The FLASH effect—An evaluation of preclinical studies of ultra-high dose rate radiotherapy: Supplementary Materials

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1 Additional Graphs (not in main body)

Figure 1: Pearson's correlation coefficients in heat map form to show the correlations between each dosimetric parameter and the corresponding endpoint. The values range between -1 and 1, where the extremities (closest to -1 and 1) have the deepest colour and the weakest correlations (closer to 0) have a weak colour. Statistically significant correlations are identifiable by an asterisk at the top left of the corresponding correlation coefficient. Key: TIS- Therapeutic Index Score, TCS- Tumour Control Score, NTSS- Normal-tissue Sparing Score, ILS- Increased Lifespan, S_1- Survival % at 1 month, S_2- Survival % at 2 month, S_3- Survival % at 3 month.

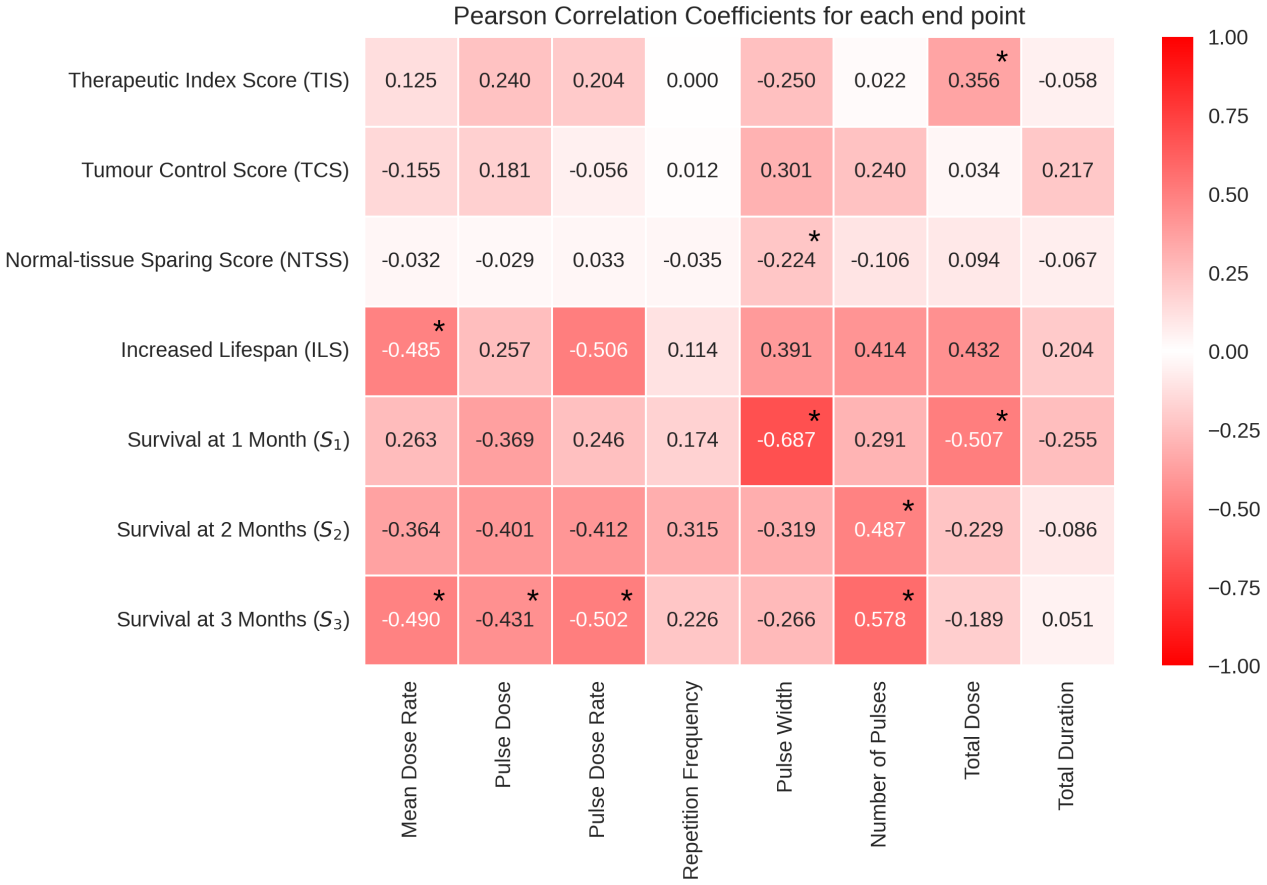


Figure 2: Pearson's correlation coefficients in heat map form to show the correlations between the log of each dosimetric parameter and the corresponding endpoint **for all data with mean and pulse dose rates above 30Gy/s.** The values range between -1 and 1, where the extremities (closest to -1 and 1) have the deepest colour and the weakest correlations (closer to 0) have a weak colour. Statistically significant correlations are identifiable by an asterisk at the top left of the corresponding correlation coefficient. Key: TIS- Therapeutic Index Score, TCS- Tumour Control Score, NTSS- Normal-tissue Sparing Score, ILS- Increased Lifespan, S_1- Survival % at 1 month, S_2- Survival % at 2 month, S_3- Survival % at 3 month.

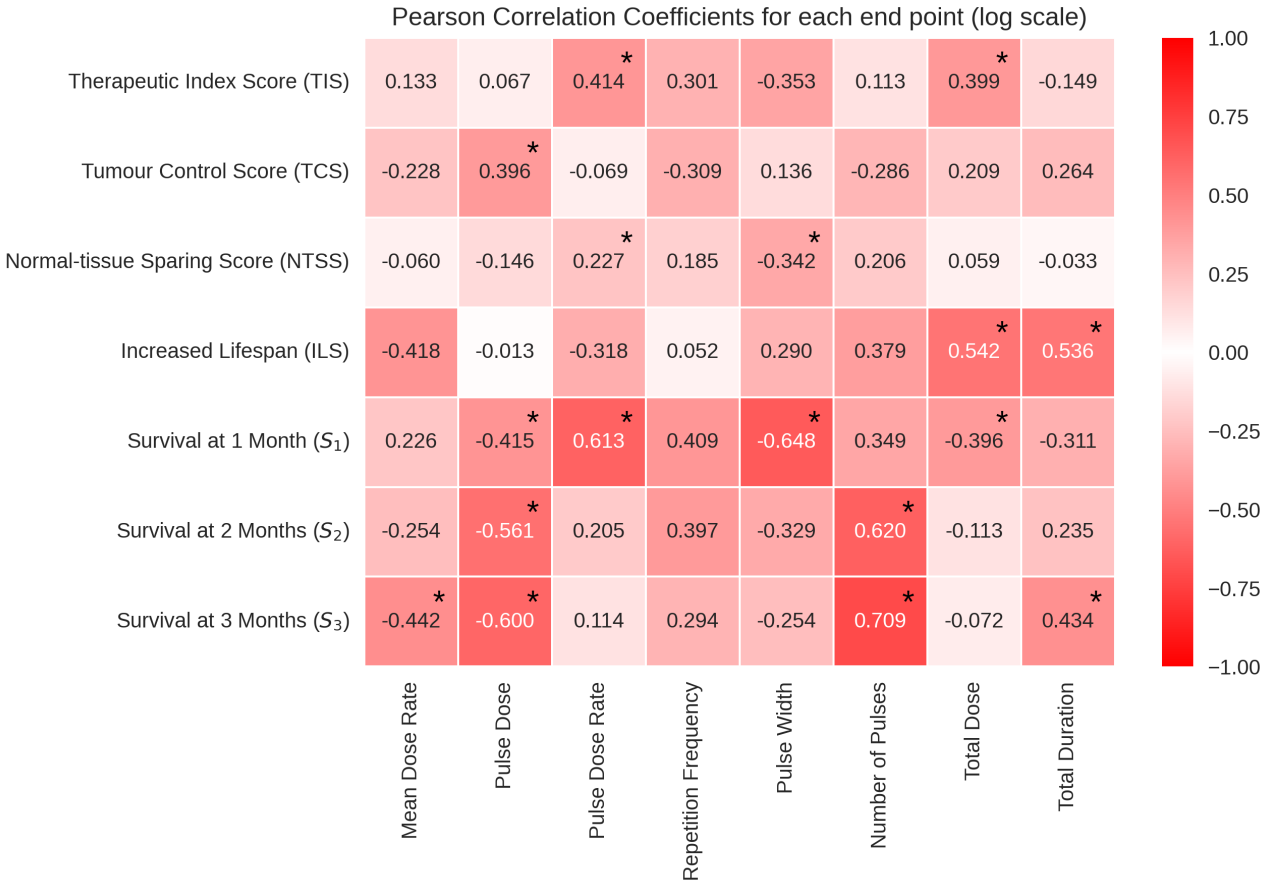
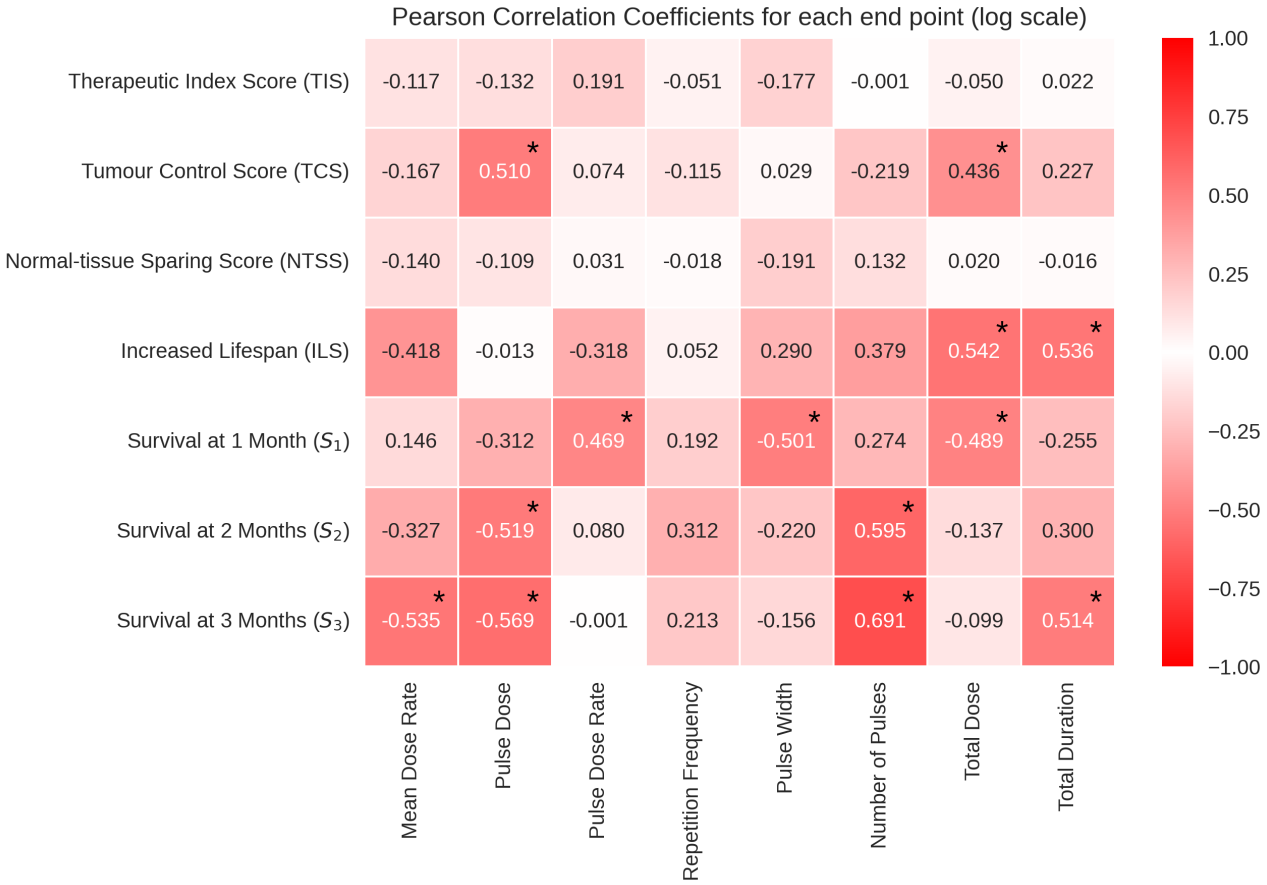
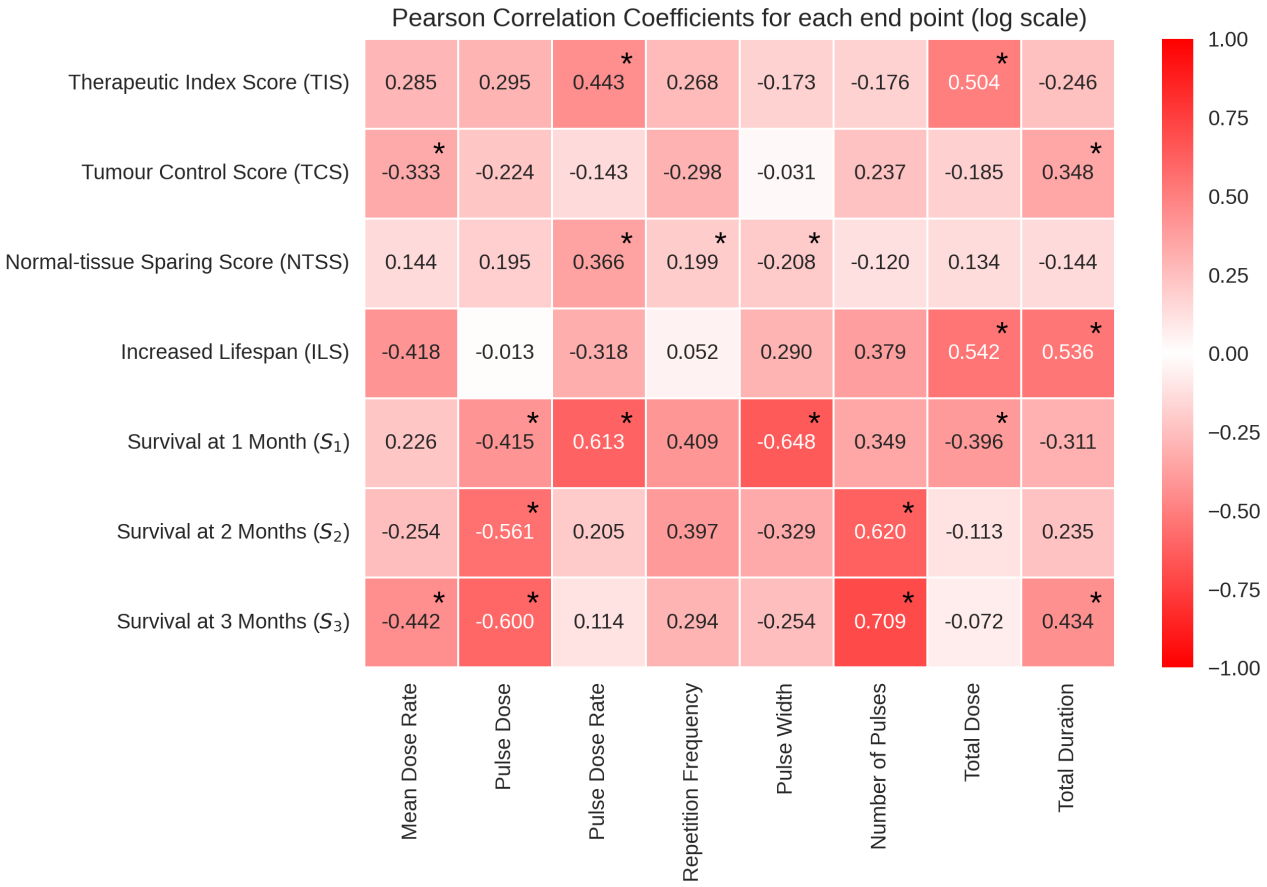


