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 right 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.

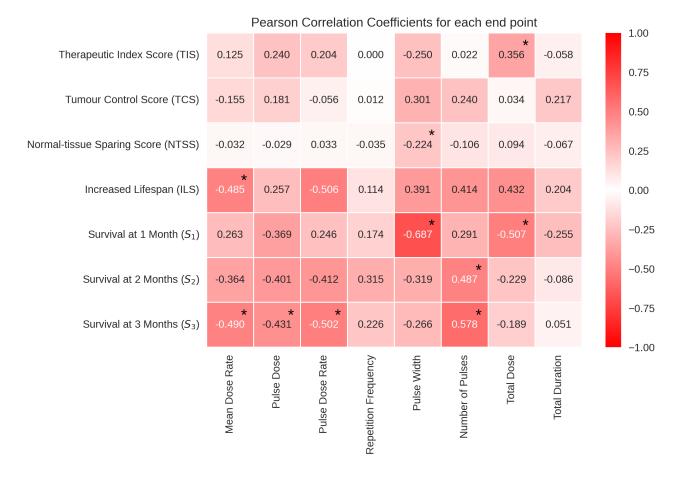


Figure 2: Pearson's Correlation Coefficients in heat map form to show the correlations between the log of each dosimetric parameter and the corresponding endpoint for all data with mean and pulse dose rates above 30Gy/s. The values range between -1 and 1, where the extremities (closest to -1 and 1) have 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 right of the corresponding correlation coefficient. Key: TIS- Therapeutic Index Score, TCS- Tumour Control Score, NTSS- Normaltissue Sparing Score, ILS- Increased Lifespan, S_1 - Survival % at 1 month, S_2 - Survival % at 2 month, S_3 - Survival % at 3 month.

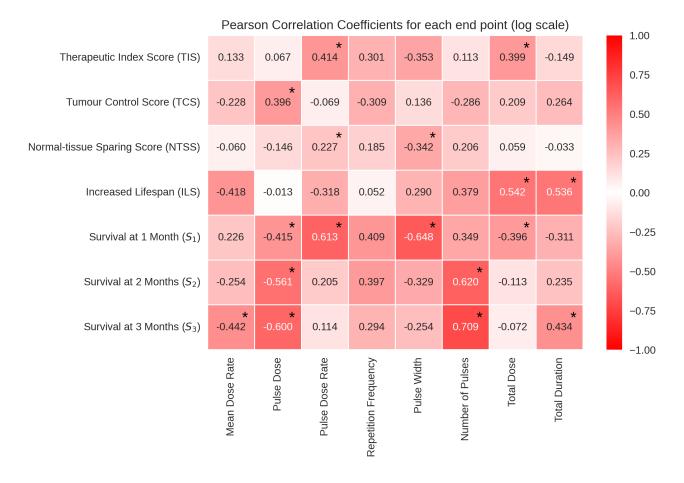
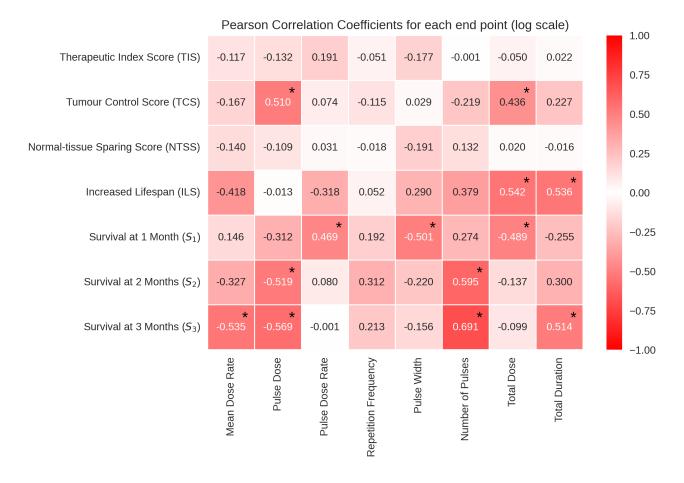
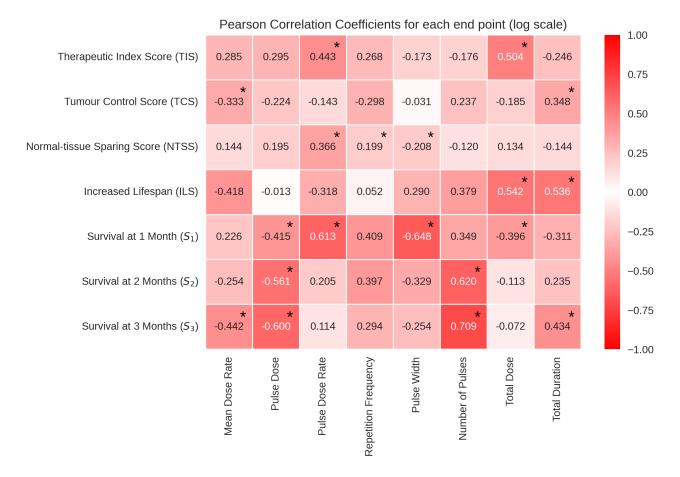


Figure 3: Pearson's Correlation Coefficients in heat map form to show the correlations between the log of each dosimetric parameter and the corresponding endpoint for all data with mean and pulse dose rates above 40Gy/s. The values range between -1 and 1, where the extremities (closest to -1 and 1) have 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 right of the corresponding correlation coefficient. Key: TIS- Therapeutic Index Score, TCS- Tumour Control Score, NTSS- Normaltissue 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 right 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.



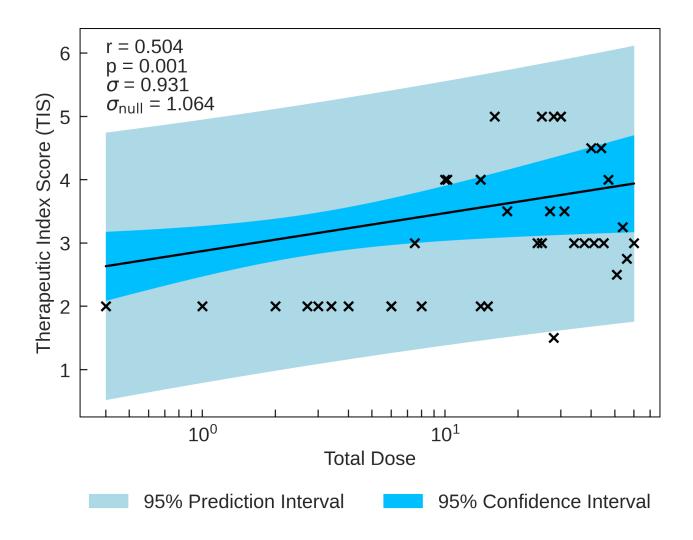


Figure 5: TIS plotted against the strongest dosimetric parameter, Total Dose. There is a strong positive correlation between the parameters, showing that an increase in dose will increase the chance of observing a higher therapeutic index.

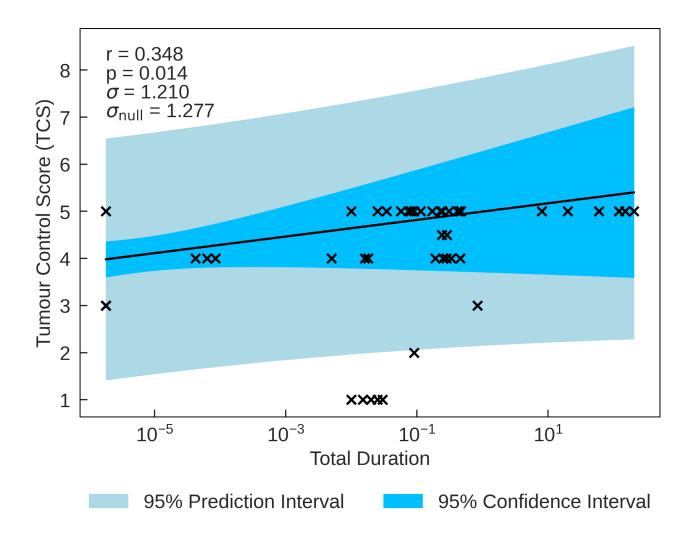


Figure 6: TCS plotted against the strongest dosimetric parameter, Total Time. There is a moderate positive correlation between the parameters, suggesting that an increase in irradiation duration may increase tumour control.

