Mouse tumor growth

Monitoring tumor growth in mice is a commonly used method in preclinical cancer research. Also, in radiobiology/radiotherapy research animal models like mice and rats are frequently used for *in vivo* studies. The possibilities are nearly endless with models that meet specific needs, e.g., immunocompromised mice, syngeneic and xenograft models, orthotopic tumor models, spontaneous tumor models, genetically modified mice, reporter mice, etc. However, animal welfare and costs are important limitations with regard to the use of animal models. Also, it is sometimes debated how representative such models are for the human setting. Nevertheless, animal (mouse) models are an indispensable and valuable addition to the toolbox of the biomedical researcher.

For the purpose of this virtual research quest, we set up a virtual mouse experiment. It is far from realistic but it gives an idea of issues that one can encounter when performing combination treatment studies. It also illustrates the complexity when trying to optimize combination treatments as so many parameters are involved. For example, here we only address treatment dose (radiation dose and compound concentration) but you can imagine that also scheduling of combinations and duration of treatment play an important role. For now, just play around with the model by trying different settings and monitoring the effects.

Tip: Play around with radiation dose and concentrations of the compounds. Compare what happens with tumor growth but also with mouse survival (as a measure of toxicity). Try to find an optimal balance between effect and toxicity. With regard to radiation dose, increasing the dose improves tumor control but at the cost of more animal dying. The same holds true for the compounds, some are more active with increasing dose but again at the cost of toxicity.

Hint: Set radiation dose between 1 and 3 Gy and test compounds between 20-200 mg/kg.