Figure 3: Pearson's correlation coefficients in heat map form to show the correlations between the log of each dosimetric parameter and the corresponding endpoint **for all data with mean and pulse dose rates above 40Gy/s.** The values range between -1 and 1, where the extremities (closest to -1 and 1) have the deepest colour and the weakest correlations (closer to 0) have a weak colour. Statistically significant correlations are identifiable by an asterisk at the top left of the corresponding correlation coefficient. Key: TIS- Therapeutic Index Score, TCS- Tumour Control Score, NTSS- Normal-tissue Sparing Score, ILS- Increased Lifespan, S_1- Survival % at 1 month, S_2- Survival % at 2 month, S_3- Survival % at 3 month.



2 Full Versions of Graphs (in main body)

Figure 4: Pearson's correlation coefficients in heat map form to show the correlations between the log of each dosimetric parameter and the corresponding endpoint. The values range between -1 and 1, where the extremities (closest to -1 and 1) have the deepest colour and the weakest correlations (closer to 0) have a weak colour. Statistically significant correlations are identifiable by an asterisk at the top left of the corresponding correlation coefficient. Key: TIS- Therapeutic Index Score, TCS- Tumour Control Score, NTSS- Normal-tissue Sparing Score, ILS- Increased Lifespan, S_1- Survival % at 1 month, S_2- Survival % at 2 month, S_3- Survival % at 3 month.



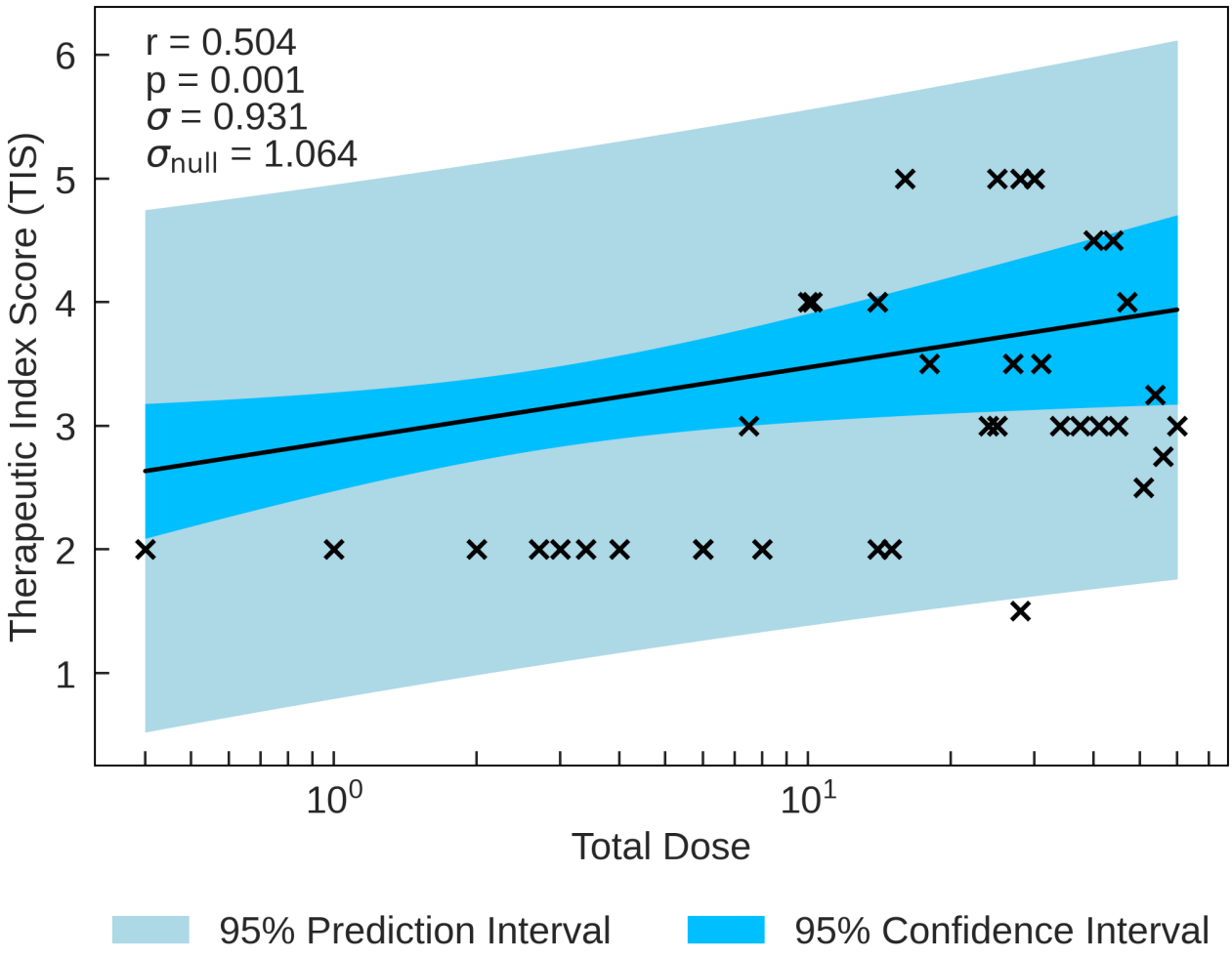


Figure 5: TIS plotted against the strongest dosimetric parameter, Total Dose. There is a strong positive correlation between the parameters, showing that an increase in dose will increase the chance of observing a higher therapeutic index.

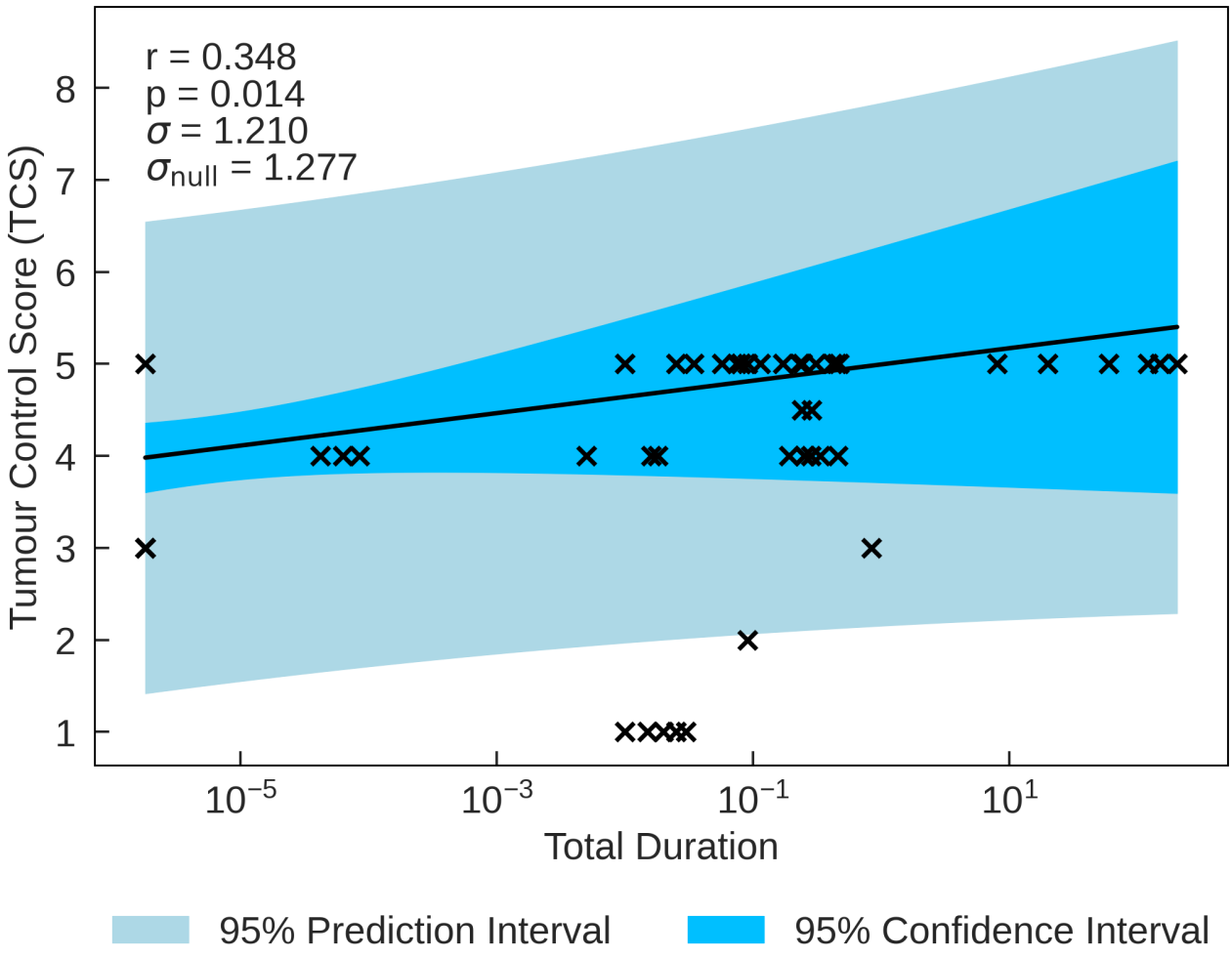


Figure 6: TCS plotted against the strongest dosimetric parameter, Total Time. There is a moderate positive correlation between the parameters, suggesting that an increase in irradiation duration may increase tumour control.