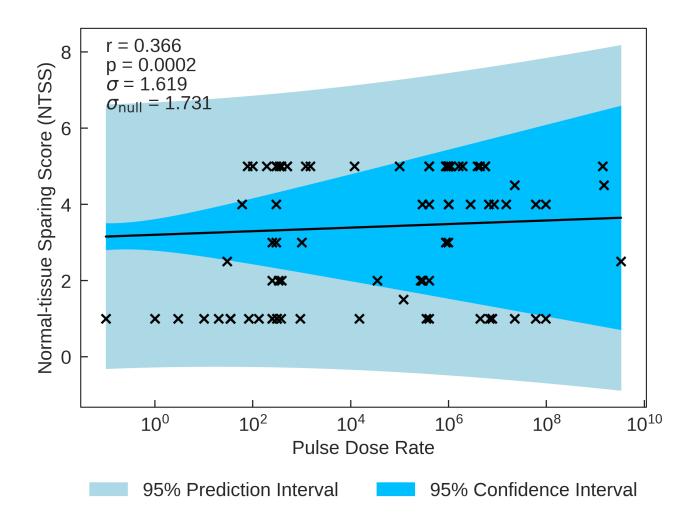


Figure 7: NTSS plotted against the strongest dosimetric parameter, Pulse Dose Rate. There is a moderate positive correlation between the parameters, suggesting that an increase in the dose rate of each pulse may increase the chance of observing a sparing effect in normal tissue.

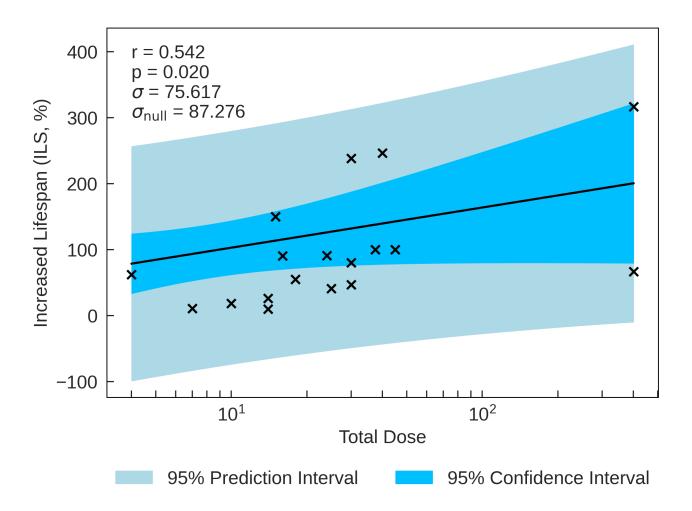


Figure 8: ILS plotted against the strongest dosimetric parameter, Total Dose. There is a strong positive correlation between the parameters, illustrating that an increase in dose can increase the lifespan of small animals.

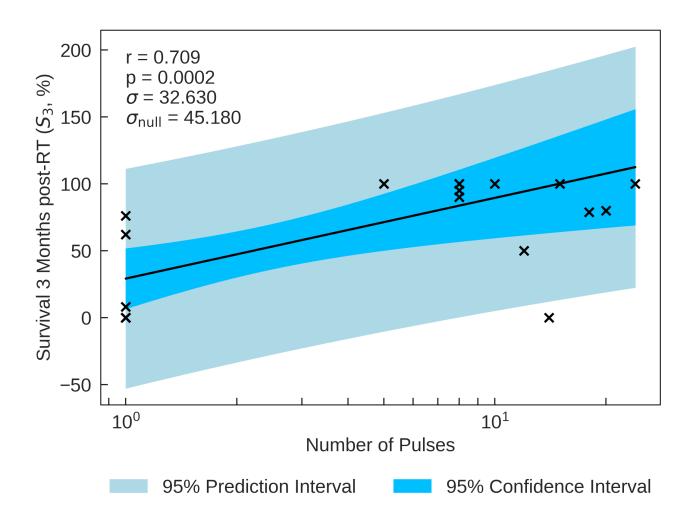


Figure 9: SS percentage plotted against the strongest dosimetric parameter, Number of Pulses. There is a strong positive correlation between the parameters, illustrating that an increase in the Number of Pulses can increase the survival time of small animals.

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+0	2 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+0	2 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+0	1 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+0	1 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+0	1 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+0	1 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+0	1 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+0	1 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+0	1	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+0	0 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+0	1 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+0	1 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+0	1 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+0	1 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+0	1 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+0	1 2.22E-01	1.60E+01	1.00E+02	8.00E+01	8.00E+01	5.30E+01
10.1126/scitransImed.3008973	6.00E+01						1.50E+0	1 2.50E-01	4.50E+00	4.00E+01	2.00E+01		
10.1126/scitransImed.3008973	6.00E+01						2.30E+0	1 3.83E-01	4.50E+00	8.00E+01	6.00E+01		
10.1126/scitransImed.3008973	6.00E+01						2.80E+0	1 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+0	1 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.

