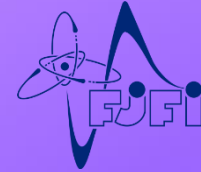


NOWADAYS PROTON THERAPY: DOUBLE SCATTERING VERSUS PENCIL BEAM SCANNING MODE



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Introduction

- Most of proton therapy studies in double scattering.
 - Now-a-days increased usage of pencil beam scanning mode.
- This study represents an in vitro comparison of DS and PBS.

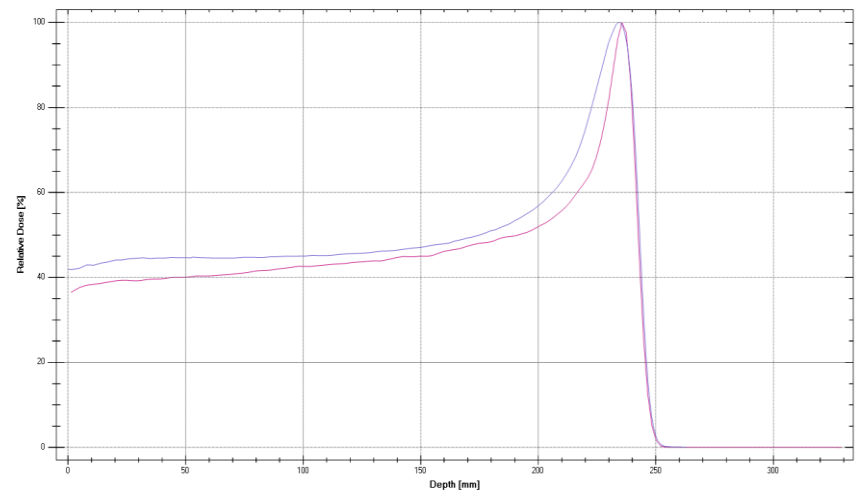
Methods

Irradiated medulloblastoma cell line DAOY.

Irradiation in two positions.
First in the plateau region.
Second in the peak.