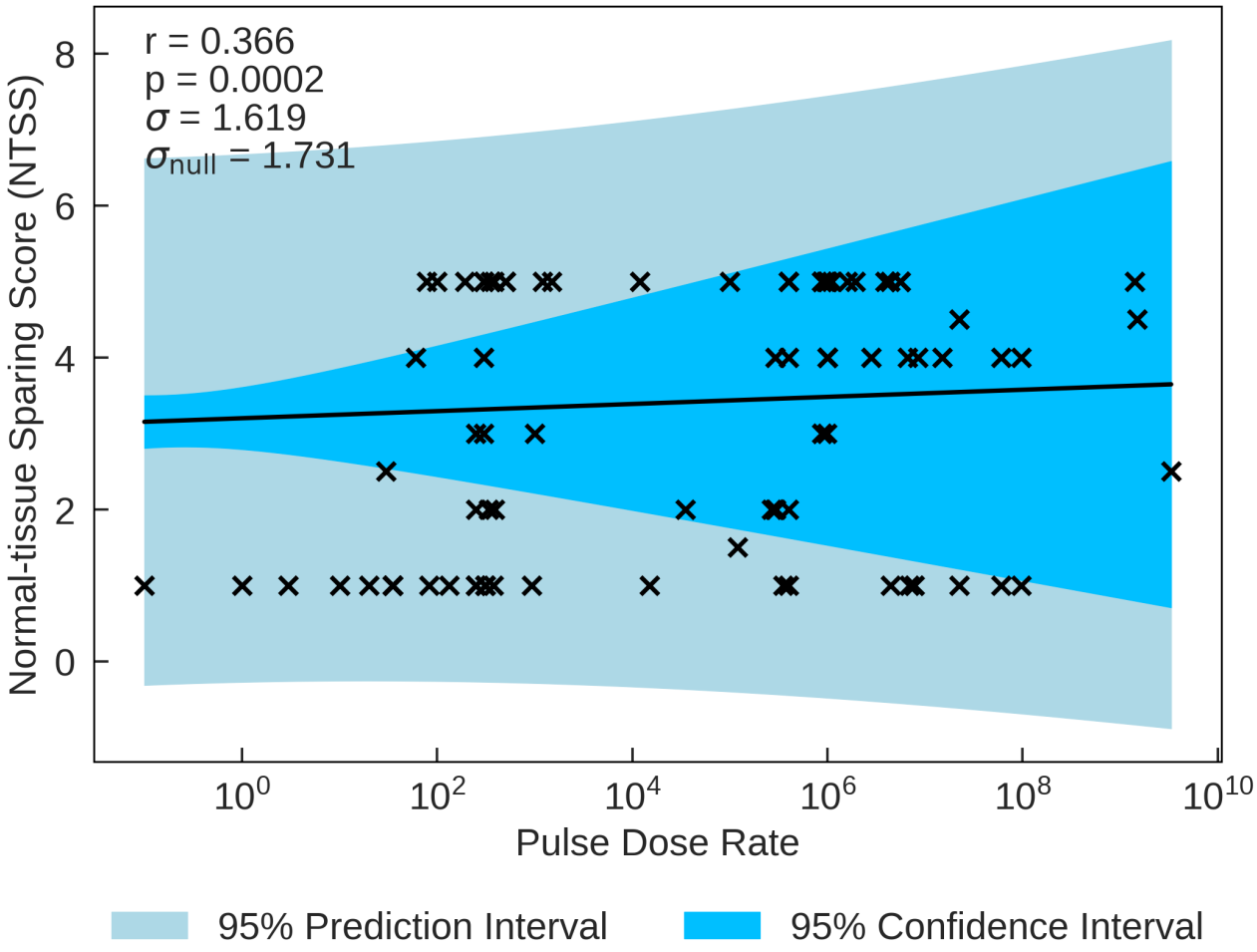


Figure 7: NTSS plotted against the strongest dosimetric parameter, Pulse Dose Rate. There is a moderate positive correlation between the parameters, suggesting that an increase in the dose rate of each pulse may increase the chance of observing a sparing effect in normal tissue.

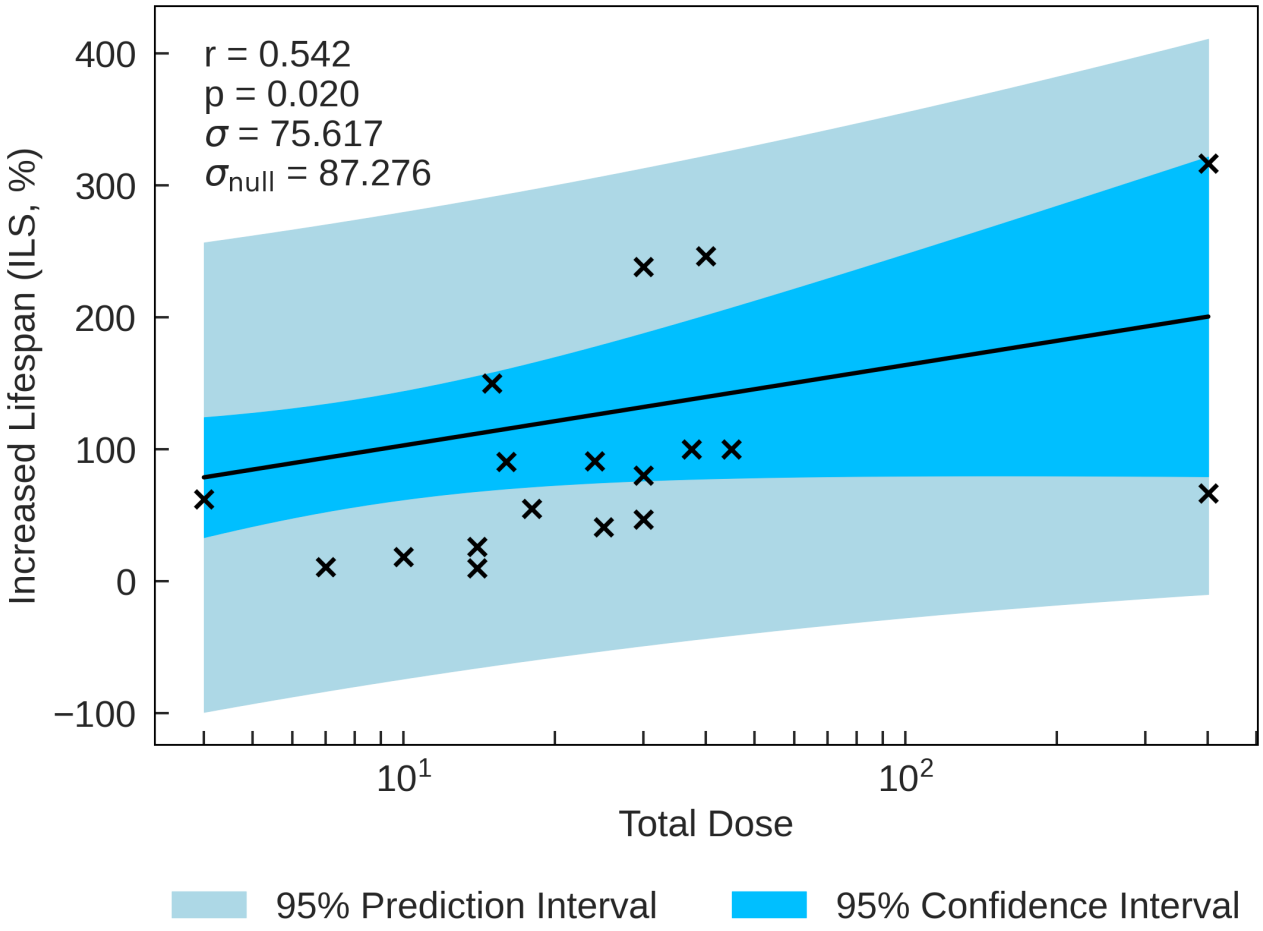


Figure 8: ILS plotted against the strongest dosimetric parameter, Total Dose. There is a strong positive correlation between the parameters, illustrating that an increase in dose can increase the lifespan of small animals.

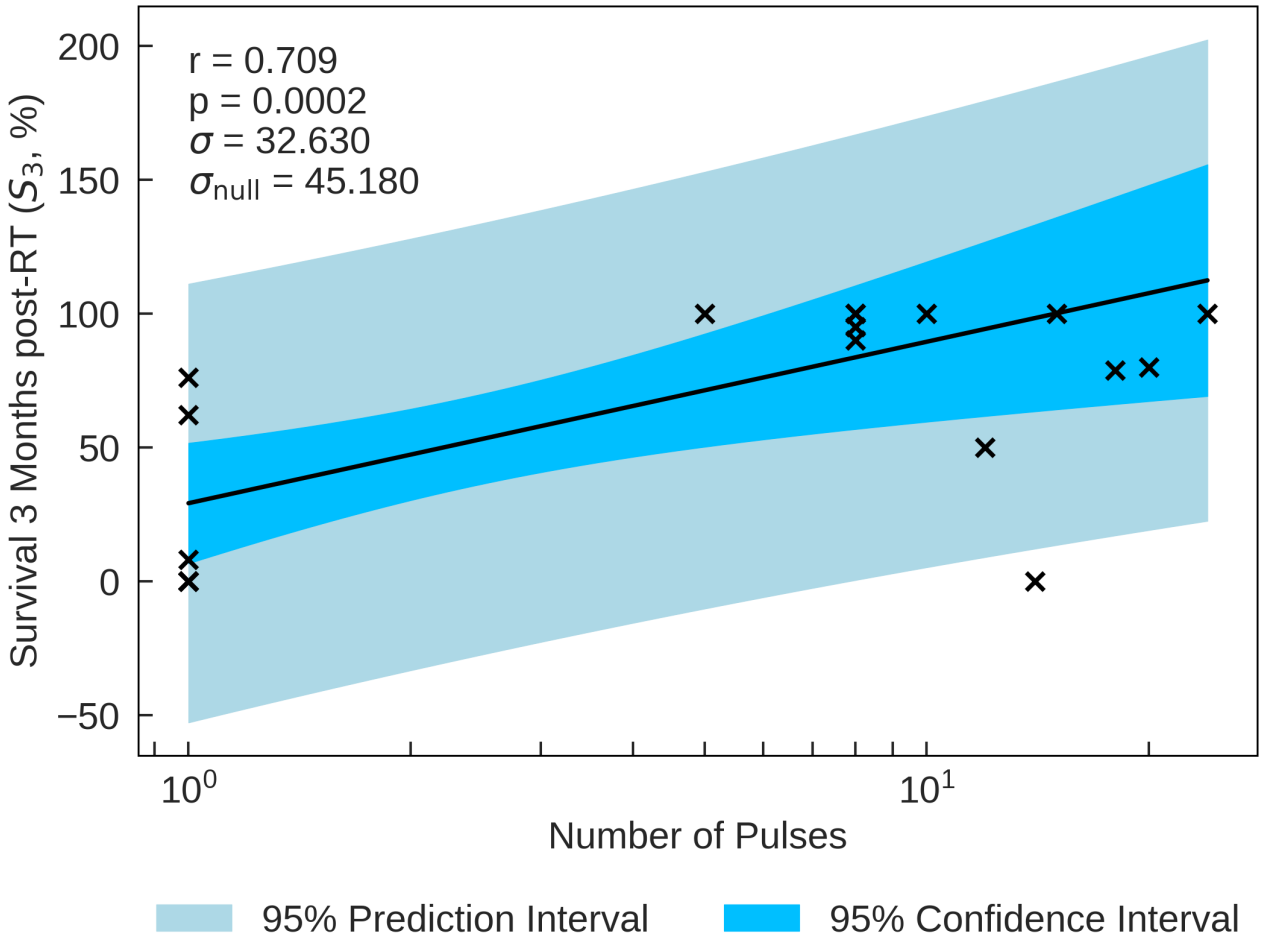


Figure 9: SS percentage plotted against the strongest dosimetric parameter, Number of Pulses. There is a strong positive correlation between the parameters, illustrating that an increase in the Number of Pulses can increase the survival time of small animals.

3 Data Tables

Table 1: Full table of beam parameters including the DOI of each study with the corresponding Increased Lifespan (ILS).