	Tat	oie 5:	гип	table	e or be	зані ра	aran	ieters including ti	ne D	Of of cac	n study with the con	esponan	ng TIS, TCS and NTSS.
Mea 3/pnas.1901777116 3/pnas.1901777116	sn Dose Rate (Gyls) Pulse 5.552-05 6.67E+05	5.56E+05 6.67E+05	1.80E+00 1.80E+00	1.00E+01 1.20E+01	petition Frequency (Hz) 5 1,00E+02 1,00E+02	1.00E+00 1.00E+00	1.00E+01 1.20E+01	al Duration (s) Energy (MeV) 1.60E-05 Oristron 6e (eRT6; PMS-Alcen) 1.60E-05 Oristron 6e (eRT6; PMS-Alcen)	Particle Electrons Electrons	Energy (MeV) In VVVOIn VIT 6.00E+00 In VVVO 6.00E+00 In VVVO	Mos brain Normal Tissue Maintenance of discrimination index (DI) Mos brain Normal Tissue Maintenance of discrimination index (DI)	smal-tissue Sparing Score Therap 5.00E+00 4.00E+00	sulic Index Score Reason for score Exhibits short term and long term radioprotection Key: Black text From paper
3/pnax.1901777116 3/cancers12092656	7.78E+06 1.17E+04	7.78E+08	1.80E+00	1.40E+01	1.00E+02	1.00E+00	1.40E+01 4.01E+02	1.80E-05 Oristron Se (eRTS; PMS-Alcen) 3.43E-02 ID17 Biomedical Beamine of the ESRF	Electrons Synchrotron	6.00E+00 In VIVO 1.04E-01 In VIVO	Mice brain Normal Tissue No maintenance of discrimination index (I Local irradiation o Turnour FLASH-RT incres 5,005+00	1.00E+00	Exhibits short term radioprotection Does not exhibit radioprotection Treated termor successfully, potentially more than CONV due to found anti-tumour immune responses
radonic 2019 05 024 09553007414551221	1.00E+02 6.67E+01	5.00E+02	4.60E+04	2:30E+01			1.97E+01	Horizontal fixed-beam beamline (UPTD) 2.95E-01	Proton Electrons	2.24E+02 In VIVO 7.00E+00 In VIVO	Wildtype zebrafia Tumour AND Nor Rate of pericards 5.00E+00 Hind feet rats Normal Tissue Small reduction in early skin reaction corr Hind feet rats Normal Tissue No reduction in early skin reaction corrps	5.00E+00 3.00E+00	5.00E+00 Turnour treated successfully, rate of pericandial edema significantly reduced for FLASH (sudoprotection) Exhibits slightly more radioprotection than CONV
9553007414551221 9553007414551221	6.67E+01 6.67E+01						2.37E+01 2.75E+01	355E-01 4.12E-01	Electrons Electrons	7.00E+00 In VIVO 7.00E+00 In VIVO		1.00E+00 5.00E+00	Does not exhibit more radioprotection than CONV Exhibits good radioprotection
553007414551221 553007414551221	6.67E+01 6.67E+01						2.04E+01 2.59E+01	3.05E-01 3.88E-01	Electrons Electrons	7.00E+00 in VIVO 7.00E+00 in VIVO	Hind feet rats Normal Tasue Significant reduction in early skin reaction Hind feet rats Normal Tasue Significant reduction in early skin reaction	5.00E+00 5.00E+00	Exhibits good radioprotection Exhibits good radioprotection
5852 5852	8.00E+01 1.20E+01	1.00E+05 1.50E+04	2.00E+00 2.00E+00	2.00E-01 3.00E-02 2.00E+00	4,00E+02 4,00E+02 1,08E+02	4.00E+02 4.00E+02	8.00E+01 1.20E+01	1.00E+00 1.00E+00	Electrons Electrons	1.00E+01 In VIVO 1.00E+01 In VIVO		5.00E+00 1.00E+00	Exhibits good radioprotection Dose not exhibit more radioprotection than CONV 5.00E-00 Exhibits good tumour context & radioprotection for high survival
9.12.12.873414 9.12.12.873414	2.16E+02 2.16E+02	1.00E+06 1.00E+06	2.00E+00 2.00E+00	2.00E+00	1.08E+02	8.00E+00 8.00E+00	1.60E+01 1.60E+01	7.41E-02 Varian Trilogy LINAC 7.41E-02 Varian Trilogy LINAC	Electrons Electrons	1.60E+01 In VIVO	Mouse foot skin Normal Tissue Resistance was induced at 0.2 Gy per put Mice total abdom Turnour Survival post inse 5.00E+00 Mice total abdom Normal Tissue 2x presence of regenerating crypts within	5.00E+00 5.00E+00	Double radioprotection compared to CONV
0.12.12.873414 0.12.12.873414 0.12.12.873414	2.16E+02 2.16E+02	1.00E+08 1.00E+08	2.00E+00 2.00E+00	2.00E+00 2.00E+00	1.08E+02 1.08E+02	8.00E+00 7.00E+00	1.60E+01 1.40E+01	7.41E-02 Varian Trilogy LINAC 6.48E-02 Varian Trilogy LINAC	Electrons Electrons	1.60E+01 In VIVO 1.60E+01 In VIVO	Mice total abdom Normal Tissue Preservation of intestinal mucosa Mice total abdom Normal Tissue Kopatrontestinal function but improved Mice total abdom Normal Tissue Epithelial integrity preserved	5.00E+00 4.00E+00	Exhibits good radioprofection Exhibits moderately more radioprofection than CONV
12.12.873414	2.16E+02 2.16E+02 2.16E+02	1.00E+08 1.00E+08 1.00E+08	2.00E+00 2.00E+00	2.00E+00 2.00E+00 2.00E+00	1.08E+02 1.08E+02 1.08E+02	7.00E+00 6.00E+00 6.00E+00	1.40E+01 1.20E+01 1.20E+01	6.48E-02 Varian Trilogy LINAC 5.56E-02 Varian Trilogy LINAC 5.56E-02 Varian Trilogy LINAC	Electrons Electrons	1.60E+01 In VIVO 1.60E+01 In VIVO 1.60E+01 In VIVO	Mice total abdom Normal Tissue Epithelial integrity preserved Mice total abdom Normal Tissue Increase in regenerating crypts compared Mice total abdom Normal Tissue Less apoptosis in intestral crypt base col	5.00E+00 4.00E+00 4.00E+00	Exhibits good radioprotection Exhibits moderately more radioprotection than CONV
12.12.873414 12.12.873414	2.16E+02 2.16E+02	1.00E+06	2.00E+00 2.00E+00	2.00E+00 2.00E+00	1.08E+02 1.08E+02 1.08E+02	6.00E+00	1.20E+01	5:56E-02 Varian Trilogy LINAC 5:56E-02 Varian Trilogy LINAC 1:50E-01 Varian Clinac 21EX	Electrons Electrons Electrons	1.60E+01 In VIVO 1.60E+01 In VIVO	Mice total abdom Normal Tissue Less apoptoss in infestral crypt base col Mice total abdom Normal Tissue Infermediate increase in DNA damage co Mice whole brain Normal Tissue Cognitive funtion preserved	4.00E+00 4.00E+00	Exhibits moderately more radioprotection than CONV Exhibits moderately more radioprotection than CONV Exhibits good radioprotection Exhibits good radioprotection
12.12.873414 nc.2019.06.006 nc.2019.06.006	2.16E+02 2.00E+02 2.00E+02	8.75E+05 8.75E+05	2.00E+00 2.00E+00	2.00E+00 1.75E+00 1.75E+00	1.08E+02	6.00E+00 1.62E+01 1.62E+01	1.20E+01 3.00E+01 3.00E+01		Electrons	1.60E+01 In VIVO 2.00E+01 In VIVO 2.00E+01 In VIVO		5.00E+00 5.00E+00	
nc 2019.06.006 nc 2019.06.006	2.00E+02 2.00E+02 3.00E+02	8.75E+05 8.75E+05 8.75E+05	2.00E+00 2.00E+00	1.75E+00 1.75E+00 1.75E+00	1.08E+02 1.08E+02 1.80E+02	1.62E+01 1.62E+01 1.80E+01	3.00E+01 3.00E+01 3.00E+01	1.50E-01 Varian Clinac 21EX 1.50E-01 Varian Clinac 21EX 1.50E-01 Varian Clinac 21EX	Electrons Electrons	2.00E+01 In VIVO 2.00E+01 In VIVO 1.60E+01 In VIVO	Mice whole brain Normal Tissue Mice whole brain Normal Tissue No increase in 5 of 10 pro-infirmatory cy Mice whole brain Normal Tissue Cognitive furtion preserved	5.00E+00 3.00E+00 5.00E+00	Exhibits good raid-operatedion Exhibits slightly more radioprotection than CONV for some data sets
nc 2019 06 006 nc 2019 06 006 nc 2019 06 006	3.00E+02	8.75E+05 8.75E+05	2.00E+00 2.00E+00	1.75E+00 1.75E+00	1.80E+02 1.80E+02	1.80E+01 1.80E+01	3.00E+01 3.00E+01	1.00E-01 Varian Clinac 21EX 1.00E-01 Varian Clinac 21EX 1.00E-01 Varian Clinac 21EX	Electrons Electrons	1.60E+01 In VIVO 1.60E+01 In VIVO 1.60E+01 In VIVO		5.00E+00 5.00E+00	Exhibits good radioprotection Exhibits good radioprotection Exhibits good radioprotection