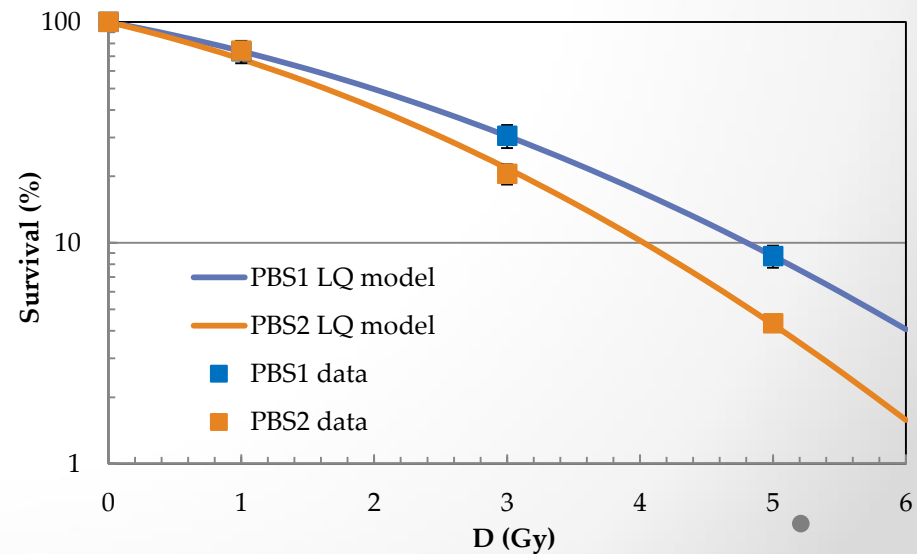
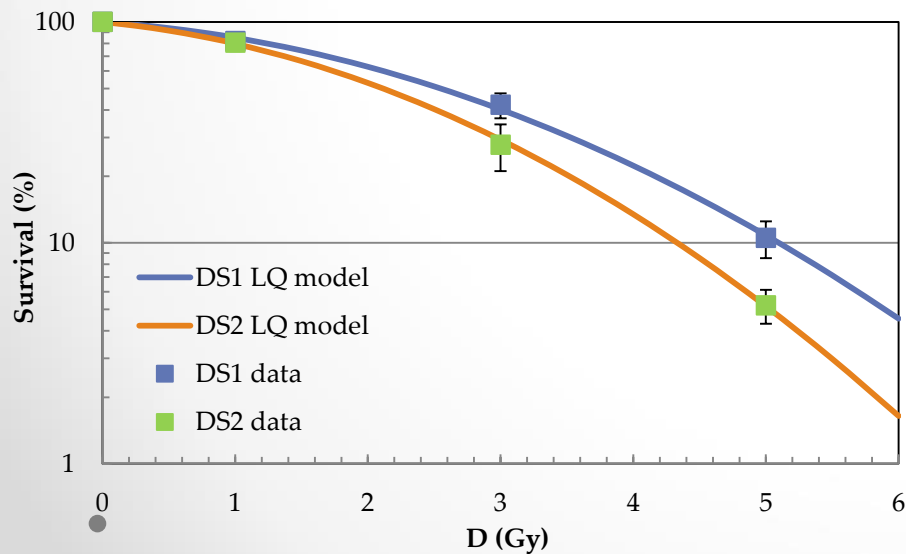
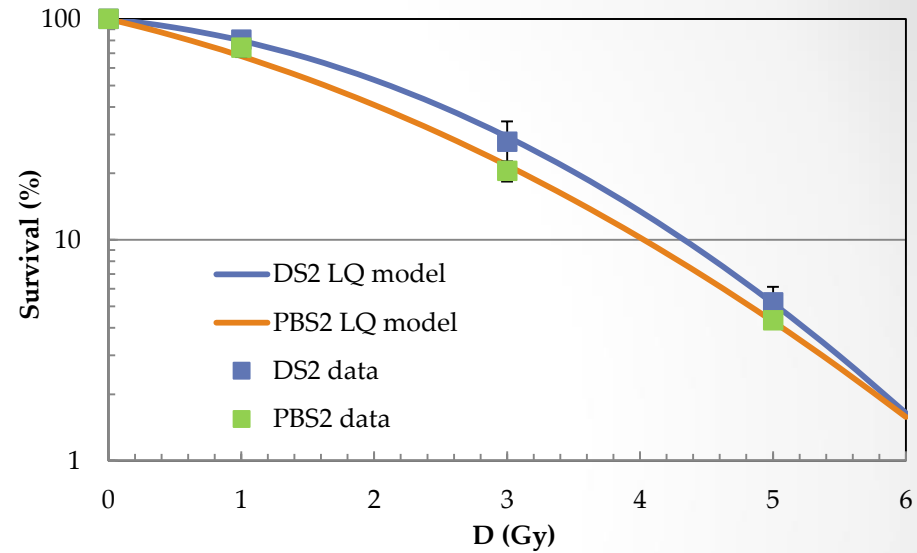
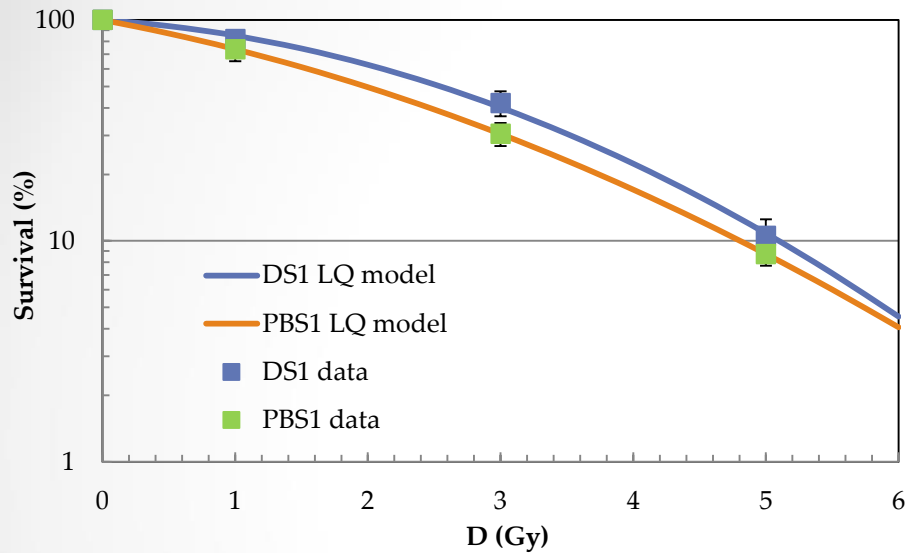
Blue PDD – DS