DOI	Mean Dose Rate (Gy/s)	Pulse Dose Rate (Gy/s)	Pulse Width (µs)	Pulse Dose (Gy)	Repetition Frequency (Hz)	Number of Pulses	Total Dose (Gy)	Total Duration (s)	Energy (MeV)	ILS
10.3390/cancers12092656	1.29E+04						4.01E+02	3.11E-02	1.04E-01	6.67E+01
10.3390/cancers12092656	1.17E+04						4.01E+02	3.43E-02	1.04E-01	3.17E+02
10.1158/1078-0432.ccr-20-0894	5.60E+06	5.56E+06	1.80E+00	1.00E+01	1.00E+02	1.00E+00	1.00E+01	1.80E-06	6.00E+00	1.85E+01
10.1158/1078-0432.ccr-20-0894	7.80E+06	7.78E+06	1.80E+00	1.40E+01	1.00E+02	1.00E+00	1.40E+01	1.80E-06	6.00E+00	2.58E+01
10.1158/1078-0432.ccr-20-0894	1.90E+06	1.94E+06	1.80E+00	3.50E+00	1.00E+02	1.00E+00	4 x 3.50E+00	1.80E-06	6.00E+00	1.06E+01
10.1158/1078-0432.ccr-20-0894	3.90E+06	3.89E+06	1.80E+00	7.00E+00	1.00E+02	1.00E+00	2 x 7.00E+00	1.80E-06	6.00E+00	9.77E+00
10.1158/1078-0432.ccr-20-0894	5.60E+06	5.56E+06	1.80E+00	1.00E+01	1.00E+02	1.00E+00	3 x 1.00E+01	1.80E-06	6.00E+00	4.66E+01
10.1016/j.radonc.2021.11.004	1.00E+03	1.00E+03	1.80E+04	1.80E+01	5.56E+01	1.00E+00	1.80E+01	1.80E-02	8.00E+00	5.49E+01
10.1016/j.radonc.2021.11.005	7.00E+02	7.00E+02	4.29E+04	3.00E+01	2.33E+01	1.00E+00	3.00E+01	4.29E-02	8.00E+00	2.38E+02
10.1016/j.ijrobp.2020.10.012	2.00E+02	1.11E+06	1.80E+00	2.00E+00	1.00E+02	2.00E+00	4.00E+00	2.00E-02	6.00E+00	6.20E+01
10.1016/j.adro.2022.101011	5.71E+05	2.86E+05	3.50E+00	2.00E+00	2.86E+05	4 x 3.00E+00	8 x 3.00E+00	4.20E-05	1.00E+01	9.10E+01
10.1016/j.adro.2022.101011	5.95E+05	2.98E+05	3.50E+00	2.08E+00	2.86E+05	6 x 3.00E+00	12.5 x 3.00E+00	6.30E-05	1.00E+01	1.00E+02
10.1016/j.adro.2022.101011	5.36E+05	2.68E+05	3.50E+00	1.88E+00	2.86E+05	8 x 3.00E+00	15 x 3.00E+00	8.40E-05	1.00E+01	1.00E+02
10.1038/s41598-022-16612-6	6.60E+01	1.33E+02	3.00E+04	4.00E+00	3.33E+01	2 x 4.00E+00	2 x 8.00E+00	2 x 1.20E-01		9.05E+01
10.1038/s41598-022-16612-6	7.40E+01	7.35E+01	2.43E+04	1.79E+00	3.33E+01	2 x 7.00E+00	2 x 1.25E+01	2 x 1.70E-01		4.09E+01
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	1.50E+01	3.00E+01	1.67E-01	1.60E+01	8.00E+01
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	2.00E+01	4.00E+01	2.22E-01	1.60E+01	2.46E+02
10.1126/scitranslmed.3008973	6.00E+01						1.50E+01	2.50E-01	4.50E+00	1.50E+02

Table 2: Full table of beam parameters including the DOI of each study with the corresponding % survivals (S_M).

DOI	Mean Dose Rate (Gy/s)	Pulse Dose Rate (Gy/s)	Pulse Width (μs)	Pulse Dose (Gy)	Repetition Frequency (Hz)	Number of Pulses	Total Dose (Gy)	Total Duration (s)	Energy (MeV)	One month survival %	Two month survival %	Three month survival %	Six month survival %
10.3390/cancers12092656	1.29E+04						4.01E+02	3.11E-02	1.04E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10.3390/cancers12092656	1.17E+04						4.01E+02	3.43E-02	1.04E-01	3.50E+01	3.50E+01	3.50E+01	3.50E+01
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	8.00E+00	1.60E+01	7.41E-02	1.60E+01	9.50E+01	9.50E+01	9.50E+01	
10.1158/1078-0432.ccr-20-0894	5.60E+06	5.56E+06	1.80E+00	1.00E+01	1.00E+02	1.00E+00	1.00E+01	1.80E-06	6.00E+00	1.00E+02	0.00E+00	0.00E+00	0.00E+00
10.1158/1078-0432.ccr-20-0894	7.80E+06	7.78E+06	1.80E+00	1.40E+01	1.00E+02	1.00E+00	1.40E+01	1.80E-06	6.00E+00	1.00E+02	0.00E+00	0.00E+00	0.00E+00
10.1158/1078-0432.ccr-20-0894	1.90E+06	1.94E+06	1.80E+00	3.50E+00	1.00E+02	1.00E+00	4 x 3.50E+00	1.80E-06	6.00E+00	8.30E+01	8.00E+00	0.00E+00	0.00E+00
10.1158/1078-0432.ccr-20-0894	3.90E+06	3.89E+06	1.80E+00	7.00E+00	1.00E+02	1.00E+00	2 x 7.00E+00	1.80E-06	6.00E+00	1.00E+02	0.00E+00	0.00E+00	0.00E+00
10.1158/1078-0432.ccr-20-0894	5.60E+06	5.56E+06	1.80E+00	1.00E+01	1.00E+02	1.00E+00	3 x 1.00E+01	1.80E-06	6.00E+00	1.00E+02	8.00E+01	8.00E+00	0.00E+00
10.1016/j.radonc.2021.11.004	1.00E+03	1.00E+03	1.80E+04	1.80E+01	5.56E+01	1.00E+00	1.80E+01	1.80E-02	8.00E+00	1.00E+02	2.00E+01	0.00E+00	0.00E+00
10.1016/j.radonc.2021.11.004	1.20E+03	1.20E+03	2.50E+04	3.00E+01	4.00E+01	1.00E+00	3.00E+01	2.50E-02	8.00E+00	9.00E+01	9.00E+01	7.60E+01	0.00E+00
10.1016/j.radonc.2021.11.004	9.37E+02	9.37E+02	1.60E+04	1.50E+01	6.25E+01	1.00E+00	1.50E+01	1.60E-02	8.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10.1016/j.radonc.2021.11.004				1.20E+01		1.00E+00	1.20E+01		8.00E+00	6.20E+01	6.20E+01	6.20E+01	
10.1016/j.ijrobp.2020.10.012	2.00E+02	1.11E+06	1.80E+00	2.00E+00	1.00E+02	2.00E+00	4.00E+00	2.00E-02	6.00E+00	1.00E+02	1.00E+02		
10.1038/s41598-019-53562-y	3.50E+01	3.50E+01	4.57E+05	1.60E+01	4.57E-01	1.00E+00	1.60E+01	4.57E-01	2.00E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10.1016/j.adro.2022.101011	5.71E+05	2.86E+05	3.50E+00	2.00E+00	2.86E+05	4 x 3.00E+00	8 x 3.00E+00	4.20E-05	1.00E+01	1.00E+02	1.00E+02	5.00E+01	
10.1016/j.adro.2022.101011	5.95E+05	2.98E+05	3.50E+00	2.08E+00	2.86E+05	6 x 3.00E+00	12.5 x 3.00E+00	6.30E-05	1.00E+01	1.00E+02	9.00E+01	7.88E+01	
10.1016/j.adro.2022.101011	5.36E+05	2.68E+05	3.50E+00	1.88E+00	2.86E+05	8 x 3.00E+00	15 x 3.00E+00	8.40E-05	1.00E+01	1.00E+02	1.00E+02	1.00E+02	
10.1038/s41598-022-16612-6	6.60E+01	1.33E+02	3.00E+04	4.00E+00	3.33E+01	2 x 4.00E+00	2 x 8.00E+00	2 x 1.20E-01		1.00E+02	1.00E+02	1.00E+02	
10.1038/s41598-022-16612-6	7.40E+01	7.35E+01	2.43E+04	1.79E+00	3.33E+01	2 x 7.00E+00	2 x 1.25E+01	2 x 1.70E-01		6.40E+01	0.00E+00	0.00E+00	0.00E+00
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	5.00E+00	1.00E+01	5.56E-02	1.60E+01	1.00E+02	1.00E+02	1.00E+02	1.00E+02
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	8.00E+00	1.60E+01	8.89E-02	1.60E+01	1.00E+02	1.00E+02	1.00E+02	1.00E+02
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	1.00E+01	2.00E+01	1.11E-01	1.60E+01	1.00E+02	1.00E+02	1.00E+02	1.00E+02
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	1.50E+01	3.00E+01	1.67E-01	1.60E+01	1.00E+02	1.00E+02	1.00E+02	1.00E+02
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	2.00E+01	4.00E+01	2.22E-01	1.60E+01	1.00E+02	8.00E+01	8.00E+01	5.30E+01
10.1126/scitranslmed.3008973	6.00E+01						1.50E+01	2.50E-01	4.50E+00	4.00E+01	2.00E+01		
10.1126/scitranslmed.3008973	6.00E+01						2.30E+01	3.83E-01	4.50E+00	8.00E+01	6.00E+01		
10.1126/scitranslmed.3008973	6.00E+01						2.80E+01	4.67E-01	4.50E+00	8.90E+01	6.00E+01		
10.1038/s41598-020-78017-7	2.16E+02	4.00E+05	5.00E+00	2.00E+00	1.08E+02	8.00E+00	1.60E+01	7.41E-02	1.60E+01	9.00E+01	9.00E+01	9.00E+01	

Table 3: Full table of beam parameters including the DOI of each study with the corresponding TIS, TCS and NTSS.

