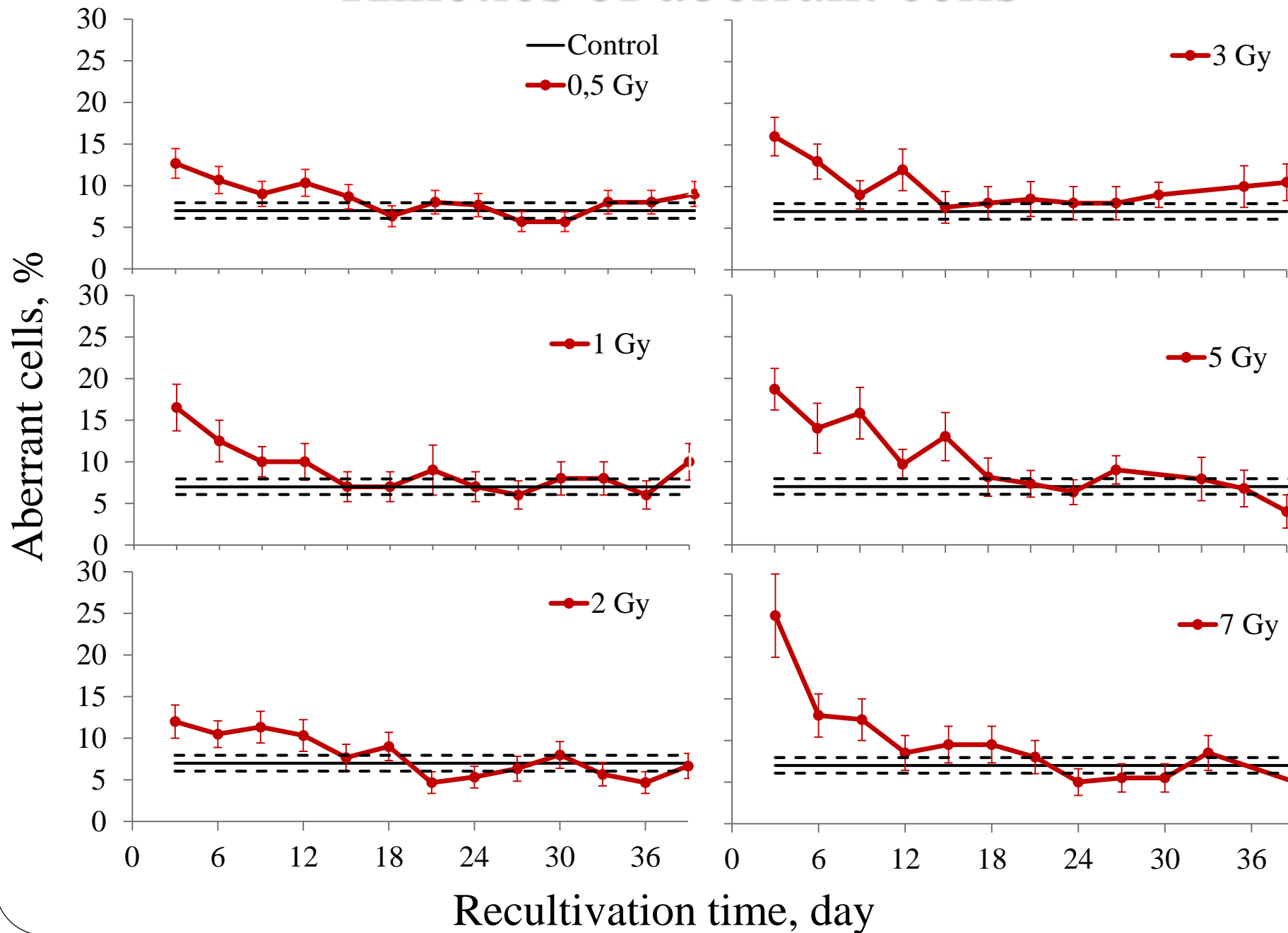
# Materials and methods

Cells culture	Unit	Type of radiation	Energy, MeV	Dose, Gy	Cultivation time
Chinese hamster cells-V79	“Rokus-M”	$\gamma$ -irradiation $^{60}\text{Co}$	1,17 и 1,33	0.5, 1, 2, 3, 5, 7	3 to 39 days