nc.2019.05.005	3.00E+02 3.00E+02	8.75E+05 8.75E+05	2.00E+00 2.00E+00	1.75E+00 1.75E+00	1.80E+02 1.80E+02	1.80E+01 1.80E+01	3.00E+01 3.00E+01		Electrons Electrons		Mice whole brain Normal Tasue Maintainance of CD63-positive microglia Mice whole brain Normal Tasue No increase in 5 of 10 pro-infirmatory cy	5.00E+00 3.00E+00	Exhibits slightly more radioprotection than CONV for some data sets
2020.11.012 008014551031 008014551031	3.85E+02 7.00E+02 2.40E+03	3.525+02	2.00E+00	1.71E+00	2.03E+02	7.90E+00	1.50E+01 3.00E+01 3.00E+01	3.90E-02 Varian Clinac 21EX 2.33E+01 Mitsubishi linac, model ML-15MII	Electrons Electrons	1.60E+01 In VIVO 8.00E+00 In VIVO 8.00E+00 In VIVO	Local irradiation (Normal Tissue FLASH irradiation increased the infiltration Mice leg Normal Tissue Skin day desquareation	5.00E+00 5.00E+00 4.50E+00	Exhibits good radioprotection No noticible damage, solid radioprotection exhibited
008014551031 008014551031 008014551031	2.40E+03 6.00E+03 1.50E+04						3.00E+01	8.00E+01 Mitsubishi linac, model ML-15MII 2.00E+02 Mitsubishi linac, model ML-15MII 5.00E+02 Mitsubishi linac, model ML-15MII	Electrons Electrons	8.00E+00 In VIVO 8.00E+00 In VIVO 8.00E+00 In VIVO	Mice leg Normal Tissue Skin dry/ mild moist desquamation Mice leg Normal Tissue Mild Skin moist desquamation Mice leg Normal Tissue Mild Skin moist desquamation	4.50E+00 4.00E+00 4.00E+00	Slight noticible damage, moderate radioprotection exhibited Some noticible damage, some radioprotection exhibited Some noticible damage, some radioprotection exhibited
08014551031							3.00E+01 3.00E+01	5.00F±02 Mitsubishi linar model MI J15MII	Electrons Electrons		Mice leg Normal Tissue Mild Skin moist desquareation Mice leg Normal Tissue Skin dry/mild moist desquareation	4.50E+00	Some noticible damage, some radioprotection exhibited Slight noticible damage, moderate radioprotection exhibited
08014551031 08014551031	1.50E+04 7.00E+02						3.00E+01 5.00E+01	5.00E+02 Mitsubishi linac, model ML-15MII 1.40E+01 Mitsubishi linac, model ML-15MII	Electrons Electrons	8.00E+00 In VIVO 8.00E+00 In VIVO	Mice leg Normal Tissue Skin dry/ mild moist desquarration Mice leg Normal Tissue Skin dry desquarration Mice leg Normal Tissue Moderate skin moist desquarration	5.00E+00 2.00E+00	Slight noticible damage, moderniar radioprotection eshibited No noticible damage, solid radioprotection subsibited Noticible damage, sittle radioprotection subsibiled
108014551031 108014551031 108014551031	2.40E+03 6.00E+03 1.50E+04						5.00E+01 5.00E+01	4.80E+01 Mitsubishi linac, model ML-15MII 1.20E+02 Mitsubishi linac, model ML-15MII 3.00E+02 Mitsubishi linac, model ML-15MII	Electrons Electrons Electrons	8.00E+00 In VIVO 8.00E+00 In VIVO 8.00E+00 In VIVO	Mice leg Normal Tissue Moderate skin moist desquamation Mice leg Normal Tissue Severe skin moist desquamation Mice leg Normal Tissue Very severe skin moist desquamation	2.00E+00 1.00E+00	Notichia dimaga, ittir astiopotaction archibited Heavy darrage, negligible radioprotection Internse damaga, zwo radioprotection
08014551031							5.00E+01 5.00E+01	3.00E+02 Mtsubishi linac, model ML-15MII	Electrons		Mice leg Normal Tissue Very severe skin moist desquamation Mice leg Normal Tissue Severe skin moist desquamation	1.00E+00 1.00E+00	Intense damage, zero radioprotection Heinry damage, negligible radioprotection
08014551031 08014551031	1.50E+04 7.30E+03	2.23E+07	4.00E+00	1.57E-02	8.00E+01	1.91E+03	5.00E+01 3.00E+01	3.00E+02 Mtsubishi linac, model ML-15MII 2.43E+02 Mtsubishi linac, model ML-15MII	Electrons Electrons	8.00E+00 In VIVO 8.00E+00 In VIVO	Mice leg Normal Tissue Severe skin moist desquamation Mice leg Normal Tissue Moderate skin moist desquamation Mice leg Normal Tissue Skin dry/ mild moist desquamation	2.00E+00 4.50E+00	Heavy derange, regisjable redopretection Noticible derange, ittle redopretection exhibited Slight reticible derange, reclamate redopretection exhibited
08014551031 08014551031	7.30E+03 7.30E+03	6.04E+07 9.60E+07 2.23E+07	3.30E+00 3.40E+00	3.16E-02 5.34E-02	4.17E+01 2.30E+01 8.00E+01	9.49E+02 5.62E+02 3.18E+03 1.58E+03 9.36E+02	3.00E+01 3.00E+01	2.43E+02 Mitubishi linac, model ML-15MII 2.43E+02 Mitubishi linac, model ML-15MII 1.46E+02 Mitubishi linac, model ML-15MII	Electrons Electrons	8.00E+00 In VVVO 8.00E+00 In VVVO 8.00E+00 In VVVO	Mice leg Normal Tissue Mild Skin moist desquamation Mice leg Normal Tissue Mild Skin moist desquamation	4.00E+00 4.00E+00	Some noticible damage, some radioprotection exhibited Some noticible damage, some radioprotection exhibited
08014551031 08014551031	7.30E+03 7.30E+03	6.04E+07	4.00E+00 3.30E+00	1.57E-02 3.16E-02	4.17E+01	3.18E+03 1.58E+03	5.00E+01 5.00E+01	1.46E+02 Mitsubishi linac, model ML-15MII	Electrons Electrons		Mice leg Normal Tissue Severe skin moist descusmation	1.00E+00 1.00E+00	
08014551031	7.30E+03 9.40E+01	9.60E+07 7.80E+01	3.40E+00 1.00E+05	5.34E-02 7.80E+00	2.30E+01 3.07E-01	9.36E+02 1.92E+00	5.00E+01 1.50E+01	1.46E+02 Mtsubishi linac, model ML-15MII 6.27E+00 IBA Proteus Plus	Electrons Proton	8.00E+00 In VIVO 2.30E+02 In VIVO	Mice leg Normal Tissue Very severe skin moist desquamation Mice leg Normal Tissue Severe skin moist desquamation Mice whole abdo Normal Tissue Significant in loss of proliferating cells in i	1.00E+00 5.00E+00	Intense damage, zero radoprotection Meany damage, ragilgable radoprotection Exhibits good radoprotection
2019.10.049	6.30E+01 6.30E+01		1.00E+05 1.00E+05				1.80E+01 1.20E+01	2.88E-01 IBA Proteza Plus 1.90E-01 IBA Proteza Plus	Proton Proton	2.30E+02 In VIVO 2.30E+02 In VIVO	Mice intestine Normal Tissue Significantly reduced intestinal fibrosis co Mice pancreatic c Turnour Same short term 4.00E+00	5.00E+00	Exhibits good redispreadors Exhibits good redispreadors Cood antitumor response, or as good as CONV Good antitumor response, direct as good as CONV but not quite
2019.10.049	6.30E+01 3.70E+01	1.205+04	1.00E+05				1.80E+01 1.00E+01	2.865-01 IBA Proteus Plus 2.705-01 Suprement Name on ID17 (FSRF Granning France)	Proton X-ray	2.30E+02 In VWO 2.25E+02 In VWO	Mice pancreatic c Tumour Same short term 4.50E+00	5.00E+00	Good antitumour response, almost as good as CONV but not quite Exhibits good radioprofection in 3 areas
14.1	5.74E+01	1.20E+04 1.92E+02	1.30E-03				1.74E+01 3.50E+01	2.70E-01 Synchrotron beam on ID17 (ESRF, Granoble, France) Ion microprobe SNAKE (Munich tandem accelerator) 6.09E-01 Varian ProBeam proton clinical gantry system	Proton Proton (FLASHS	2.30E+01 In VIVO	Mice whole brain Normal Tasse Cognitive furtion preserved, Preservation FaDu SCC Normal Tasse Tumour growth delay not as affective but Hind leg irradiatic Normal Tasse FLASH-RT reduced activations of TGP-8	5.00E+00 1.00E+00 5.00E+00	Exhibits good subprotection in 3 areas No radioprotection improvement on CONV, artifumour control poorer Exhibits good sudoprotection