DOI	Mean Dose Rate (Gy/s)	Pulse Dose Rate (Gy/s)	Pulse Width (μs)	Pulse Dose (Gy)	Repetition Frequency (Hz)	Number of Pulses	Total Dose (Gy)	Total Duration (s)	Energy (MeV)	Particle	Energy (MeV)	In VIVO/In VITRO	Biological target	Tissue type	Result	Tumour Control Score	Normal-tissue Sparing Score	Therapeutic Index Score	Reason for score			
10.1073/pnas.1901777116	5.56E+06	5.56E+06	1.80E+00	1.00E+01	1.00E+02	1.00E+00	1.00E+01	1.80E-06	Oriatron 6e (eRT6; PMB-Alcen)	Electrons	6.00E+00	In VIVO	Mice brain	Normal Tissue	Maintenance of discrimination index (DI) (		5.00E+00		Exhibits short term and long term radioprotection	Key:	Black text	From paper
10.1073/pnas.1901777116	6.67E+06	6.67E+06	1.80E+00	1.20E+01	1.00E+02	1.00E+00	1.20E+01	1.80E-06	Oriatron 6e (eRT6; PMB-Alcen)	Electrons	6.00E+00	In VIVO	Mice brain	Normal Tissue	Maintenance of discrimination index (DI) (		4.00E+00		Exhibits short term radioprotection		Red text	Calculated
10.1073/pnas.1901777116	7.78E+06	7.78E+06	1.80E+00	1.40E+01	1.00E+02	1.00E+00	1.40E+01	1.80E-06	Oriatron 6e (eRT6; PMB-Alcen)	Electrons	6.00E+00	In VIVO	Mice brain	Normal Tissue	No maintenance of discrimination index (I		1.00E+00		Does not exhibit radioprotection			
10.3390/cancers12092656	1.17E+04						4.01E+02	3.43E-02	ID17 Biomedical Beamline of the ESRF	Synchrotron	1.04E-01	In VIVO	Local irradiation (	Tumour	FLASH-RT increa	5.00E+00			Treated tumour successfully, potentially more than CONV due to found anti-tumour immune responses			
10.1016/j.radonc.2019.06.024	1.00E+02	5.00E+02	4.60E+04	2.30E+01					Horizontal fixed-beam beamline (UPTD)	Proton	2.24E+02	In VIVO	Wildtype zebrafis	Tumour AND Nor	Rate of pericardia	5.00E+00	5.00E+00	5.00E+00	Tumour treated successfully, rate of pericardial edema significantly reduced for FLASH (radioprotection)			
10.1080/09553007414551221	6.67E+01						1.97E+01	2.95E-01		Electrons	7.00E+00	In VIVO	Hind feet rats	Normal Tissue	Small reduction in early skin reaction com		3.00E+00		Exhibits slightly more radioprotection than CONV			
10.1080/09553007414551221	6.67E+01						2.37E+01	3.55E-01		Electrons	7.00E+00	In VIVO	Hind feet rats	Normal Tissue	No reduction in early skin reaction compa		1.00E+00		Does not exhibit more radioprotection than CONV			
10.1080/09553007414551221	6.67E+01						2.75E+01	4.12E-01		Electrons	7.00E+00	In VIVO	Hind feet rats	Normal Tissue	Significant reduction in early skin reaction		5.00E+00		Exhibits good radioprotection			
10.1080/09553007414551221	6.67E+01						2.04E+01	3.05E-01		Electrons	7.00E+00	In VIVO	Hind feet rats	Normal Tissue	Significant reduction in early skin reaction		5.00E+00		Exhibits good radioprotection			
10.1080/09553007414551221	6.67E+01						2.59E+01	3.88E-01		Electrons	7.00E+00	In VIVO	Hind feet rats	Normal Tissue	Significant reduction in early skin reaction		5.00E+00		Exhibits good radioprotection			
10.2307/3575852	8.00E+01	1.00E+05	2.00E+00	2.00E-01	4.00E+02	4.00E+02	8.00E+01	1.00E+00		Electrons	1.00E+01	In VIVO	Mouse foot skin	Normal Tissue	Resistance was induced at 0.2 Gy per pu		5.00E+00		Exhibits good radioprotection			
10.2307/3575852	1.20E+01	1.50E+04	2.00E+00	3.00E-02	4.00E+02	4.00E+02	1.20E+01	1.00E+00		Electrons	1.00E+01	In VIVO	Mouse foot skin	Normal Tissue	Resistance was induced at 0.2 Gy per pu		1.00E+00		Does not exhibit more radioprotection than CONV			
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	8.00E+00	1.60E+01	7.41E-02	Varian Trilogy LINAC	Electrons	1.60E+01	In VIVO	Mice total abdom	Tumour	Survival post irra	5.00E+00	5.00E+00	5.00E+00	Exhibits good tumour control & radioprotection for high survival			
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	8.00E+00	1.60E+01	7.41E-02	Varian Trilogy LINAC	Electrons	1.60E+01	In VIVO	Mice total abdom	Normal Tissue	2x presence of regenerating crypts withir		5.00E+00		Double radioprotection compared to CONV			
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	8.00E+00	1.60E+01	7.41E-02	Varian Trilogy LINAC	Electrons	1.60E+01	In VIVO	Mice total abdom	Normal Tissue	Preservation of intestinal mucosa		5.00E+00		Exhibits good radioprotection			
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	7.00E+00	1.40E+01	6.48E-02	Varian Trilogy LINAC	Electrons	1.60E+01	In VIVO	Mice total abdom	Normal Tissue	No gastrointestinal function but improved		4.00E+00		Exhibits moderately more radioprotection than CONV			
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	7.00E+00	1.40E+01	6.48E-02	Varian Trilogy LINAC	Electrons	1.60E+01	In VIVO	Mice total abdom	Normal Tissue	Epithelial integrity preserved		5.00E+00		Exhibits good radioprotection			
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	6.00E+00	1.20E+01	5.56E-02	Varian Trilogy LINAC	Electrons	1.60E+01	In VIVO	Mice total abdom	Normal Tissue	Increase in regenerating crypts comparec		4.00E+00		Exhibits moderately more radioprotection than CONV			
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	6.00E+00	1.20E+01	5.56E-02	Varian Trilogy LINAC	Electrons	1.60E+01	In VIVO	Mice total abdom	Normal Tissue	Less apoptosis in intestinal crypt base co		4.00E+00		Exhibits moderately more radioprotection than CONV			
10.1101/2019.12.12.873414	2.16E+02	1.00E+06	2.00E+00	2.00E+00	1.08E+02	6.00E+00	1.20E+01	5.56E-02	Varian Trilogy LINAC	Electrons	1.60E+01	In VIVO	Mice total abdom	Normal Tissue	Intermediate increase in DNA damage co		4.00E+00		Exhibits moderately more radioprotection than CONV			
10.1016/j.radonc.2019.06.006	2.00E+02	8.75E+05	2.00E+00	1.75E+00	1.08E+02	1.62E+01	3.00E+01	1.50E-01	Varian Clinac 21EX	Electrons	2.00E+01	In VIVO	Mice whole brain	Normal Tissue	Cognitive funtion preserved		5.00E+00		Exhibits good radioprotection			
10.1016/j.radonc.2019.06.006	2.00E+02	8.75E+05	2.00E+00	1.75E+00	1.08E+02	1.62E+01	3.00E+01	1.50E-01	Varian Clinac 21EX	Electrons	2.00E+01	In VIVO	Mice whole brain	Normal Tissue	Dendritic spine density in hippocampal ap		5.00E+00		Exhibits good radioprotection			
10.1016/j.radonc.2019.06.006	2.00E+02	8.75E+05	2.00E+00	1.75E+00	1.08E+02	1.62E+01	3.00E+01	1.50E-01	Varian Clinac 21EX	Electrons	2.00E+01	In VIVO	Mice whole brain	Normal Tissue	Maintainance of CD68-positive microglia		5.00E+00		Exhibits good radioprotection			
10.1016/j.radonc.2019.06.006	2.00E+02	8.75E+05	2.00E+00	1.75E+00	1.08E+02	1.62E+01	3.00E+01	1.50E-01	Varian Clinac 21EX	Electrons	2.00E+01	In VIVO	Mice whole brain	Normal Tissue	No increase in 5 of 10 pro-inflmmatory cy		3.00E+00		Exhibits slightly more radioprotection than CONV for some data sets			
10.1016/j.radonc.2019.06.006	3.00E+02	8.75E+05	2.00E+00	1.75E+00	1.80E+02	1.80E+01	3.00E+01	1.00E-01	Varian Clinac 21EX	Electrons	1.60E+01	In VIVO	Mice whole brain	Normal Tissue	Cognitive funtion preserved		5.00E+00		Exhibits good radioprotection			
10.1016/j.radonc.2019.06.006	3.00E+02	8.75E+05	2.00E+00	1.75E+00	1.80E+02	1.80E+01	3.00E+01	1.00E-01	Varian Clinac 21EX	Electrons	1.60E+01	In VIVO	Mice whole brain	Normal Tissue	Dendritic spine density in hippocampal ap		5.00E+00		Exhibits good radioprotection			
10.1016/j.radonc.2019.06.006	3.00E+02	8.75E+05	2.00E+00	1.75E+00	1.80E+02	1.80E+01	3.00E+01	1.00E-01	Varian Clinac 21EX	Electrons	1.60E+01	In VIVO	Mice whole brain	Normal Tissue	Maintainance of CD68-positive microglia		5.00E+00		Exhibits good radioprotection			
10.1016/j.radonc.2019.06.006	3.00E+02	8.75E+05	2.00E+00	1.75E+00	1.80E+02	1.80E+01	3.00E+01	1.00E-01	Varian Clinac 21EX	Electrons	1.60E+01	In VIVO	Mice whole brain	Normal Tissue	No increase in 5 of 10 pro-inflmmatory cy		3.00E+00		Exhibits slightly more radioprotection than CONV for some data sets			
10.1016/j.ijrobp.2020.11.012	3.85E+02	3.52E+02	2.00E+00	1.71E+00	2.03E+02	7.90E+00	1.50E+01	3.90E-02	Varian Clinac 21EX	Electrons	1.60E+01	In VIVO	Local irradiation (	Normal Tissue	FLASH irradiation increased the infiltratio		5.00E+00		Exhibits good radioprotection			
10.1080/09553008014551031	7.00E+02						3.00E+01	2.33E+01	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Skin dry desquamation		5.00E+00		No noticible damage, solid radioprotection exhibited			
10.1080/09553008014551031	2.40E+03						3.00E+01	8.00E+01	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Skin dry/ mild moist desquamation		4.50E+00		Slight noticible damage, moderate radioprotection exhibited			
10.1080/09553008014551031	6.00E+03						3.00E+01	2.00E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Mild Skin moist desquamation		4.00E+00		Some noticible damage, some radioprotection exhibited			
10.1080/09553008014551031	1.50E+04						3.00E+01	5.00E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Mild Skin moist desquamation		4.00E+00		Some noticible damage, some radioprotection exhibited			
10.1080/09553008014551031	1.50E+04						3.00E+01	5.00E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Skin dry/ mild moist desquamation		4.50E+00		Slight noticible damage, moderate radioprotection exhibited			
10.1080/09553008014551031	1.50E+04						3.00E+01	5.00E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Skin dry desquamation		5.00E+00		No noticible damage, solid radioprotection exhibited			
10.1080/09553008014551031	7.00E+02						5.00E+01	1.40E+01	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Moderate skin moist desquamation		2.00E+00		Noticible damage, little radioprotection exhibited			
10.1080/09553008014551031	2.40E+03						5.00E+01	4.80E+01	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Moderate skin moist desquamation		2.00E+00		Noticible damage, little radioprotection exhibited			
10.1080/09553008014551031	6.00E+03						5.00E+01	1.20E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Severe skin moist desquamation		1.00E+00		Heavy damage, negligible radioprotection			
10.1080/09553008014551031	1.50E+04						5.00E+01	3.00E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Very severe skin moist desquamation		1.00E+00		Intense damage, zero radioprotection			
10.1080/09553008014551031	1.50E+04						5.00E+01	3.00E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Severe skin moist desquamation		1.00E+00		Heavy damage, negligible radioprotection			
10.1080/09553008014551031	1.50E+04						5.00E+01	3.00E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Moderate skin moist desquamation		2.00E+00		Noticible damage, little radioprotection exhibited			
10.1080/09553008014551031	7.30E+03	2.23E+07	4.00E+00	1.57E-02	8.00E+01	1.91E+03	3.00E+01	2.43E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Skin dry/ mild moist desquamation		4.50E+00		Slight noticible damage, moderate radioprotection exhibited			
10.1080/09553008014551031	7.30E+03	6.04E+07	3.30E+00	3.16E-02	4.17E+01	9.49E+02	3.00E+01	2.43E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Mild Skin moist desquamation		4.00E+00		Some noticible damage, some radioprotection exhibited			
10.1080/09553008014551031	7.30E+03	9.60E+07	3.40E+00	5.34E-02	2.30E+01	5.62E+02	3.00E+01	2.43E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Mild Skin moist desquamation		4.00E+00		Some noticible damage, some radioprotection exhibited			