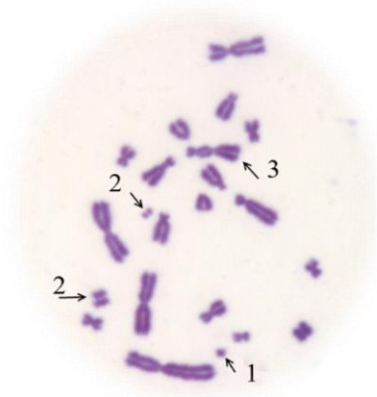
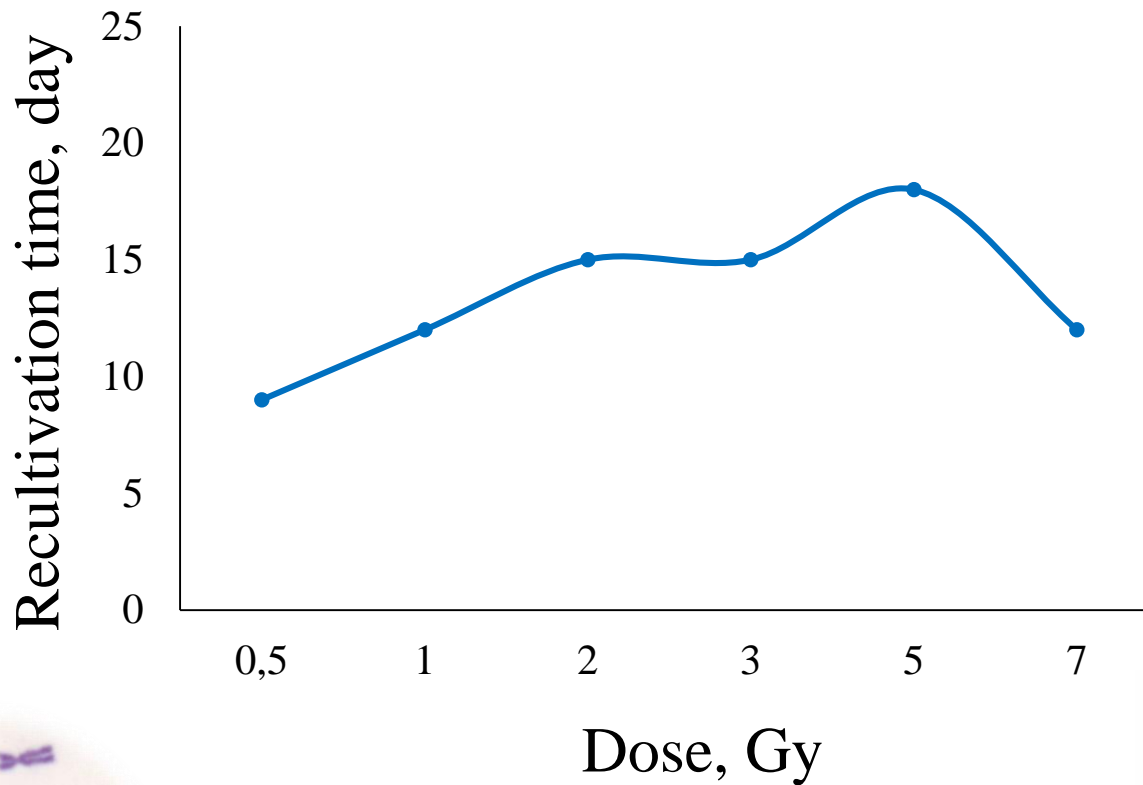
## Scheme of the experiment