13051012 13051012	1.15E+02	3.85E+02					3.50E+01 3.50E+01		Proton (FLASHS Proton (FLASHS Proton (FLASHS	2.50E+02 In VIVO		5.00E+00 5.00E+00	Exhibits good radioprotection
13051012 13051012 K32.ccr-20-0894	6.18E+01 6.22E+01 5.60E+06	2.06E+02 2.08E+02 5.56E+06	1.80E+00	1000	1.00E+02	1.00E+00	1.50E+01 1.50E+01 1.00E+01	2.43E-01 Varian ProBeam proton clinical gardry system 2.41E-01 Varian ProBeam proton clinical gardry system 1.60E-05 LINAC (Cristron Se; eRTG; PMB Alcen)	Proton (FLASHS Proton (FLASHS Electrons	2.50E+02 In VIVO 2.50E+02 In VIVO 6.00E+00 In VIVO	MOCT Tumour Tumour Very similar antitis 5.00E+00 MOCZ Tumour Tumour Similar antitumos 4.50E+00 Mice whole brain Tumour AND Nor Cognitive function 3.00E+00	5.00€+00	Very similar antifurnour response to CONV Similar antifurnour response CONV 4.00±00 Embilis good radioprotection, Moderale tumour control
K32.ccr-20-0894	5.60E+06 7.60E+06 1.50E+08	5.55E+05 7.78E+05 1.94E+05 3.85E+05	1.80E+00	1.40E+01	1.00E+02 1.00E+02 1.00E+02	1.00E+00 1.00E+00 1.00E+00 4×	1.00E+01 1.40E+01	1.80E-05 LINAC (Oristron Se; eRTS; PMB Alcen) 1.80E-05 LINAC (Oristron Se; eRTS; PMB Alcen) 1.80E-05 LINAC (Oristron Se; eRTS; PMB Alcen)	Electrons	6.00E+00 In VIVO	Mice whole brain Tumour AND Nor Cognitive funtion 3.00E+00 Mice whole brain Tumour AND Nor No cognitive funti 3.00E+00 Mice whole brain Tumour AND Nor Cognitive funtion 3.00E+00	1.00E+00	4.00E+00 Exhibits good radioprotection, Moderate amour control 2.00E+00 No radioprotection, Moderate furmour control 4.00E+00 Exhibits good radioprotection, Moderate amour control 4.00E+00 Exhibits good radioprotection, Moderate amour control 4.00E+00 Exhibits good radioprotection, Moderate humour control
K32.ccr-20-0894 K32.ccr-20-0894	3.90E+06	1.94E+08 3.89E+08	1.80E+00 1.80E+00	1.40E+01 3.50E+00 7.00E+00 1.00E+01	1.00E+02	1.00E+00 2 x	7.00E+00		Electrons Electrons	6.00E+00 In VIVO 6.00E+00 In VIVO		5.00E+00 5.00E+00	4.00E+00 Exhibits good radioprotection, Moderate tumour control
32 ccr-20-0894 32 ccr-20-0894	5.60E+06 2.50E+03	5.56E+06 6.94E+06	1.80E+00 1.80E+00	1.00E+01 1.25E+01 1.80E+01	1.00E+02 1.00E+02	1.00E+00 3 x 2.00E+00	2.50E+01	1.50E-05 LINAC (Cristron Se; eRTS; PMB Alcen) 1.50E-02 LINAC (Cristron Se; eRTS; PMB Alcen) 1.50E-02 LINAC, HEX PARTER	Electrons Electrons	6.00E+00 In VVVO 6.00E+00 In VVVO	Mice whole brain Tumour AND Not Cognitive fundion 5.00E+00 Mice whole brain Tumour AND Not No cognitive fund 5.00E+00 Mice bent brain Tumour AND Not No cognitive fund 5.00E+00	5.00E+00 1.00E+00	3.00E+00 No radioprotection, Effective fumour control 3.00E+00 No radioprotection, Effective fumour control
:2021.11.004 :2021.11.005	1.00E+03 1.20E+03 9.37E+02	1.00E+03 1.20E+03 9.37E+02	1.80E+04 2.50E+04	1.80E+01 3.00E+01 1.50E+01	5.56E+01 4.00E+01	1.00E+00 1.00E+00	1.80E+01 3.00E+01 1.50E+01	1.80E-02 LINAC, HEX PARTER 2.50E-02 LINAC, HEX PARTER 1.60E-02 LINAC, HEX PARTER	Electrons Electrons	8.00E+00 In VIVO 8.00E+00 In VIVO	Mice breast cand Tumor AND Not Tumor control sin 4.00E+00 Mice lung Tumor AND Not Tumor control sin 5.00E+00 Mice intestine Tumor AND Not Tumor control sin 4.00E+00	3.00E+00 5.00E+00	Oct-On Exhibit good redispersacional Valentine Instruct carbon SOCHOD Exhibit good redispersacional Exhibiti in Instruct control SOCHOD Exhibit good redispersacional Exhibiti in Instruct control SOCHOD Sheet instructure response, in endopresacional good short lemn) SOCHOD Exhibiti septimizer side primari exhibitional pode and control SOCHOD Exhibiti septimizer justification in endopresacional SOCHOD Texton Control sealing, on difference in redispersacional
2021.11.006	2.00E+02		1.80E+04 1.80E+00	2.00E+00	6.25E+01 1.00E+02	1.00E+00 2.00E+00	4.00E+00		Electrons Electrons	8.00E+00 In VIVO 8.00E+00 In VIVO 2.00E+01 Ex VIVO		1.00E+00 5.00E+00	2.5uc 1/3 Tumor control similar, no difference in radioprotection Exhibits good radioprotection & lukemia control
019-53562-y 019-53562-y	3.50E+01 3.50E+01	3.50E+01 3.50E+01	5.71E+04 1.14E+05	2.00E+00 4.00E+00	5.71E-02 1.14E-01	1.00E+00 1.00E+00	2.00E+00 4.00E+00	5.71E-02 Varian 2100 IX linear accelerator 1.14E-01 Varian 2100 IX linear accelerator	Electrons Electrons		Murine pancreati Tumour AND Nor FLASH slightly et 5.00E+00 Murine pancreati Tumour AND Nor FLASH intermed 5.00E+00	1.00E+00 1.00E+00	Exhibits good radioprotection & lukumia control 2:000-00 Sightly higher turnour control than COMV, no additional radioprotection 2:000-01 Intermediately higher furnour control than COMV, no additional radioprotection
019-53562-y 019-53562-y	3.50E+01 3.50E+01 3.50E+01	3.50E+01 3.50E+01 3.50E+01	1.71E+05 2.29E+05 5.71E+04	6.00E+00 8.00E+00	1.71E-01 2.29E-01 5.71E-02	1.00E+00 1.00E+00	6.00E+00 8.00E+00 1.00E+01	1.715-01 Varian 2100 IX linear accelerator 2.295-01 Varian 2100 IX linear accelerator	Electrons Electrons	2.00E+01 Ex VWO 2.00E+01 Ex VWO 2.00E+01 In VWO	Murine pencreati Turnour AND Nor FLASH more poli 5.00E+00 Murine pencreati Turnour AND Nor FLASH much mo 5.00E+00	1.00E+00 1.00E+00	2.00E+00 Higher turnour control than CONV, no additional radioprotection 2.00E+00 Much higher turnour control than CONV, no additional radioprotection
019-53562-y 019-53562-y	3.50E+01	3.50E+01	5.71E+04 2.86E+04	2.00E+00 1.00E+00	5.71E-02 2.86E-02	5.00E+00 5.00E+00		2.805-01 Varian 2100 IX linear accelerator 1.435-01 Varian 2100 IX linear accelerator	Electrons Electrons	2.00E+01 In VIVO 2.00E+01 In VIVO		1.00E+00 1.00E+00	No radioprotection, effective tumour control
019-53562-y	3.50E+01	3.50E+01	4.57E+05	1.60E+01 4.25E-01	2.86E-02 4.57E-01	1.00E+00 8.00E+00	1.60E+01 3.40E+00	4.57E-01 Varian 2100 IX linear accelerator PFMA-3	Electrons Electrons	2.00E+01 In VIVO 2.00E+01 In VIVO 2.00E-01 In VITRO	Mice spleen Normal Tissue No lymphocyte spaning Mice whole abdo Normal Tissue Survival rate worse than CONV Breast adenocar Tumour AND Nor High probability c 5.00E+00	1.00E+00 1.00E+00	No radioprotection, worse survival than CONV 3.00E+00 High tumour control, no radioprotection (high cell death)
1	5.00E-02	2.50€+02	4.00E+00	1.80E-01 1.00E-03	5.00E+01	1.50E+01 4.00E+02	2.70E+00 4.00E-01	PFMA-3 8.00E+00 LINAC, Oncor Impression, Siemens AG	Electrons Electrons	2.00E-01 In VITRO 6.00E+00 In VITRO	Breast adenocar Tumour AND Nor High probability c 5.00E+00 Normal tissue oil Tumour AND Nor FLASH and CON 5.00E+00	1.00E+00 1.00E+00	3.00E+00 High tumour control, no radioprotection (high cell death) 3.00E+00 No radioprotection, good antitumour control