10.1080/09553008014551031	7.30E+03	2.23E+07	4.00E+00	1.57E-02	8.00E+01	3.18E+03	5.00E+01	1.46E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Severe skin moist desquamation		1.00E+00		Heavy damage, negligible radioprotection			
10.1080/09553008014551031	7.30E+03	6.04E+07	3.30E+00	3.16E-02	4.17E+01	1.58E+03	5.00E+01	1.46E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Very severe skin moist desquamation		1.00E+00		Intense damage, zero radioprotection			
10.1080/09553008014551031	7.30E+03	9.60E+07	3.40E+00	5.34E-02	2.30E+01	9.36E+02	5.00E+01	1.46E+02	Mitsubishi linac, model ML-15MII	Electrons	8.00E+00	In VIVO	Mice leg	Normal Tissue	Severe skin moist desquamation		1.00E+00		Heavy damage, negligible radioprotection			
10.1016/j.ijrobp.2019.10.049	9.40E+01	7.80E+01	1.00E+05	7.80E+00	3.07E-01	1.92E+00	1.50E+01	6.27E+00	IBA Proteus Plus	Proton	2.30E+02	In VIVO	Mice whole abdo	Normal Tissue	Significant in loss of proliferating cells in i		5.00E+00		Exhibits good radioprotection			
10.1016/j.ijrobp.2019.10.049	6.30E+01		1.00E+05				1.80E+01	2.86E-01	IBA Proteus Plus	Proton	2.30E+02	In VIVO	Mice intestine	Normal Tissue	Significantly reduced intestinal fibrosis co		5.00E+00		Exhibits good radioprotection			
10.1016/j.ijrobp.2019.10.049	6.30E+01		1.00E+05				1.20E+01	1.90E-01	IBA Proteus Plus	Proton	2.30E+02	In VIVO	Mice pancreatic (	Tumour	Same short term	4.00E+00			Good antitumour response, not as good as CONV			
10.1016/j.ijrobp.2019.10.049	6.30E+01		1.00E+05				1.80E+01	2.86E-01	IBA Proteus Plus	Proton	2.30E+02	In VIVO	Mice pancreatic (	Tumour	Same short term	4.50E+00			Good antitumour response, almost as good as CONV but not quite			
10.1016/j.radonc.2018.08.016	3.70E+01	1.20E+04					1.00E+01	2.70E-01	Synchrotron beam on ID17 (ESRF, Grenoble, France)	X-ray	2.25E+02	In VIVO	Mice whole brain	Normal Tissue	Cognitive funtion preserved, Preservation		5.00E+00		Exhibits good radioprotection in 3 areas			
10.1667/RR13464.1			1.30E-03				1.74E+01		Ion microprobe SNAKE (Munich tandem accelerator)	Proton	2.30E+01	In VIVO	FaDu SCC	Normal Tissue	Tumour growth delay not as affective but		1.00E+00		No radioprotection improvement on CONV, antitumour control poorer			
10.3390/cancers13051012	5.74E+01	1.92E+02					3.50E+01	6.09E-01	Varian ProBeam proton clinical gantry system	Proton (FLASH6(	2.50E+02	In VIVO	Hind leg irradiatic	Normal Tissue	FLASH-RT reduced activations of TGF-β		5.00E+00		Exhibits good radioprotection			
10.3390/cancers13051012	1.15E+02	3.85E+02					3.50E+01	3.04E-01	Varian ProBeam proton clinical gantry system	Proton (FLASH1	2.50E+02	In VIVO	Hind leg irradiatic	Normal Tissue	FLASH-RT reduced activations of TGF-β		5.00E+00		Exhibits good radioprotection			
10.3390/cancers13051012	6.18E+01	2.06E+02					1.50E+01	2.43E-01	Varian ProBeam proton clinical gantry system	Proton (FLASH6(	2.50E+02	In VIVO	MOC1 Tumour	Tumour	Very similar antitu	5.00E+00			Very similar antitumour response to CONV			
10.3390/cancers13051012	6.22E+01	2.08E+02					1.50E+01	2.41E-01	Varian ProBeam proton clinical gantry system	Proton (FLASH6(	2.50E+02	In VIVO	MOC2 Tumour	Tumour	Similar antitumou	4.50E+00			Similar antitumour response CONV			
10.1158/1078-0432.ccr-20-0894	5.60E+06	5.56E+06	1.80E+00	1.00E+01	1.00E+02	1.00E+00	1.00E+01	1.80E-06	LINAC (Oriatron 6e; eRT6; PMB Alcen)	Electrons	6.00E+00	In VIVO	Mice whole brain	Tumour AND Nor	Cognitive funtion	3.00E+00	5.00E+00	4.00E+00	Exhibits good radioprotection, Moderate tumour control			
10.1158/1078-0432.ccr-20-0894	7.80E+06	7.78E+06	1.80E+00	1.40E+01	1.00E+02	1.00E+00	1.40E+01	1.80E-06	LINAC (Oriatron 6e; eRT6; PMB Alcen)	Electrons	6.00E+00	In VIVO	Mice whole brain	Tumour AND Nor	No cognitive funt	3.00E+00	1.00E+00	2.00E+00	No radioprotection, Moderate tumour control			
10.1158/1078-0432.ccr-20-0894	1.90E+06	1.94E+06	1.80E+00	3.50E+00	1.00E+02	1.00E+00	4 x 3.50E+00	1.80E-06	LINAC (Oriatron 6e; eRT6; PMB Alcen)	Electrons	6.00E+00	In VIVO	Mice whole brain	Tumour AND Nor	Cognitive funtion	3.00E+00	5.00E+00	4.00E+00	Exhibits good radioprotection, Moderate tumour control			
10.1158/1078-0432.ccr-20-0894	3.90E+06	3.89E+06	1.80E+00	7.00E+00	1.00E+02	1.00E+00	2 x 7.00E+00	1.80E-06	LINAC (Oriatron 6e; eRT6; PMB Alcen)	Electrons	6.00E+00	In VIVO	Mice whole brain	Tumour AND Nor	Cognitive funtion	3.00E+00	5.00E+00	4.00E+00	Exhibits good radioprotection, Moderate tumour control			
10.1158/1078-0432.ccr-20-0894	5.60E+06	5.56E+06	1.80E+00	1.00E+01	1.00E+02	1.00E+00	3 x 1.00E+01	1.80E-06	LINAC (Oriatron 6e; eRT6; PMB Alcen)	Electrons	6.00E+00	In VIVO	Mice whole brain	Tumour AND Nor	Cognitive funtion	5.00E+00	5.00E+00	5.00E+00	Exhibits good radioprotection, Effective tumour control			
10.1158/1078-0432.ccr-20-0894	2.50E+03	6.94E+06	1.80E+00	1.25E+01	1.00E+02	2.00E+00	2.50E+01	1.00E-02	LINAC (Oriatron 6e; eRT6; PMB Alcen)	Electrons	6.00E+00	In VIVO	Mice hemi brain	Tumour AND Nor	No cognitive funt	5.00E+00	1.00E+00	3.00E+00	No radioprotection, Effective tumour control			
10.1016/j.radonc.2021.11.004	1.00E+03	1.00E+03	1.80E+04	1.80E+01	5.56E+01	1.00E+00	1.80E+01	1.80E-02	LINAC, HEX PARTER	Electrons	8.00E+00	In VIVO	Mice breast canc	Tumour AND Nor	Tumor control sir	4.00E+00	3.00E+00	3.50E+00	Similar antitumour response, fair radioprotection (good short term)			
10.1016/j.radonc.2021.11.005	1.20E+03	1.20E+03	2.50E+04	3.00E+01	4.00E+01	1.00E+00	3.00E+01	2.50E-02	LINAC, HEX PARTER	Electrons	8.00E+00	In VIVO	Mice lung	Tumour AND Nor	Tumor control sir	5.00E+00	5.00E+00	5.00E+00	Exhibits significantly better radioprotection, good tumour control			
10.1016/j.radonc.2021.11.006	9.37E+02	9.37E+02	1.60E+04	1.50E+01	6.25E+01	1.00E+00	1.50E+01	1.60E-02	LINAC, HEX PARTER	Electrons	8.00E+00	In VIVO	Mice intestine	Tumour AND Nor	Tumor control sir	4.00E+00	1.00E+00	2.50E+00	Tumor control similar, no difference in radioprotection			
10.1016/j.ijrobp.2020.10.012	2.00E+02	1.11E+06	1.80E+00	2.00E+00	1.00E+02	2.00E+00	4.00E+00	2.00E-02	eRT6/Oriatron	Electrons	6.00E+00	In VIVO	Mice	Normal Tissue	Control of leukemic cell expansion 2 subt		5.00E+00		Exhibits good radioprotection & lukemia control			
10.1038/s41598-019-53562-y	3.50E+01	3.50E+01	5.71E+04	2.00E+00	5.71E-02	1.00E+00	2.00E+00	5.71E-02	Varian 2100 IX linear accelerator	Electrons	2.00E+01	Ex VIVO	Murine pancreati	Tumour AND Nor	FLASH slightly m	5.00E+00	1.00E+00	2.00E+00	Slightly higher tumour control than CONV, no additional radioprotection			
10.1038/s41598-019-53562-y	3.50E+01	3.50E+01	1.14E+05	4.00E+00	1.14E-01	1.00E+00	4.00E+00	1.14E-01	Varian 2100 IX linear accelerator	Electrons	2.00E+01	Ex VIVO	Murine pancreati	Tumour AND Nor	FLASH intermedi	5.00E+00	1.00E+00	2.00E+00	Intermediately higher tumour control than CONV, no additional radioprotection			
10.1038/s41598-019-53562-y	3.50E+01	3.50E+01	1.71E+05	6.00E+00	1.71E-01	1.00E+00	6.00E+00	1.71E-01	Varian 2100 IX linear accelerator	Electrons	2.00E+01	Ex VIVO	Murine pancreati	Tumour AND Nor	FLASH more pot	5.00E+00	1.00E+00	2.00E+00	Higher tumour control than CONV, no additional radioprotection			
10.1038/s41598-019-53562-y	3.50E+01	3.50E+01	2.29E+05	8.00E+00	2.29E-01	1.00E+00	8.00E+00	2.29E-01	Varian 2100 IX linear accelerator	Electrons	2.00E+01	Ex VIVO	Murine pancreati	Tumour AND Nor	FLASH much mo	5.00E+00	1.00E+00	2.00E+00	Much higher tumour control than CONV, no additional radioprotection			
10.1038/s41598-019-53562-y	3.50E+01	3.50E+01	5.71E+04	2.00E+00	5.71E-02	5.00E+00	1.00E+01	2.86E-01	Varian 2100 IX linear accelerator	Electrons	2.00E+01	In VIVO	Mice heart	Normal Tissue	No lymphocyte sparing		1.00E+00		No radioprotection, effective tumour control			
10.1038/s41598-019-53562-y	3.50E+01	3.50E+01	2.86E+04	1.00E+00	2.86E-02	5.00E+00	5.00E+00	1.43E-01	Varian 2100 IX linear accelerator	Electrons	2.00E+01	In VIVO	Mice spleen	Normal Tissue	No lymphocyte sparing		1.00E+00		No radioprotection, effective tumour control			
10.1038/s41598-019-53562-y	3.50E+01	3.50E+01	4.57E+05	1.60E+01	4.57E-01	1.00E+00	1.60E+01	4.57E-01	Varian 2100 IX linear accelerator	Electrons	2.00E+01	In VIVO	Mice whole abdo	Normal Tissue	Survival rate worse than CONV		1.00E+00		No radioprotection, worse survival than CONV			
10.1002/xrs.2621				4.25E-01		8.00E+00	3.40E+00		PFMA-3	Electrons	2.00E-01	In VITRO	Breast adenocarc	Tumour AND Nor	High probability c	5.00E+00	1.00E+00	3.00E+00	High tumour control, no radioprotection (high cell death)			
10.1002/xrs.2621				1.80E-01		1.50E+01	2.70E+00		PFMA-3	Electrons	2.00E-01	In VITRO	Breast adenocarc	Tumour AND Nor	High probability c	5.00E+00	1.00E+00	3.00E+00	High tumour control, no radioprotection (high cell death)			
10.1269/jrr.11080	5.00E-02	2.50E+02	4.00E+00	1.00E-03	5.00E+01	4.00E+02	4.00E-01	8.00E+00	LINAC, Oncor Impression, Siemens AG	Electrons	6.00E+00	In VITRO	Normal tissue cel	Tumour AND Nor	FLASH and CON	5.00E+00	1.00E+00	3.00E+00	No radioprotection, good antitumour control			
10.1269/jrr.11080	5.00E-02	2.50E+02	4.00E+00	1.00E-03	5.00E+01	1.00E+03	1.00E+00	2.00E+01	LINAC, Oncor Impression, Siemens AG	Electrons	6.00E+00	In VITRO	Normal tissue cel	Tumour AND Nor	FLASH has less	5.00E+00	1.00E+00	2.00E+00	Worse radioprotection, good antitumour control			
10.1269/jrr.11080	5.00E-02	2.50E+02	4.00E+00	1.00E-03	5.00E+01	3.00E+03	3.00E+00	6.00E+01	LINAC, Oncor Impression, Siemens AG	Electrons	6.00E+00	In VITRO	Normal tissue cel	Tumour AND Nor	FLASH has less	5.00E+00	1.00E+00	2.00E+00	Worse radioprotection, good antitumour control			
10.1269/jrr.11080	5.00E-02	2.50E+02	4.00E+00	1.00E-03	5.00E+01	6.00E+03	6.00E+00	1.20E+02	LINAC, Oncor Impression, Siemens AG	Electrons	6.00E+00	In VITRO	Normal tissue cel	Tumour AND Nor	FLASH and CON	5.00E+00	1.00E+00	3.00E+00	No radioprotection, good antitumour control			
10.1269/jrr.11080	5.00E-02	2.50E+02	4.00E+00	1.00E-03	5.00E+01	7.50E+03	7.50E+00	1.50E+02	LINAC, Oncor Impression, Siemens AG	Electrons	6.00E+00	In VITRO	Normal tissue cel	Tumour AND Nor	FLASH has sligh	5.00E+00	2.00E+00	3.50E+00	Some radioprotection, good antitumour control			
10.1269/jrr.11080	5.00E-02	2.50E+02	4.00E+00	1.00E-03	5.00E+01	1.02E+04	1.02E+01	2.04E+02	LINAC, Oncor Impression, Siemens AG	Electrons	6.00E+00	In VITRO	Normal tissue cel	Tumour AND Nor	FLASH has more	5.00E+00	3.00E+00	4.00E+00	Slightly more radioprotection, good antitumour control			
10.1158/1078-0432.CCR-17-3375	3.13E+02	3.13E+02	8.00E+04	2.50E+01	1.25E+01	1.00E+00	2.50E+01	8.00E-02	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Cat skin	Tumour AND Nor	Acute toxicity-Ery	5.00E+00	1.00E+00	3.00E+00	Good tumour control, limited radioprotection			
10.1158/1078-0432.CCR-17-3375	3.38E+02	3.38E+02	8.00E+04	2.70E+01	1.25E+01	1.00E+00	2.70E+01	8.00E-02	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Cat skin	Tumour AND Nor	Late Toxicity- dep	5.00E+00	2.00E+00	3.50E+00	Good tumour control, small amount of radioprotection			
10.1158/1078-0432.CCR-17-3375	3.11E+02	3.11E+02	9.00E+04	2.80E+01	1.11E+01	1.00E+00	2.80E+01	9.00E-02	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Cat skin	Tumour AND Nor	Late Toxicity- dep	2.00E+00	1.00E+00	1.50E+00	Tumour recurrance after initial control, death			