Pink PDD – PBS



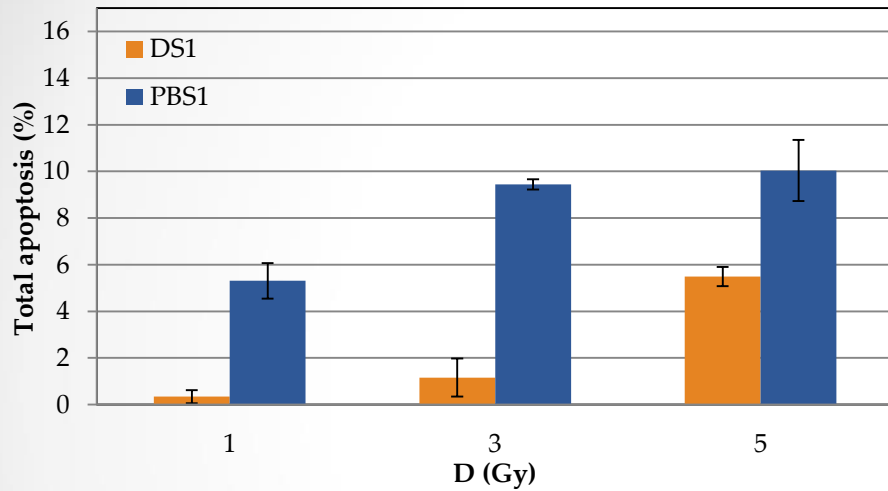
After irradiation – cell survival, apoptosis levels, DSB induction and micronuclei formation.