	5.00E-02 5.00E-02	2.50E+02 2.50E+02 2.50E+02	4.00E+00 4.00E+00	1.00E-03 1.00E-03	5.00E+01 5.00E+01	1.00E+03 3.00E+03	1.00E+00 3.00E+00		Electrons Electrons		Normal tissue cel Turnour AND Nor FLASH has less i 5.00E+00 Normal tissue cel Turnour AND Nor FLASH has less i 5.00E+00	1.00E+00 1.00E+00	
	5.00E-02 5.00E-02	2.50E+02	4.00E+00 4.00E+00	1.00E-03 1.00E-03 1.00E-03	5.00E+01 5.00E+01	6.00E+03 7.50E+03	6.00E+00 7.50E+00	6.00E+01 LINAC, Oncor Impression, Siemens AG 1.20E+02 LINAC, Oncor Impression, Siemens AG 1.50E+02 LINAC, Oncor Impression, Siemens AG	Electrons Electrons	6.00E+00 In VITRO 6.00E+00 In VITRO 6.00E+00 In VITRO	Normal fissue cel Turnour AND Nor FLASH and CON 5.00E+00 Normal fissue cel Turnour AND Nor FLASH has sligh 5.00E+00	1.00E+00 2.00E+00	2.00E+00 Worse radioprotection, good antitumour control 3.00E+00 No radioprotection, good artitumour control 3.00E+00 Some satisprotection, good artitumour control
32.CCR-17-3375 32.CCR-17-3375	5.00E-02	2.50E+02	4.00E+00 8.00E+04	1.00E-03 1.00E-03 2.50E+01	5.00E+01 1.25E+01	1.02E+04	1.005401	2-04E-02 LINAC, Oncor Impression, Sameria AG 8:00E-02 Chiston (PMEAlcan)' Kineton 8:00E-02 Chiston (PMEAlcan)' Kineton	Electrons Electrons	6.00E+00 In VITRO 4.50E+00IS.00E+00 In VIVO 4.50E+00IS.00E+00 In VIVO	Manuscription and Tomasse AMP Man El APM has masse # 000Ex00	3.00E+00 1.00E+00	3.50E+00 Some addiprotection, good enthumour control 4.00E+00 Slightly more radioprotection, good enthumour control 3.00E+00 Good tumour control, limited radioprotection
	3.13E+02 3.38E+02 3.11E+02	3.13E+02 3.38E+02 3.11E+02	8.00E+04 9.00E+04	2.50E+01 2.70E+01 2.80E+01	1.25E+01 1.11E+01	1.00E+00 1.00E+00 1.00E+00	2.50E+01 2.70E+01 2.80E+01				Cast skin Tumour AND Nort site Toxicity- dep 5.00E+00 Cast skin Tumour AND Nort site Toxicity- dep 2.00E+00	2.00E+00 1.00E+00	1.50E+00 Good surrour control, small amount of nadoprolaction
32.CCR-17-3375 32.CCR-17-3375 32.CCR-17-3375	3.88E+02 3.78E+02	3.88E+02 3.78E+02	8.00E+04 9.00E+04	3.10E+01 3.40E+01 4.10E+01	1.25E+01 1.11E+01	1.00E+00 1.00E+00 1.00E+00	3.10E+01 3.40E+01 4.10E+01	8.00E-02 Cristron (PMBAlcen) Kinetron 9.00E-02 Cristron (PMBAlcen) Kinetron 3.10E-01 Cristron (PMBAlcen) Kinetron	Electrons Electrons	4.50E+0016.00E+00 In VIVO 4.50E+0016.00E+00 In VIVO 4.50E+0016.00E+00 In VIVO	Cat skin Tumour AND Nor Late Toxicity- dep 5.00E+00 Cat skin Tumour AND Nor Acute toxicity-Mo 5.00E+00	2.00E+00 1.00E+00	3.50E+00 Good tumour control, small amount of radioprotection 3.00E+00 Good tumour control, limited radioprotection
32.CCR-17-3375	1.32E+02 3.00E+02	1.32E+02 3.00F+02	3.10E+05 7.33E+04	2.20E+01	3.23E+00 1.36E+01	1.00E+00	2.20E+01					1.00E+00 3.00E+00	3.00E+00 Good tumour control, limited radioprotection Same liquid of radioprotection as COMV
12.CCR-17-3375 12.CCR-17-3375	3.00E+02 3.00E+02	3.00E+02 3.00E+02	8.33E+04 9.33E+04	2.50E+01 2.80E+01	1.07E+01	1.00E+00 1.00E+00	2.50E+01 2.60E+01	8.33E-02 Oristron (PMBAlcen)/ Kinetron 9.33E-02 Oristron (PMBAlcen)/ Kinetron	Electrons Electrons	4.50E+00/6.00E+00 In VIVO 4.50E+00/6.00E+00 In VIVO	Minopg sidn Normal Bassa Chris deplation & regrowth COW no mg Minopg sidn Normal Bassa Chris deplation & regrowth COW no mg Minopg sidn Normal Bassa Chris deplation & regrowth, COW no mg Minopg sidn Normal Bassa Chris deplation & regrowth, deplation sign Minopg sidn Normal Bassa Chris deplation for regrowth, CoRN sidn Minopg sidn Normal Bassa Chris deplation, no regrowth, CORN sidn Normal Bassa Chris deplation, no regrowth, CORN sidn Normal Bassa Chris deplation, no regrowth, CORN sidn Normal Bassa Chris deplation for the regrowth of th	4.00E+00 5.00E+00	Better radioprotection than CONV Much better radioprotection than CONV
32.CCR-17-3375 32.CCR-17-3375	3.00E+02	3.00E+02 3.00E+02	1.03E+05 1.13E+05	3.10E+01 3.40E+01	9.68E+00 8.82E+00	1.00E+00 1.00E+00	3.10E+01 3.40E+01	1.03E-01 Oriatron (PMBAlcen)/ Kinetron 1.13E-01 Oriatron (PMBAlcen)/ Kinetron	Dectrors	4.50E+00/6.00E+00 In VIVO 4.50E+00/6.00E+00 In VIVO	Minipig skin Normal Tissue Only depliation & regrowth, depliation aga Minipig skin Normal Tissue Only depliation, no regrowth, CONV also	5.00E+00 5.00E+00	Much better radioprotection than CONV Much better radioprotection than CONV
2017.05.003 2017.05.003	1.00E-01 1.00E+00	1.00E-01 1.00E+00	1.80E+00 1.80E+00	1.80E-07 1.80E-06	1.00E+01 1.00E+02	5.56E+07 5.56E+06	1.00E+01 1.00E+01	1.00E+02 Oriatron (eRT0; PMBAlcen,EuroMeV) LINAC 1.00E+01 Oriatron (eRT0; PMBAlcen,EuroMeV) LINAC	Electrons Electrons	4.50E+00/6.00E+00 In VIVO 4.50E+00/6.00E+00 In VIVO	Mouse brain Normal Tasue 53% Recognition Ratio Mouse brain Normal Tasue 55% Recognition Ratio	1.00E+00 1.00E+00	No radioprotection No radioprotection
2017.05.003	3.00E+00 1.00E+01	3.00E+00 1.00E+01	1.80E+00 1.80E+00	5.40E-06	1.00E+02 1.00E+02	1.855+05	1.00E+01 1.00E+01	3.33E+00 Origina (eRT6: PMBAloen:EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00 In V/VO	Mouse brain Normal Tissue 56.7% Recognition Ratio Mouse brain Normal Tissue 57.1% Recognition Ratio Mouse brain Normal Tissue 54.4% Recognition Ratio	1.00E+00 1.00E+00	No radiopolaction No radiopolaction No radiopolaction No radiopolaction No radiopolaction
2017.05.003 2017.05.003 2017.05.003	1.00E+01 2.00E+01 3.00E+01	1.00E+01 2.00E+01 3.00E+01	1.80E+00 1.80E+00 1.80E+00	1.80E-05 3.60E-05 5.40E-05	1.00E+02 1.00E+02 1.00E+02	5.56E+05 2.78E+05 1.85E+05	1.00E+01 1.00E+01 1.00E+01	1.00E+00 Cristron (eRT6; PMBAlcen;EuroMeV) LINAC 5.00E-01 Cristron (eRT6; PMBAlcen;EuroMeV) LINAC 3.33E-01 Cristron (eRT6; PMBAlcen;EuroMeV) LINAC	Electrons Electrons Electrons	4.50E+00/6.00E+00 In VIVO 4.50E+00/6.00E+00 In VIVO 4.50E+00/6.00E+00 In VIVO	Mouse brain Normal Tasue 54.4% Recognition Ratio Mouse brain Normal Tasue 65.9% Recognition Ratio	1.00E+00 1.00E+00 2.50E+00	No radioprotection Some radioprotection
2017-05-003 2017-05-003 2017-05-003	6.00E+01	6.00E+01	1.80E+00	1.08E-04	1.00E+02 1.00E+02	9.25E+04 5.55E+04	1.00E+01	1.67E-01 Oriatron (eRT0; PMBAloen,EuroMeV) LINAC 1.60E-01 Oriatron (eRT0; PMBAloen,EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00 In VIVO 4.50E+00/6.00E+00 In VIVO	Mouse brain Normal Tasue 72.1% Recognition Ratio Mouse brain Normal Tasue 75.9% Recognition Ratio	4.000+00	Fair radioprotection Good radioprotection
2017.05.003	5.00E+02 5.00E+02	5.000+02	1.80E+00 1.80E+00	9.00E-04	1.00E+02 1.00E+02	1.11E+04	1.00E+01 1.00E+01	2.00E-02 Oristron (eRT6; PMBAlcen,EuroMeV) LINAC	Electrons	4.50E+00/6.00E+00 In VIVO	Mouse brain Normal Tasue 79.1% Recognition Ratio	5.00E+00 5.00E+00	Good radioprotection Good radioprotection No endeaverage
