

# Kinetic model for dose equivalent - an efficient way to predict systems response of irradiated cells

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The response of tumours onto ionizing radiation cannot be fully understood by commonly used radiobiological models. The reason may lie in the complex structure of the cellular systems which show a high degree of compartmentalisation and which is characterised by a network of interacting processes at different time scales. To access the dynamic response of cells onto radiation, compartmental models based on a biological dose equivalent can be used. Two different models ( $\Gamma$ -LQ- and  $\Gamma$ -IR- model) are used to fit experimental data of the clonogenic survival of irradiated cells at very high dose rates. The models reveal the correct dose rate dependence over a wide range of the parameter space when adapting the kinetic constants to the dose rate. This adaption could be an indication for the multi-scale structure of the system.