

# **Radiobiology research at SCAPA - PoPLaR**

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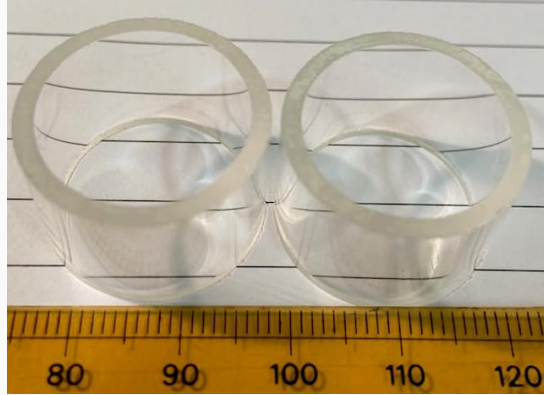


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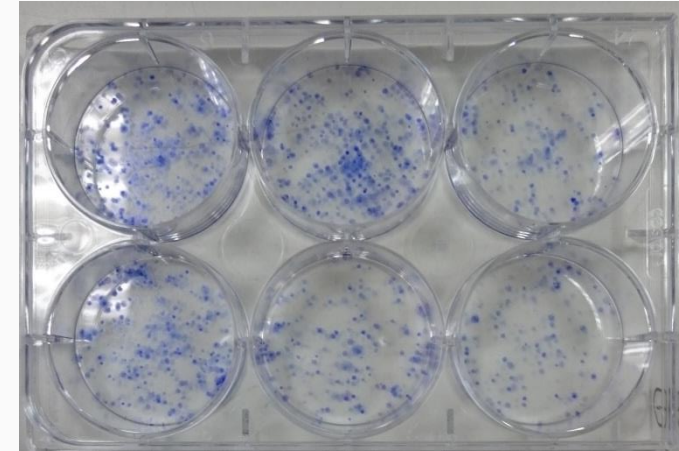
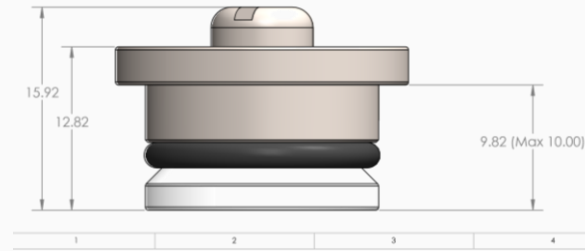


# Initial radiobiology experiments at SCAPA

- Clonogenic survival assays (gold standard in radiobiology)
- ~10 MeV – grow cells on 2.5  $\mu$ M Mylar in glass rings



Internal diameter – 18.5 mm  
Outer diameter – 22.5 mm

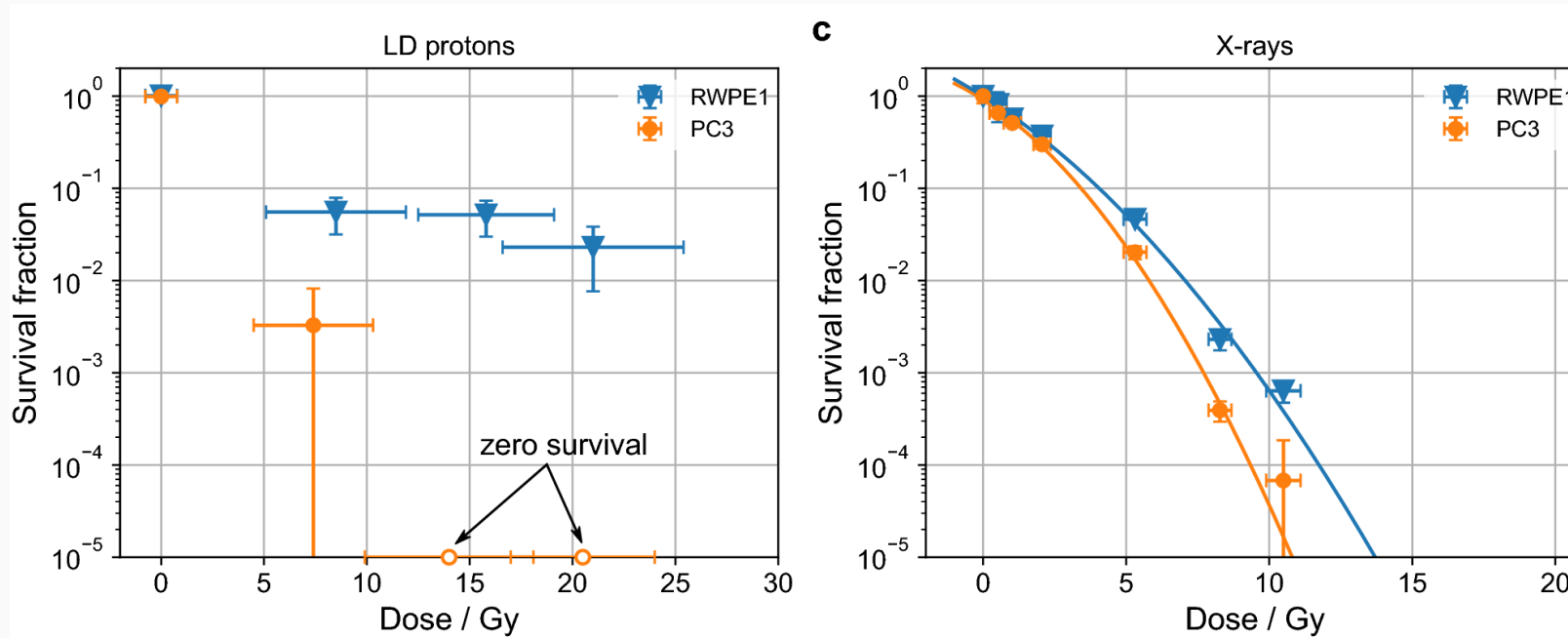


Utilise several cancer (HeLa and HNSCC/GBM) and normal cell lines.

Irradiate at multiple doses (0-8 Gy, plus 15 Gy), most likely at a single shot (to achieve highest dose rate; ~10<sup>9</sup> Gy/s). Some consideration for lower average dose rate (similar to conventional) with multiple shots.

Need at least 3 independent biological repeats.





- X-rays delivered at 1.3 Gy/min (0.02 Gy/s).
- LD protons delivered in 10-30 fractions in  $\sim 1$  Gy shots, with an instantaneous dose rate of  $\sim 3 \times 10^7$  Gy/s and dose rate average of  $\sim 0.2$  Gy/s (5 s between pulses).



# Initial radiobiology experiments at SCAPA

- DNA repair foci analysis (usually done on 0.1 mm glass coverslips within dishes/plates).

Likely can grow and stain cells on Mylar.

Again, need to utilise several cancer and normal cell lines, irradiating at multiple doses and at least 3 independent biological repeats.

Need to analyse foci at several different time points (1-24 h) but samples can be fixed and processed off site.

- DNA repair analysis using comet assays.

Lot of sample processing required – cells placed on microscope slides, lysed, and electrophoresed post-irradiation (after 1-24 h repair time).