2019.02.009 2019.02.009	5.00E-02 5.00E-02						5.00E-01 5.00E-01	1.00E+01 HVE 5.5 MV Singleton accelerator 1.00E+01 HVE 5.5 MV Singleton accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tissue Proton dose rate doesn't affect clonogeni Normal human lu Normal Tissue No increased yt/2AX fod formation	1.00E+00 5.00E+00	No radioprotection Good radioprotection
2019.02.009 2019.02.009	5.00E-02 1.00E+02 1.00E+02						5.00E-01 5.00E-01 5.00E-01	1.00E+01 HVE 5.5 MV Singleton accelerator 5.00E-03 HVE 5.5 MV Singleton accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tissue No neduced number of senescence cells Normal human lu Normal Tissue Proton dose rate dossn't affect clonogeni Normal human lu Normal Tissue No increased yH2AX fod formation	1.00E+00 1.00E+00	No radioprotection No radioprotection
2019.02.009	1.00E+02						5.00E-01	5.00E-03 HVE 5.5 MV Singletron accelerator 5.00E-03 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tissue Reduced number of servisionne cells (Sq.	5.00E+00 5.00E+00	Good radioprotection Good radioprotection
2019.02.009	1.00E+03 1.00E+03 1.00E+03						5.00E-01 5.00E-01 5.00E-01	5.00E-04 HVE 5.5 MV Singletron accelerator 5.00E-04 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tissue Proton dose rafe doesn't affect clonogeni Normal human lu Normal Tissue No increased yHZAX foot formation Normal human lu Normal Tissue Reduced number of senescence cells (8)	1.00E+00 5.00E+00	No radioprotection Good radioprotection
2019.02.009	5.00E-02 5.00E-02						1.00E+00 1.00E+00	5.00E-04 HVE 5.5 MV Singletron accelerator 2.00E+01 HVE 5.5 MV Singletron accelerator	Proton		Normal human tu Normal Tasus Clonogenic cell survival	5.00E+00 5.00E+00 5.00E+00	Good radioprotection Good radioprotection
2019.02.009	5.00F-02						1.00E+00	200E+01 HVE 5.5 MV Singleton accelerator 200E+01 HVE 5.5 MV Singleton accelerator	Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human la Normal Tissue Normal human la Normal Tissue No increased yH2AX foot formation Normal human la Normal Tissue No reduced number of senescence cells	1.00E+00	Good radioprotection No radioprotection
2019 02 009 2019 02 009 2019 02 009 2019 02 009 2019 02 009 2019 02 009 2019 02 009	1.00E+02 1.00E+02 1.00E+02 1.00E+03 1.00E+03 1.00E+03						1.00E+00 1.00E+00 1.00E+00 1.00E+00 1.00E+00 1.00E+00	1.00E-02 PVE 5.5 MV Singletron accelerator 1.00E-02 PVE 5.5 MV Singletron accelerator 1.00E-02 PVE 5.5 MV Singletron accelerator 1.00E-03 PVE 5.5 MV Singletron accelerator	Proton Proton Proton Proton	4.50E+00 in VITRO 4.50E+00 in VITRO 4.50E+00 in VITRO 4.50E+00 in VITRO	Normal human is Normal Tasses Proton dose rate dosen't affect disruptive Normal human is Normal Tasses No increased y420X fool formation Normal human is Normal Tasses No reduced number of ensecurace cells Normal human is Normal Tasses Proton dose rate dosen't affect clorogers Normal human is Normal thasses in consequent yabout of ensecurace cells (\$\bar{q}\$) (and the proton dose rate dosen't affect clorogers Normal human is Normal thasses (Reduced number of sensionne cells (\$\bar{q}\$)).	1.00E+00 5.00E+00 1.00E+00	No radioprotection Good radioprotection No radioprotection
2019.02.009	1.00E+03 1.00E+03						1.00E+00 1.00E+00	1.00E-03 HVE 5.5 MV Singletron accelerator 1.00E-03 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tissue Proton dose rate dosen't affect clonogeni Normal human lu Normal Tissue No increased yH2AX foot formation	1.00E+00	No radioprotection No radioprotection Good radioprotection
									Proton Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human is Normal Tissue Reduced number of sensoence cells (\$\bar{g}\$) Normal human is Normal Tissue Clonogenic cell survival Normal human is Normal Tissue No increased yH2AX fool formation	5.00E+00 5.00E+00 5.00E+00	Good radioprotection Good radioprotection
2019.02.009	5.00E-02 5.00E-02						2.00E+00 2.00E+00	4.00E+01 HVE 5.5 MV Singletron accelerator 4.00E+01 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tissue No Increased yH2AX foot formation Normal human lu Normal Tissue No reduced number of senescence cells i	5.00E+00 1.00E+00	Good radioprotection No radioprotection
2019 02 009	1.00E+02 1.00E+02						2.00E+00 2.00E+00	2.00E-02 HVE 5.5 MV Singletron accelerator 2.00E-02 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 in VITRO 4.50E+00 in VITRO	Normal human lu Normal Tissue No reduced number of senescence cells Normal human lu Normal Tissue Proton dose rate doesn't affect clonogeni Normal human lu Normal Tissue No increased yHZAX fod formation	1.00E+00 5.00E+00	No radioprotection Good radioprotection
2019.02.009	1.00E+02 1.00E+03						2.00E+00 2.00E+00	2.00E-02 HVE 5.5 MV Singletton accelerator 2.00E-03 HVE 5.5 MV Singletton accelerator	Proton Proton	4.50E+00 in VITRO 4.50E+00 in VITRO	Normal human lu Normal Tasue Reduced number of sensoence cells (bg Normal human lu Normal Tasue Proton dose rate dosen't affect clonogeni	5.00E+00 1.00E+00	Good radioprotection No radioprotection
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 la Normal Tasue No increased yH2AX fod formation	5.00E+00	Good radioprotection
2019.02.009 2019.02.009 2019.02.009	1.00E+03 5.00E-02 5.00E-02						2.00E+00 5.00E+00 5.00E+00	2.00E-03 HVE 5.5 MV Singletron accelerator 1.00E+02 HVE 5.5 MV Singletron accelerator	Proton Proton Proton	4.50E+00 in VITRO 4.50E+00 in VITRO 4.50E+00 in VITRO	Normal human la Normal Tissue No increased yH2AX foot formation Normal human la Normal Tissue Reduced number of sensionince cells (\$5; Normal human la Normal Tissue Proton dose rate dosen't affect diorogeni Normal human la Normal Tissue	5.00E+00 1.00E+00 5.00E+00	Good radioprotection No radioprotection Good radioprotection
2019.02.009 2019.02.009 2019.02.009							5.00E+00	1.00E+02 HVE 5.5 MV Singleton accelerator 1.00E+02 HVE 5.5 MV Singleton accelerator 5.00E-02 HVE 5.5 MV Singleton accelerator	Proton Proton Destro	4.50E+00 In VITRO	Normal human lu Normal Tissue No increased yH2AX foo formation Normal human lu Normal Tissue No reduced number of senescence cells	1.00E+00	No radioprotection
2019.02.009 2019.02.009 2019.02.009	1.00E+02 1.00E+02 1.00E+02 1.00E+03 1.00E+03						5.00E+00 5.00E+00 5.00E+00	5.00E-02 HVE 5.5 MV Singletron accelerator 5.00E-02 HVE 5.5 MV Singletron accelerator 5.00E-02 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human tu Normal Tissue Proton dose rate doesn't affect clonogeni Normal human tu Normal Tissue No increased yt/2AX fod formation Normal human tu Normal Tissue Reduced number of sensecence cells (Sc	1.00E+00 5.00E+00 5.00E+00	No radioprotection Good radioprotection Good radioprotection