# Kinetics of aberrant cells



# Recovery the culture to the control values

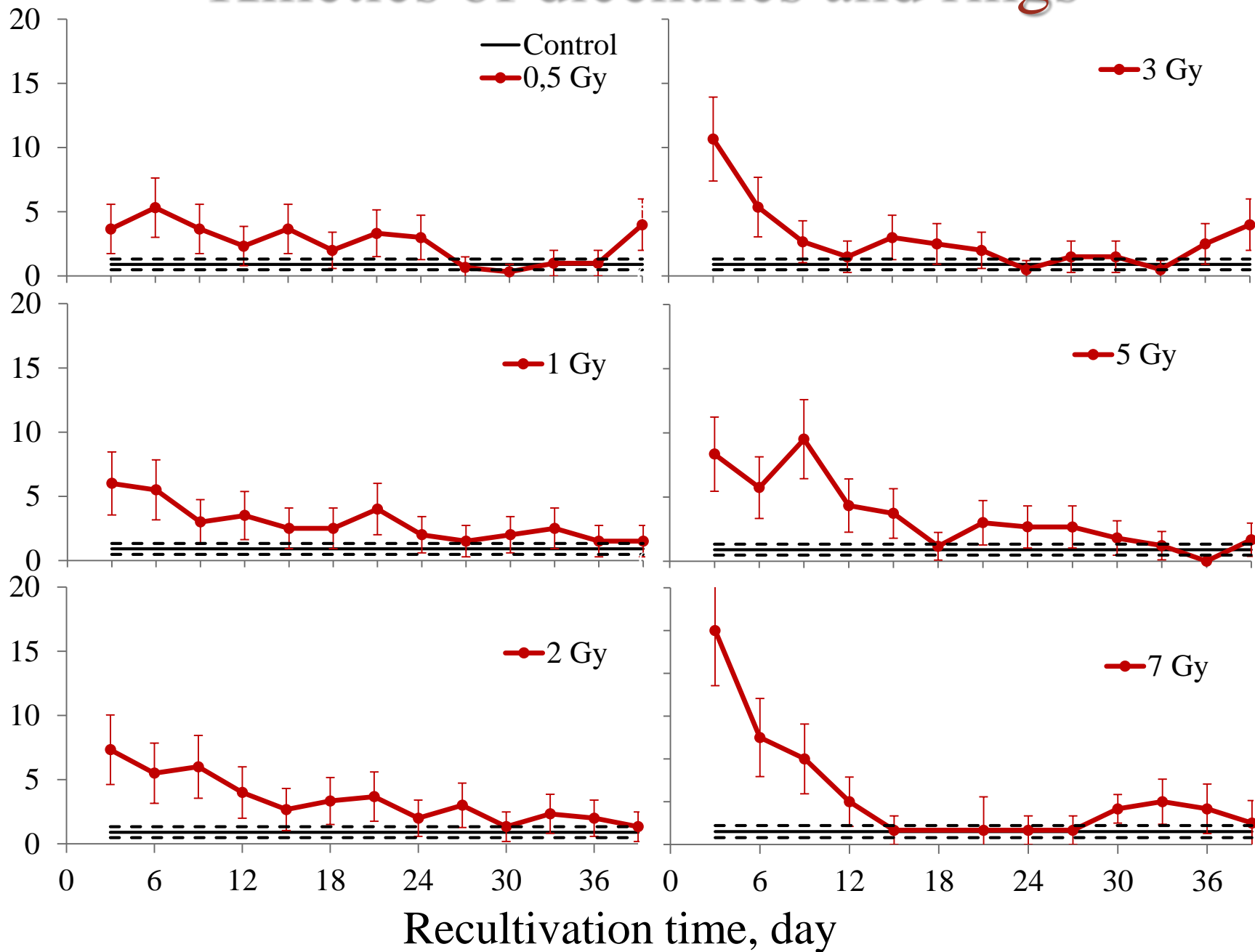


Chromosomal aberrations in Chinese hamster cells : 1- chromatide fragment;  
2 - chromosomal fragments;  
3-dicentric; 4 - exchange

