

# QUANTIFICATION OF RADIATION TRANSFORMATION FREQUENCIES

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## ABSTRACT

The relationship between the administered dose of irradiation and the frequency of transformation in vitro remains to be clarified. Several authors have detected 'bell shaped' or plateau type dose response curves, where the transformation frequency either reaches a constant level or falls off at high doses, even after an allowance is made for cell kill.

We have recently been studying the development of transformation in primary thyroid cultures and found a characteristic bell shaped curve when our results were corrected for initial cell kill using a clonogenic assay. However, we also noticed while trying to isolate immortal clones in serial subcultures that the plating efficiency of cells contained in irradiated survivor colonies in a variety of cell types including C3H 10T 1/2 and throid cells was considerably below normal. The effect is dose dependent and is significant out to the third subculture. This means that using the first survival curve will lead to a considerable overestimate of the number of surviving cells and a consequent underestimate of transformation frequency. Because of the problem of senescence of primary thyroid cells it is not easy to quantify the degree to which the effect alters the observed transformation frequency but when the effect is taken into consideration using C3H 10T 1/2 cells it raises the observed transformation frequency based on the initial surviving fraction considerably and converts the characteristic plateau type C3H 10T 1/2 transformation dose response curve to a curvilinear or linear response. The results have disturbing implications for the use of in vitro transformation data in the assessment of carcinogenic risk.