Results – Cell survival

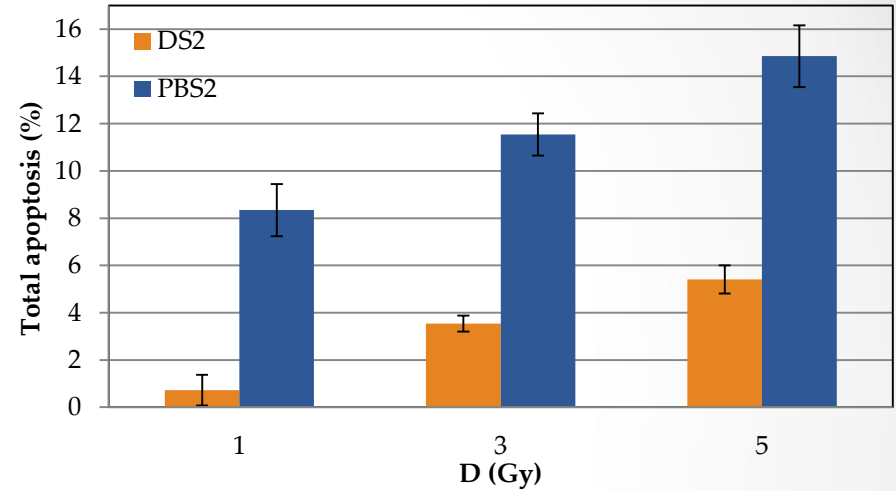


Results – Apoptosis

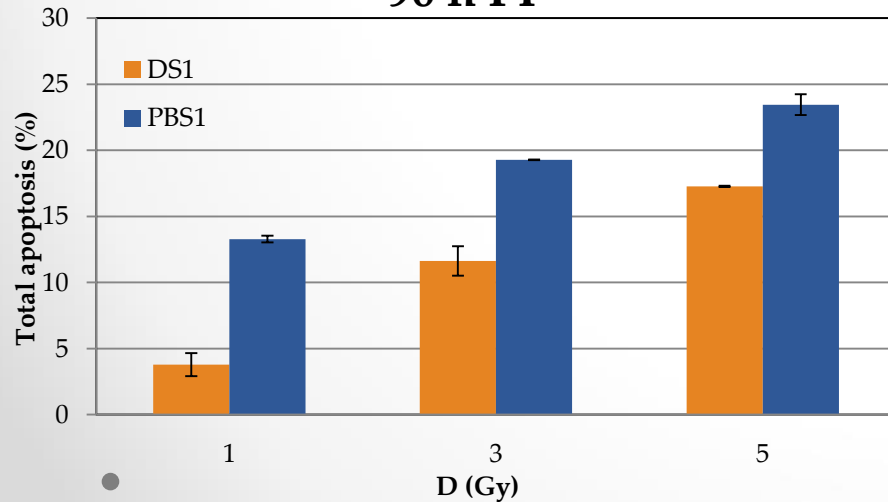
24 h PI



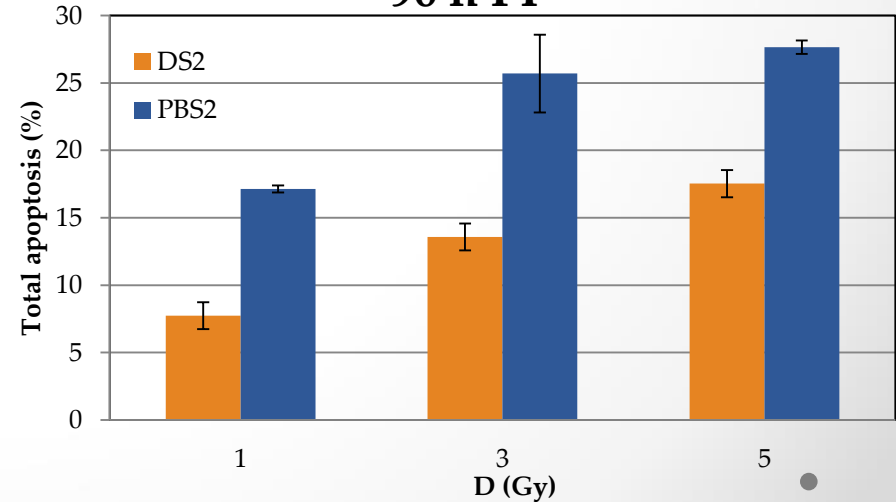
24 h PI



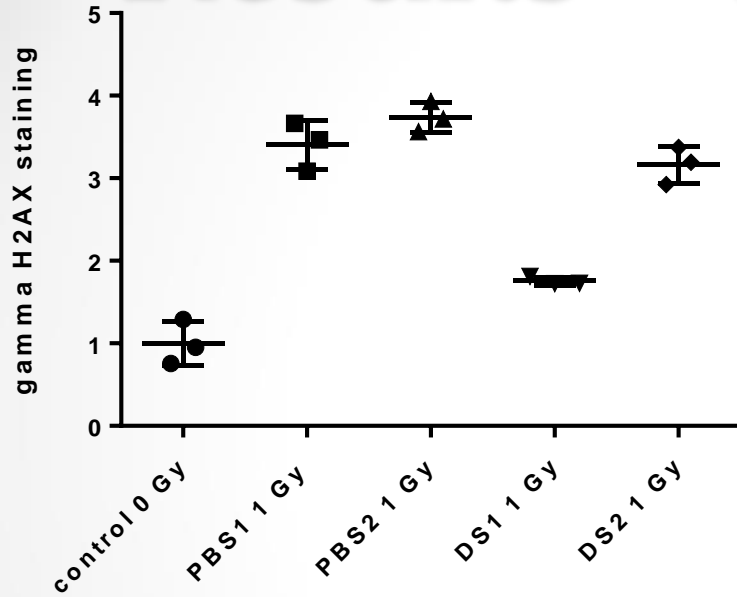
96 h PI



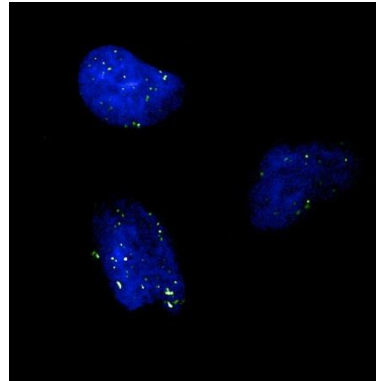
96 h PI



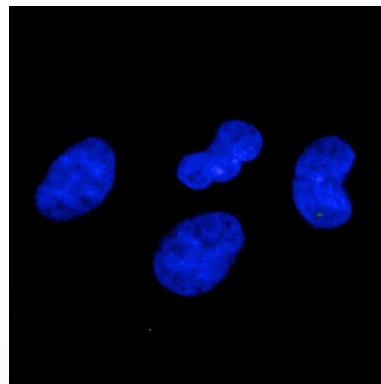
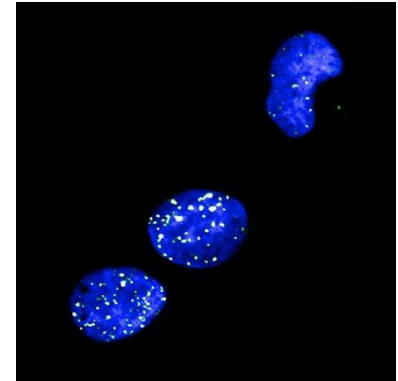
Results – DSB formation