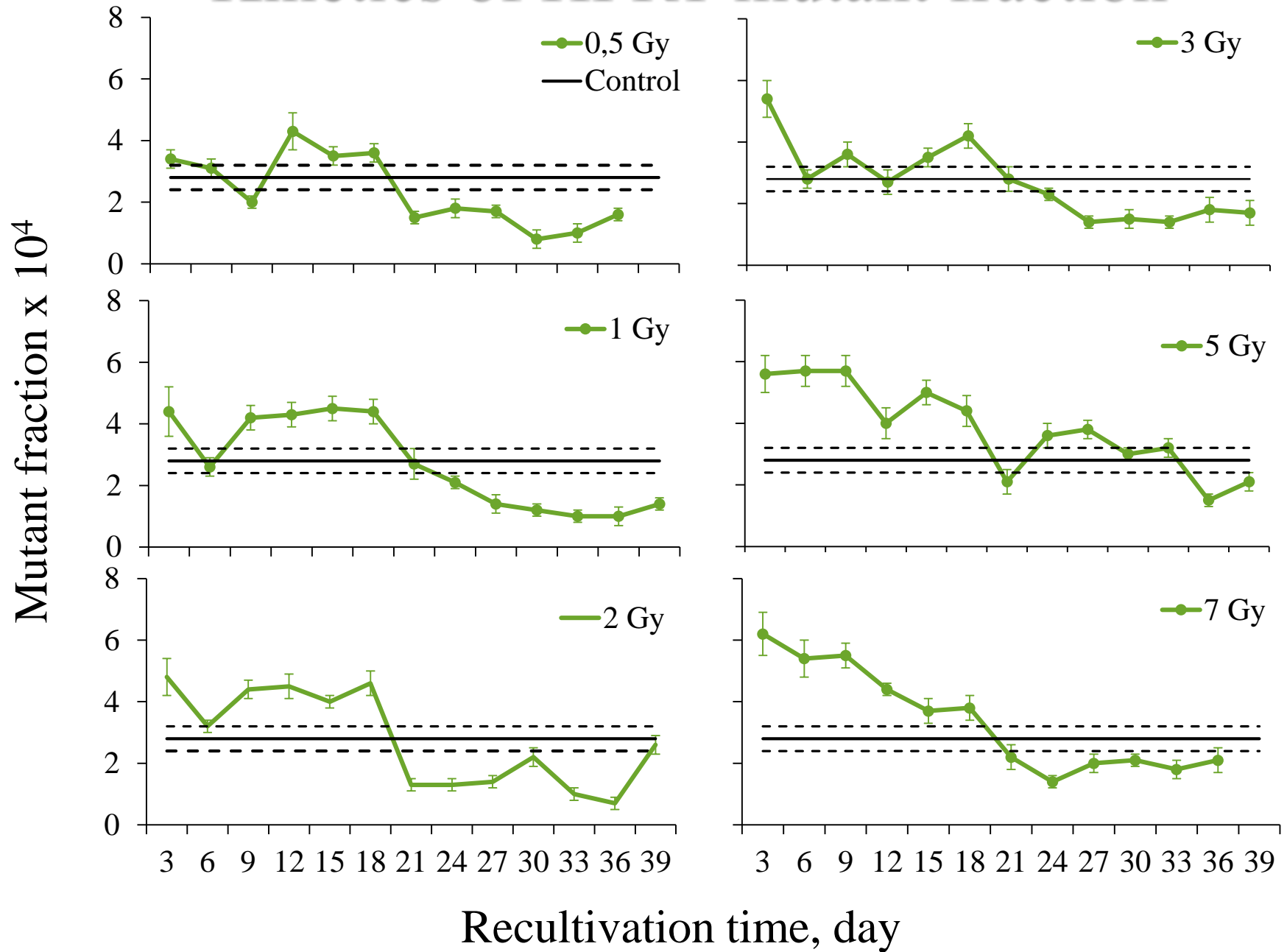


# Kinetics of dicentric chromosomes and rings

Dicentric chromosomes and rings, per 100 cells

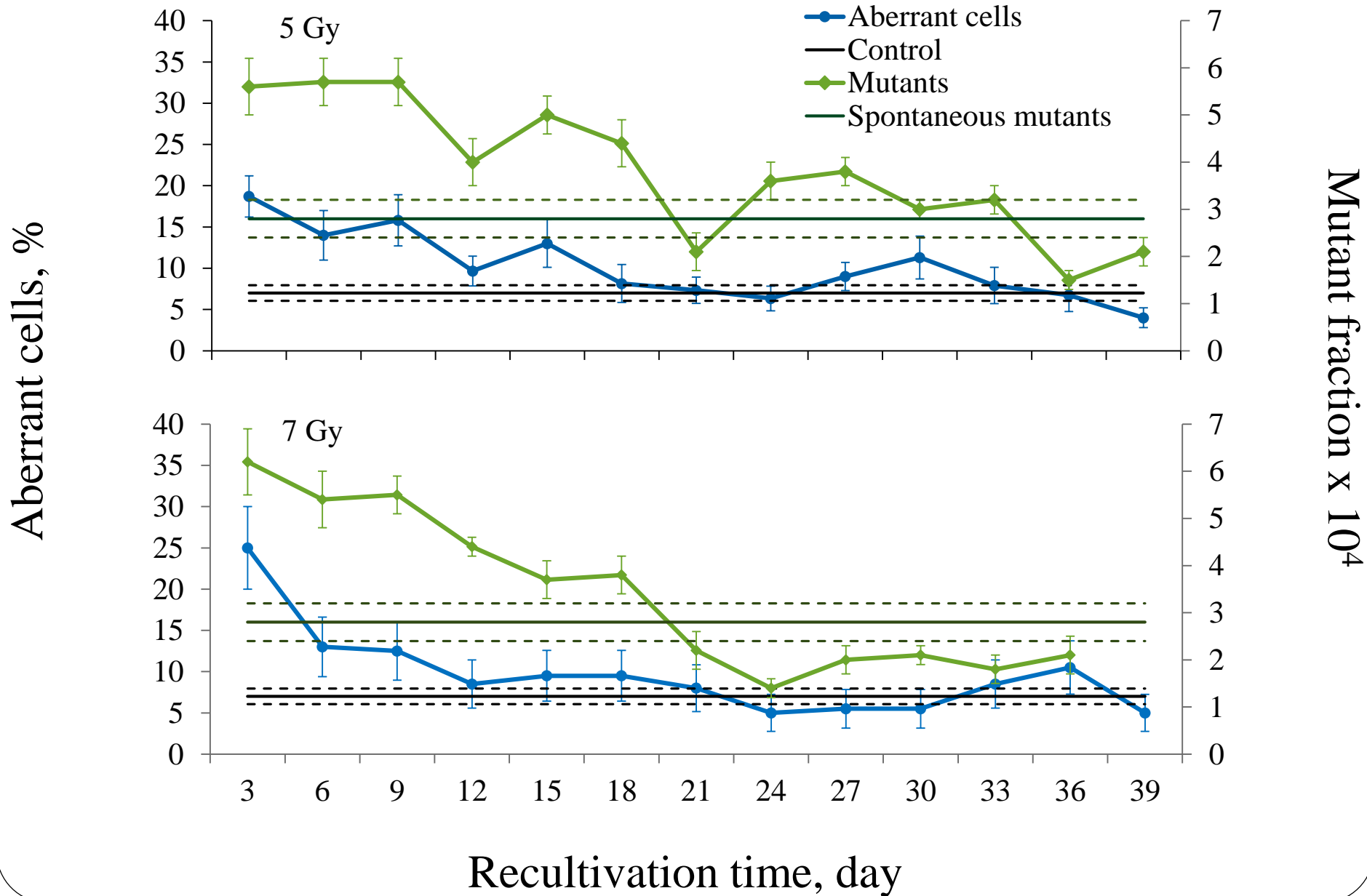


# Kinetics of HPRT-mutant fraction





# Kinetics of aberrant cells and HPRT-mutant fraction



# Conclusions

- Genome instability was detected in the progeny of cells after gamma irradiation of  $^{60}\text{Co}$  at doses of 0.5-7 Gy. It persists in the population of irradiated cells until the 20th day of the study.
- Chromosomal instability persists in the progeny of gamma-irradiated cells for a long time (from 9 to 18 days).
- The maximum yield of dicentrics and rings occurs on the 3rd day of the study. They decrease and reach control values by 12-18 days.
- The level of HPRT mutagenesis remains raised up to 20 days.
- For doses of 5 and 7 Gy of  $^{60}\text{Co}$  gamma radiation, a correlation between the yield of cells with chromosomal aberrations and the frequency of HPRT mutagenesis was found.

**Thank you for attention !**