10.1158/1078-0432.CCR-17-3375	3.88E+02	3.88E+02	8.00E+04	3.10E+01	1.25E+01	1.00E+00	3.10E+01	8.00E-02	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Cat skin	Tumour AND Nor	Late Toxicity- dep	5.00E+00	2.00E+00	3.50E+00	Good tumour control, small amount of radioprotection			
10.1158/1078-0432.CCR-17-3375	3.78E+02	3.78E+02	9.00E+04	3.40E+01	1.11E+01	1.00E+00	3.40E+01	9.00E-02	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Cat skin	Tumour AND Nor	Acute toxicity-Mo	5.00E+00	1.00E+00	3.00E+00	Good tumour control, limited radioprotection			
10.1158/1078-0432.CCR-17-3375	1.32E+02	1.32E+02	3.10E+05	4.10E+01	3.23E+00	1.00E+00	4.10E+01	3.10E-01	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Cat skin	Tumour AND Nor	Acute toxicity-Ery	5.00E+00	1.00E+00	3.00E+00	Good tumour control, limited radioprotection			
10.1158/1078-0432.CCR-17-3375	3.00E+02	3.00E+02	7.33E+04	2.20E+01	1.36E+01	1.00E+00	2.20E+01	7.33E-02	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Minipig skin	Normal Tissue	Only depilation & regrowth		3.00E+00		Same level of radioprotection as CONV			
10.1158/1078-0432.CCR-17-3375	3.00E+02	3.00E+02	8.33E+04	2.50E+01	1.20E+01	1.00E+00	2.50E+01	8.33E-02	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Minipig skin	Normal Tissue	Only depilation & regrowth, CONV no reg		4.00E+00		Better radioprotection than CONV			
10.1158/1078-0432.CCR-17-3375	3.00E+02	3.00E+02	9.33E+04	2.80E+01	1.07E+01	1.00E+00	2.80E+01	9.33E-02	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Minipig skin	Normal Tissue	Only depilation & regrowth, depilation aga		5.00E+00		Much better radioprotection than CONV			
10.1158/1078-0432.CCR-17-3375	3.00E+02	3.00E+02	1.03E+05	3.10E+01	9.68E+00	1.00E+00	3.10E+01	1.03E-01	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Minipig skin	Normal Tissue	Only depilation & regrowth, depilation aga		5.00E+00		Much better radioprotection than CONV			
10.1158/1078-0432.CCR-17-3375	3.00E+02	3.00E+02	1.13E+05	3.40E+01	8.82E+00	1.00E+00	3.40E+01	1.13E-01	Oriatron (PMBAlcen)/ Kinetron	Electrons	4.50E+00/6.00E+00	In VIVO	Minipig skin	Normal Tissue	Only depilation, no regrowth, CONV also		5.00E+00		Much better radioprotection than CONV			
10.1016/j.radonc.2017.05.003	1.00E-01	1.00E-01	1.80E+00	1.80E-07	1.00E+01	5.56E+07	1.00E+01	1.00E+02	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	53% Recognition Ratio		1.00E+00		No radioprotection			
10.1016/j.radonc.2017.05.003	1.00E+00	1.00E+00	1.80E+00	1.80E-06	1.00E+01	5.56E+06	1.00E+01	1.00E+01	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	56% Recognition Ratio		1.00E+00		No radioprotection			
10.1016/j.radonc.2017.05.003	3.00E+00	3.00E+00	1.80E+00	5.40E-06	1.00E+02	1.85E+06	1.00E+01	3.33E+00	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	56.7% Recognition Ratio		1.00E+00		No radioprotection			
10.1016/j.radonc.2017.05.003	1.00E+01	1.00E+01	1.80E+00	1.80E-05	1.00E+02	5.56E+05	1.00E+01	1.00E+00	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	57.1% Recognition Ratio		1.00E+00		No radioprotection			
10.1016/j.radonc.2017.05.003	2.00E+01	2.00E+01	1.80E+00	3.60E-05	1.00E+02	2.78E+05	1.00E+01	5.00E-01	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	54.4% Recognition Ratio		1.00E+00		No radioprotection			
10.1016/j.radonc.2017.05.003	3.00E+01	3.00E+01	1.80E+00	5.40E-05	1.00E+02	1.85E+05	1.00E+01	3.33E-01	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	65.9% Recognition Ratio		2.50E+00		Some radioprotection			
10.1016/j.radonc.2017.05.003	6.00E+01	6.00E+01	1.80E+00	1.08E-04	1.00E+02	9.26E+04	1.00E+01	1.67E-01	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	72.1% Recognition Ratio		4.00E+00		Fair radioprotection			
10.1016/j.radonc.2017.05.003	1.00E+02	1.00E+02	1.80E+00	1.80E-04	1.00E+02	5.56E+04	1.00E+01	1.00E-01	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	75.9% Recognition Ratio		5.00E+00		Good radioprotection			
10.1016/j.radonc.2017.05.003	5.00E+02	5.00E+02	1.80E+00	9.00E-04	1.00E+02	1.11E+04	1.00E+01	2.00E-02	Oriatron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00	In VIVO	Mouse brain	Normal Tissue	79.1% Recognition Ratio		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						5.00E-01	1.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						5.00E-01	1.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						5.00E-01	1.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No reduced number of senescence cells (		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						5.00E-01	5.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						5.00E-01	5.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						5.00E-01	5.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						5.00E-01	5.00E-04	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						5.00E-01	5.00E-04	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						5.00E-01	5.00E-04	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						1.00E+00	2.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Clonogenic cell survival		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						1.00E+00	2.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						1.00E+00	2.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No reduced number of senescence cells (		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						1.00E+00	1.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						1.00E+00	1.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						1.00E+00	1.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No reduced number of senescence cells (		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						1.00E+00	1.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						1.00E+00	1.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						1.00E+00	1.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						2.00E+00	4.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Clonogenic cell survival		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						2.00E+00	4.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						2.00E+00	4.00E+01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No reduced number of senescence cells (		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						2.00E+00	2.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						2.00E+00	2.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						2.00E+00	2.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						2.00E+00	2.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						2.00E+00	2.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						2.00E+00	2.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						5.00E+00	1.00E+02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						5.00E+00	1.00E+02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						5.00E+00	1.00E+02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No reduced number of senescence cells (		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						5.00E+00	5.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						5.00E+00	5.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						5.00E+00	5.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						5.00E+00	5.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						5.00E+00	5.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						5.00E+00	5.00E-03	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						1.00E+01	2.00E+02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						1.00E+01	2.00E+02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	5.00E-02						1.00E+01	2.00E+02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No reduced number of senescence cells (		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						1.00E+01	1.00E-01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						1.00E+01	1.00E-01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+02						1.00E+01	1.00E-01	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						1.00E+01	1.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Proton dose rate doesn't affect clonogeni		1.00E+00		No radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						1.00E+01	1.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	No increased γH2AX foci formation		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						1.00E+01	1.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Reduced number of senescence cells (βg		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						1.00E+01	1.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Mitigation of expression of pro-inflammatc		5.00E+00		Good radioprotection			
10.1016/j.radonc.2019.02.009	1.00E+03						2.00E+01	2.00E-02	HVE 5.5 MV Singletron accelerator	Proton	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Increased γH2AX foci formation		1.00E+00		No radioprotection			
10.1158/1078-0432.ccr-19-1440							5.20E+00		Kinetron	Electrons	4.50E+00	In VITRO	Normal human lu	Normal Tissue	Minimises DNA damage and lethality com		5.00E+00		Good radioprotection			
10.1158/1078-0432.ccr-19-1440							1.70E+01		Kinetron	Electrons	4.50E+00	In VIVO	Mice lung	Normal Tissue	Reduction in pressure to repopulate after		5.00E+00		Good radioprotection			
10.1158/1078-0432.ccr-19-1440							1.70E+01		Kinetron	Electrons	4.50E+00	In VIVO	Mice lung	Normal Tissue	Preservation of lung from radio-induced s		5.00E+00		Good radioprotection			
10.1158/1078-0432.ccr-19-1440							1.70E+01		Kinetron	Electrons	4.50E+00	In VIVO	Terc-/- mice	Normal Tissue	No normal tissue sparing		1.00E+00		No radioprotection			
10.3390/cancers12061671	4.40E+06	4.44E-06	1.80E+00	8.00E+00	1.00E+02	1.00E+00	8.00E+00	1.80E-06	Oriatron (eRT6; PMBAlcen) LINAC	Electron	6.00E+00	In VIVO	Whole brain irrad	Normal Tissue	FLASH irradiation attenuated microglia ac		1.00E+00		High level of radioprotection (3 different end points)			
10.1016/j.ijrobp.2019.06.187	4.00E+01						1.80E+01	4.50E-01	Varian ProBeam proton clinical gantry system	Proton		In VIVO	Thoracic irradiati	Tumour	Significant differe	5.00E+00			Improved tumour control			
10.1259/bjr.20190702	6.00E+02	6.00E+02	5.00E+03	3.00E+00	2.00E+02	1.00E+00	3.00E+00	5.00E-03	Elekta Precise LINAC	Electrons	1.00E+01	In VITRO	Hypoxic prostate	Tumour	Surviving fraction	4.00E+00			Adequate tumour control			
10.1259/bjr.20190702	6.00E+02	6.00E+02	5.00E+03	3.00E+00	2.00E+02	2.00E+00	6.00E+00	1.00E-02	Elekta Precise LINAC	Electrons	1.00E+01	In VITRO	Hypoxic prostate	Tumour	Surviving fraction	1.00E+00			Not adequate tumour control			
10.1259/bjr.20190702	6.00E+02	6.00E+02	5.00E+03	3.00E+00	2.00E+02	3.00E+00	9.00E+00	1.50E-02	Elekta Precise LINAC	Electrons	1.00E+01	In VITRO	Hypoxic prostate	Tumour	Surviving fraction	1.00E+00			Not adequate tumour control			
10.1259/bjr.20190702	6.00E+02	6.00E+02	5.00E+03	3.00E+00	2.00E+02	4.00E+00	1.20E+01	2.00E-02	Elekta Precise LINAC	Electrons	1.00E+01	In VITRO	Hypoxic prostate	Tumour	Surviving fraction	1.00E+00			Very little tumour control			