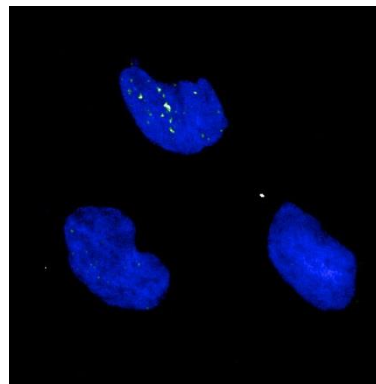
PBS1 1 Gy



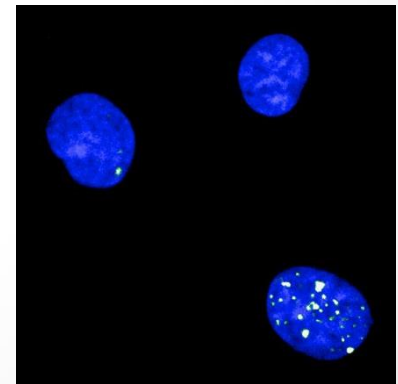
PBS2 1 Gy



control 0 Gy

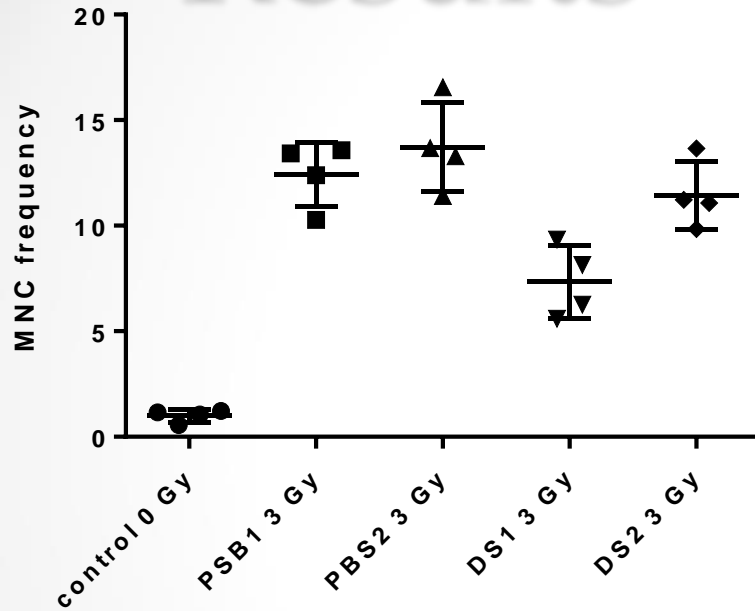


DS1 1 Gy

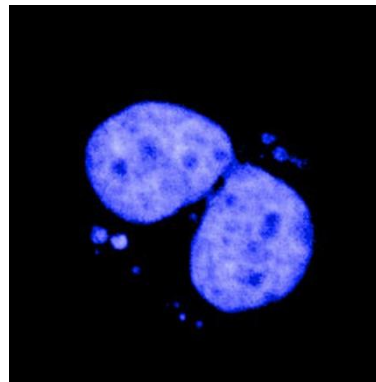


DS2 1 Gy

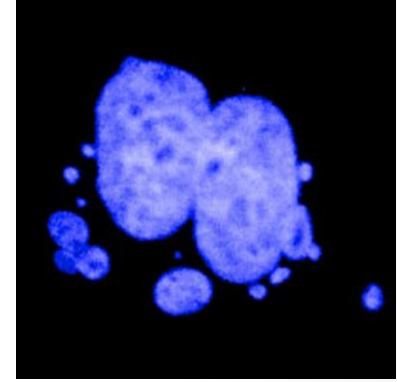
Results – Micronuclei



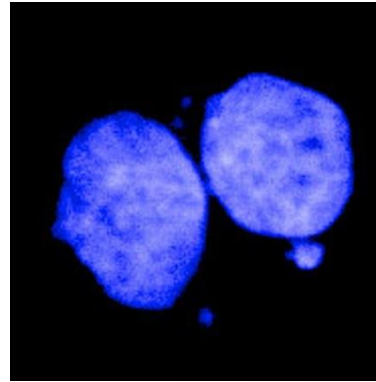
PBS1 3 Gy



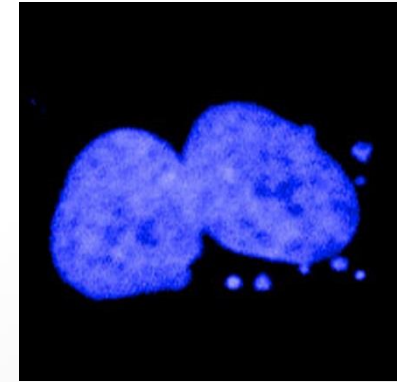
PBS2 3 Gy



control 3 Gy



DS1 3 Gy



DS2 3 Gy

Conclusions

↓ - Lower
↑ - Higher

Endpoint	PBS	DS
Cell survival	↓	↑
Apoptosis	↑	↓
DSB induction	↑	↓
MN frequencies	↑	↓

We suggest that pencil beam scanning mode is slightly more efficient than double scattering mode.

Acknowledgements

The work was supported by the Czech Science Foundation in the frame of the Center of Excellence P108/12/G108, AM also acknowledge the CTU grant SGS15/217/OHK4/3T/14.