10.1259/bjr.20190702	6.00E+02	6.00E+02	5.00E+03	3.00E+00	2.00E+02	5.00E+00	1.50E+01	2.50E-02	Elekta Precise LINAC	Electrons	1.00E+01	In VITRO	Hypoxic prostate	Tumour	Surviving fraction	1.00E+00			Very little tumour control			
10.1259/bjr.20190702	6.00E+02	6.00E+02	5.00E+03	3.00E+00	2.00E+02	6.00E+00	1.80E+01	3.00E-02	Elekta Precise LINAC	Electrons	1.00E+01	In VITRO	Hypoxic prostate	Tumour	Surviving fraction	1.00E+00			Negligible tumour control			
10.1667/RADE-20-00067.1	5.56E+06	5.56E+06	1.80E+00	1.00E+01	1.00E+02	1.00E+00	1.00E+01	1.80E-06	Oriatron (eRT6; PMBAlcen) LINAC	Electron	6.00E+00	In VIVO	Whole brain irrad	Normal Tissue	FLASH-RT limited astrogliosis in brain, Fl		5.00E+00		Good radioprotection			
10.1186/1748-717x-6-139	3.33E+09	3.33E+09	9.00E-09	3.00E-05	1.11E+14	1.00E+05	3.00E+00	9.00E-10	Pulsed microprobe SNAKE	Protons	2.00E+01	In VITRO	HeLa cells	Normal Tissue	G2 phase cell cycle arrest less than after		2.50E+00		1 level of radioprotection, 2 unaffected			
10.1080/09553007114550611	8.30E+01	8.30E+01	2.00E+00	1.66E-04	5.00E+05	4.00E+02	6.64E-02	8.00E-04	LINAC (M.C.R.)	Electrons	7.00E+00	In VIVO	Mouse intestine	Normal Tissue	No differences with CONV		1.00E+00		No radioprotection			
10.1126/scitranslmed.3008973	6.00E+01						1.70E+01	2.83E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VIVO	Mice bilateral tho	Normal Tissue	No development of pulmonary fibrosis & a		5.00E+00		High level of radioprotection (3 different end points)			
10.1126/scitranslmed.3008973	6.00E+01						2.00E+01	3.33E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VIVO	Mice bilateral tho	Normal Tissue	No development of lung fibrosis		5.00E+00		High level of radioprotection (3 different end points)			
10.1126/scitranslmed.3008973	6.00E+01						2.30E+01	3.83E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VIVO	Mice bilateral tho	Normal Tissue	Cachexia		1.50E+00		Negligible radioprotection			
10.1126/scitranslmed.3008973	6.00E+01						3.00E+01	5.00E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VIVO	Mice bilateral tho	Normal Tissue	Development massive pulmonary edema		1.00E+00		No radioprotection			
10.1126/scitranslmed.3008973	6.00E+01						1.70E+01	2.83E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VITRO	Human breast ca	Tumour	Efficacy in repres	4.00E+00			Equal tumour control to CONV			
10.1126/scitranslmed.3008973	6.00E+01						2.50E+01	4.17E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VITRO	Human head and	Tumour AND Nor	Complete tumour	5.00E+00	5.00E+00	5.00E+00	Complete tumour control and radioprotection			
10.1126/scitranslmed.3008973	6.00E+01						1.50E+01	2.50E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VITRO	Human head and	Tumour	Inhibition of tumo	4.00E+00			Good tumour control			
10.1126/scitranslmed.3008973	6.00E+01						2.00E+01	3.33E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VITRO	Human head and	Tumour	Inhibition of tumo	4.00E+00			Good tumour control			
10.1126/scitranslmed.3008973	6.00E+01						1.50E+01	2.50E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VIVO	TC-1 cells (C57B	Tumour	Tumor control as	4.00E+00			Good tumour control			
10.1126/scitranslmed.3008973	6.00E+01						2.80E+01	4.67E-01	LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00	In VIVO	TC-1 cells (C57B	Tumour AND Nor	Tumor control sig	5.00E+00	5.00E+00	5.00E+00	Exhibits significantly better tumour control than CONV and radioprotection			
10.1016/j.adro.2022.101011	5.71E+05	2.86E+05	3.50E+00	2.00E+00	2.86E+05	4 x 3.00E+00	8 x 3.00E+00	4.20E-05	Elekta Precise linear accelerator	Electrons	1.00E+01	In VIVO		Tumour AND Nor	FLASH-RT result	4.00E+00	2.00E+00	3.00E+00	Same tumour control & level of radioprotection as CONV			
10.1016/j.adro.2022.101012	5.95E+05	2.98E+05	3.50E+00	2.08E+00	2.86E+05	6 x 3.00E+00	12.5 x 3.00E+00	6.30E-05	Elekta Precise linear accelerator	Electrons	1.00E+01	In VIVO		Tumour AND Nor	FLASH-RT result	4.00E+00	2.00E+00	3.00E+00	Same tumour control & level of radioprotection as CONV			
10.1016/j.adro.2022.101013	5.36E+05	2.68E+05	3.50E+00	1.88E+00	2.86E+05	8 x 3.00E+00	15 x 3.00E+00	8.40E-05	Elekta Precise linear accelerator	Electrons	1.00E+01	In VIVO		Tumour AND Nor	FLASH-RT result	4.00E+00	2.00E+00	3.00E+00	Same tumour control & level of radioprotection as CONV			
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	5.00E+00	1.00E+01	5.56E-02	LINAC	Electrons	1.60E+01	In VIVO	Female C57BL/6	Normal Tissue	Same skin score as CONV		2.00E+00		Same radioprotection as CONV			
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	8.00E+00	1.60E+01	8.89E-02	LINAC	Electrons	1.60E+01	In VIVO	Female C57BL/6	Normal Tissue	Worse skin score than CONV		1.00E+00		Worse radioprotection than CONV			
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	1.00E+01	2.00E+01	1.11E-01	LINAC	Electrons	1.60E+01	In VIVO	Female C57BL/6	Normal Tissue	Slightly better skin score than CONV		4.00E+00		Slightly better radioprotection than CONV			
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	1.50E+01	3.00E+01	1.67E-01	LINAC	Electrons	1.60E+01	In VIVO	Female C57BL/6	Normal Tissue	Better skin score than CONV		5.00E+00		Better radioprotection than CONV			
10.1667/RADE-20-00090	1.80E+02	4.00E+05	5.00E+00	2.00E+00	9.00E+01	2.00E+01	4.00E+01	2.22E-01	LINAC	Electrons	1.60E+01	In VIVO	Female C57BL/6	Normal Tissue	Better skin score than CONV		5.00E+00		Better radioprotection than CONV			
10..1016/j.radonc.2023.109767	3.47E-01	1.60E+06	1.80E+00	2.88E+00	8.99E+02	10 x 1.04E+00	10 x 3.00E+00	8.64E+01	eRT6/Oriatron	Electrons	6.00E+00	In VIVO	Female mice whc	Normal Tissue	FLASH radiotherapy and unirradiated cor		5.00E+00		High level of radioprotection, same as control, CONV was much worse			
10.1016/j.radonc.2022.05.014	8.70E+01						4.00E+01	4.60E-01	ProBeam, Varian	Protons	2.50E+02	In VIVO	Tumor bearing hi	Tumour AND Nor	Similar tumour cc	4.00E+00	5.00E+00	4.50E+00	Same tumour control & much better radioprotection than CONV			
10.1016/j.radonc.2022.05.014							4.40E+01		ProBeam, Varian	Protons	2.50E+02	In VIVO	Tumor bearing hi	Tumour AND Nor	Similar tumour cc	4.00E+00	5.00E+00	4.50E+00	Same tumour control & much better radioprotection than CONV			
10.1016/j.radonc.2022.05.014							4.70E+01		ProBeam, Varian	Protons	2.50E+02	In VIVO	Tumor bearing hi	Tumour AND Nor	Slightly less tumc	3.00E+00	5.00E+00	4.00E+00	Slightly poorer tumour control & much better radioprotection than CONV			
10.1016/j.radonc.2022.05.014							5.10E+01		ProBeam, Varian	Protons	2.50E+02	In VIVO	Tumor bearing hi	Tumour AND Nor	Much less tumou	1.00E+00	4.00E+00	2.50E+00	Much less tumour control than CONV & better radioprotection than CONV			
10.1016/j.radonc.2022.05.014							5.40E+01		ProBeam, Varian	Protons	2.50E+02	In VIVO	Tumor bearing hi	Tumour AND Nor	Less tumour cont	2.00E+00	4.50E+00	3.25E+00	Less tumour control than CONV & better radioprotection than CONV			
10.1016/j.radonc.2022.05.014							5.60E+01		ProBeam, Varian	Protons	2.50E+02	In VIVO	Tumor bearing hi	Tumour AND Nor	Less tumour cont	2.00E+00	3.50E+00	2.75E+00	Less tumour control than CONV & slightly better radioprotection than CONV			
10.1016/j.radonc.2022.05.014	7.14E+01						6.00E+01	8.40E-01	ProBeam, Varian	Protons	2.50E+02	In VIVO	Tumor bearing hi	Tumour AND Nor	Slightly less tumc	3.00E+00	3.00E+00	3.00E+00	Slightly less tumour control than CONV & somewhat better radioprotection than CONV			
10.1016/j.radonc.2022.05.025	2.87E+02	4.40E+06	5.58E-06	2.45E-05	1.30E+07	1.30E+06	3.19E+01	1.00E-01	ELBE electron accelerator	Electrons	3.00E+01	In VIVO	Zebrafish embryo	Normal Tissue	Much less pericardial edema and less spi		5.00E+00		High level of radioprotection			
10.1016/j.radonc.2022.05.025	1.77E+02	1.40E+09	5.59E-06	7.83E-03	2.52E+04	4.13E+03	3.23E+01	1.64E-01	ELBE electron accelerator	Electrons	3.00E+01	In VIVO	Zebrafish embryo	Normal Tissue	Much less pericardial edema and less spi		5.00E+00		High level of radioprotection			
10.1016/j.radonc.2022.05.025	2.50E+05	1.50E+09	5.44E-06	8.16E-03	1.31E+07	3.94E+03	3.21E+01	3.00E-04	ELBE electron accelerator	Electrons	3.00E+01	In VIVO	Zebrafish embryo	Normal Tissue	Less pericardial edema and less spinal cu		4.50E+00		Higher level of radioprotection than CONV			
10.1016/j.radonc.2022.05.025	3.00E+02	1.50E+03	1.64E-03	2.47E-06	1.06E+08	1.22E+07	3.01E+01	1.15E-01	UPTD proton beam	Protons	2.24E+02	In VIVO	Zebrafish embryo	Normal Tissue	Much less pericardial edema and less spi		5.00E+00		High level of radioprotection			
10.1259/bjr.20211150	3.00E-01	3.50E+04	3.43E-01	1.20E-02	2.50E+01	1.67E+03	2.01E+01	6.70E+01	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Same % tail as CONV		2.00E+00		Same tumour control as CONV			
10.1259/bjr.20211150	1.00E+00	1.20E+05	3.33E-01	4.00E-02	2.50E+01	5.01E+02	2.00E+01	2.00E+01	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Higher % tail than CONV		1.50E+00		Worse radioprotection than CONV			
10.1259/bjr.20211150	3.00E+00	3.50E+05	3.43E-01	1.20E-01	2.50E+01	1.68E+02	2.01E+01	6.70E+00	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Much higher % tail than CONV		1.00E+00		Much worse radioprotection than CONV			
10.1259/bjr.20211150	1.00E+01	9.80E+05	3.37E-02	3.30E-02	3.00E+02	6.01E+02	2.00E+01	2.00E+00	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Moderately less % tail than CONV		3.00E+00		Slightly better radioprotection than CONV			
10.1259/bjr.20211150	3.00E+01	2.90E+05	3.45E-01	1.00E-01	3.00E+02	2.01E+02	2.01E+01	6.70E-01	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Less % tail than CONV		4.00E+00		Better radioprotection than CONV			
10.1259/bjr.20211150	1.00E+02	9.60E+05	3.44E-01	3.30E-01	3.00E+02	6.10E+01	2.00E+01	2.00E-01	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Much less % tail than CONV		5.00E+00		Much better radioprotection than CONV			
10.1259/bjr.20211150	3.00E+02	2.80E+06	3.39E-01	9.50E-01	3.00E+02	2.10E+01	2.01E+01	6.70E-02	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Less % tail than CONV		4.00E+00		Better radioprotection than CONV			
10.1259/bjr.20211150	1.00E+03	8.40E+06	3.45E-01	2.90E+00	3.00E+02	7.00E+00	2.00E+01	2.00E-02	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Less % tail than CONV		4.00E+00		Better radioprotection than CONV			
10.1259/bjr.20211150	2.00E+03	1.50E+07	3.33E-01	5.00E+00	3.00E+02	4.00E+00	2.00E+01	1.00E-02	Varian Truebeam linac	Electrons	6.00E+00	In VITRO	Human blood	Normal Tissue	Less % tail than CONV		4.00E+00		Better radioprotection than CONV			

Table 4: % survivors of Glioma-bearing rats at 3 months post FLASH (ultra-high dose rates, dose rate of FLASH-RT recorded in columns 2 and 3) vs CONV (conventional radiotherapy, conventional dose rates). Average and standard error recorded for both modalities.

Journal Citation	Mean Dose Rate (Gy/s)	Pulse Dose Rate (Gy/s)	% survivors post FLASH	% survivors post CONV
[1]	5600000.00	5555555.56	0.00	0.00
[2]	571428.57	285714.29	50.00	48.00
[2]	595238.10	297619.05	78.80	100.00
[2]	535714.29	267857.14	100.00	93.00
[3]	66.00	133.33	100.00	85.00
[3]	74.00	73.53	0.00	0.00
		Average	54.80	54.33
		Error	7.71	7.63

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