2019.02.009 2019.02.009	1.00E+03 1.00E+03						5.00E+00 5.00E+00	5.00E-03 HVE 5.5 MV Singletron accelerator 5.00E-03 HVE 5.5 MV Singletron accelerator	Proton Proton Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tisaue No increased yH2AX foot formation Normal human lu Normal Tisaue Reduced number of sensionos cella (§§ Normal human lu Normal Tisaue Proton doss rate desert side clorinogens Normal human lu Normal Tisaue No increased yH2AX foot formation	1.00E+00 5.00E+00	No radioprotection Good radioprotection
2019.02.009	1.00E+03						5.00E+00 1.00E+01	5.00F.03 HVF 5.5 MV Singleton sociarator				5.00E+00 1.00E+00	
1019.02.009	5.00E-02 5.00E-02 1.00E+02 1.00E+02						1.00E+01 1.00E+01	2.00E+02 HVE 5.5 MV Singletten accelerator 2.00E+02 HVE 5.5 MV Singletten accelerator 2.00E+02 HVE 5.5 MV Singletten accelerator	Proton Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO 4.50E+00 In VITRO	Nomina human is Normal Tissue Nomina human is Normal Tissue Nomina human his Normal Tissue Norma human his Normal Tissue Nomina human his Normal Tissue	5.00E+00 1.00E+00	No radioprolaction Cood autoprotection No radioprolaction
2019.02.009	1.00E+02 1.00E+02						1.00E+01 1.00E+01	1.00E-01 HVE 5.5 MV Singleton accelerator	Proton Proton	4.50E+00 In VITRO	Normal human lu Normal Tissue Proton dose rate dossn't affect clonogeni Normal human lu Normal Tissue No increased yH2AX fool formation	1.00E+00 5.00E+00	No radoprotection Good radioprotection
1019.02.009	1.00E+02 1.00E+03						1.00E+01 1.00E+01	1.00E-01 HVE 5.5 MV Singletron accelerator 1.00E-02 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human tu Normal Tissue Proton dose rate doesn't affect clonogeni	5.00E+00 1.00E+00	Good radioprotection No radioprotection
019.02.009	1.00E+03 1.00E+03						1.00E+01 1.00E+01	1.00E-02 HVE 5.5 MV Singletron accelerator 1.00E-02 HVE 5.5 MV Singletron accelerator 1.00E-02 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tissue No increased yHZAX fod formation Normal human lu Normal Tissue Reduced number of sensoence cells (\$5 Normal human lu Normal Tissue Mitigation of expression of pro-inflammats	5.00E+00 5.00E+00	Good radioprotection Good radioprotection
1019.02.009	1.00E+03 1.00E+03						1.00E+01 2.00E+01	2.00E-02 HVE 5.5 MV Singletron accelerator	Proton Proton	4.50E+00 In VITRO 4.50E+00 In VITRO	Normal human lu Normal Tissue Mitigation of expression of pro-inflammate Normal human lu Normal Tissue Increased y452AX fool formation	5.00E+00 1.00E+00	Good radioprotection No radioprotection
2.ccr-19-1440 2.ccr-19-1440							5.20E+00 1.70E+01	Kinetron Kinetron	Electrons Electrons	4.50E+00 In VITRO 4.50E+00 In VIVO	Normal human lu Normal Tissue Increised yt2AX foci formation Normal human lu Normal Tissue Minimises DNA damage and lethality corr Mice lung Normal Tissue Reduction in pressure to repopulate after	5.00E+00 5.00E+00	No radiophiction Cloud adiophotection Good adiophotection
2.ccr-19-1440 2.ccr-19-1440							1.70E+01 1.70E+01	Kinetron Kinetron	Electrons Electrons	4.50E+00 In VIVO 4.50E+00 In VIVO	Mice lung Normal Tissue Preservation of lung from radio-induced s Terc-i-mice Normal Tissue No normal tissue sparing Whole brain irrad Normal Tissue FLASH irradiation attenuated microglis ac	5.00E+00 1.00E+00	Good radioprotection No radioprotection
19.06.187	4.40E+05 4.00E+01	4.44E-05	1.80E+00	8.00E+00	1.00E+02	1.00E+00	8.00E+00 1.80E+01	1.80E-05 Criatron (eRT6; PMBAlcen) LINAC 4.50E-01 Varian ProBeam proton clinical gantry system	Electron Proton	6.00E+00 In VIVO In VIVO	Thoracic irradiate Tumour Significant differe 5.00E+00	1.00E+00	High level of radioprolection (3 different end points) Improved turnour control
ro2 ro2	6.00E+02 6.00E+02	6.00E+02 6.00E+02	5.00E+03 5.00E+03	3.00E+00 3.00E+00	2.00E+02 2.00E+02	1.00E+00 2.00E+00	3.00E+00 6.00E+00	5 00E-03 Elekta Precise LINAC 1 00E-02 Elekta Precise LINAC	Electrons Electrons	1.00E+01 In VITRO 1.00E+01 In VITRO	Hypoxic prostate Tumour Surviving fraction 4.00E+00 Hypoxic prostate Tumour Surviving fraction 1.00E+00		Adequate turnour control Not adequate turnour control
702 702	6.00E+02 6.00E+02	6.00E+02 6.00E+02	5.00E+03 5.00E+03	3.00E+00 3.00E+00	2.00E+02 2.00E+02	3.00E+00 4.00E+00	9.00E+00 1.20E+01	150E-02 Elekta Precise LINAC 200E-02 Elekta Precise LINAC	Electrons Electrons	1.00E+01 In VITRO 1.00E+01 In VITRO	Hypoxic prostate Tumour Surviving fraction 1.00E+00 Hypoxic prostate Tumour Surviving fraction 1.00E+00		Not adequate turnour control Very little turnour control
102	6.00E+02 6.00E+02	6.00E+02 6.00E+02	5.00E+03 5.00E+03	3.00E+00 3.00E+00	2.00E+02	5.00E+00 6.00E+00	1.50E+01 1.80E+01	2.50E-02 Elekta Precise LINAC	Electrons Electrons	1.00E+01 In VITRO 1.00E+01 In VITRO	Hypoxic prostate Turnour Surviving fraction 1.00E+00 Hypoxic prostate Turnour Surviving fraction 1.00E+00		Very little tamour control Negligible tamour control
702 -00067.1 e-6-139	5.58E+05 3.33E+09	5.56E+06 3.33E+09	1.80E+00 9.00E-09	1.00E+01 3.00E-05	2.00E+02 1.00E+02 1.11E+14	1.00E+00 1.00E+05	1.00E+01 3.00E+00	3.00E-02 Elekta Precise LINAC 1.80E-05 Cristron (eRTS; PMBAlcen) LINAC 9.00E-10 Pulsed microprobe SNAKE	Electron Protons	6.00E+00 In VIVO 2.00E+01 In VITRO	Whole brain irrad Normal Tassas FLASH-RT limited astroglosis in brain, FL	5.00E+00 2.50E+00	Negigipas tumbur control Good radioprotection 1 level of radioprotection, 2 unaffected
114550611 ed.3008973	8.30E+01 6.00E+01	8.30E+01	2.00E+00	1.66E-04	5.00E+05	4.00E+02	6.64E-02 1.70E+01	8.00E-04 LINAC (M.C.R.) 2.83E-01 LINAC (EuroMeV and PMB-Aloan)	Electrons Electrons	7.00E+00 In VIVO 4.50E+00 In VIVO	Mouse intestine Normal Tasue No differences with CONV Mice bilateral the Normal Tasue No development of pulmonary fibrosis & a	1.00E+00 5.00E+00	No radioprotection No radioprotection High level of radioprotection (3 different and points)
ed.3008973 ed.3008973 ed.3008973	6.00F+01						2.00E+01 2.30E+01	3.33E-01 LINAC (EuroMeV and PMB-Alcen) 3.83E-01 LINAC (EuroMeV and PMB-Alcen)	Electrons Electrons	4.50E+00 In VIVO		5.00E+00 5.00E+00 1.50E+00	High level of radioprotection (3 different end points)
ed 3008973 ed 3008973 ed 3008973	6.00E+01 6.00E+01 6.00E+01						2.30E+01 3.00E+01 1.70E+01	5.00E-01 LINAC (EuroMeV and PMS-Aloan) 5.00E-01 LINAC (EuroMeV and PMS-Aloan) 2.83E-01 LINAC (EuroMeV and PMS-Aloan)	Decrors Decrors	4.50E+00 In VIVO 4.50E+00 In VIVO 4.50E+00 In VITRO	Mice bilateral the Normal Tissue Cachesia Development massive pulmonary edema Human breast os Tumour Efficacy in repres 4.00E+00	1.00E+00	Negligible radioprotection No radioprotection Equal tamour control to CONV
ed 3008973	6.00E+01						2.50E+01	A 17E OL L MAC (Example) (and EBIR Along)	Electrons	4.50E+00 In VITRO	Human heart and Turnour AND Not Complete turnour 5 00F+00	5.00E+00	5.00E+00 Complete turnour control and radioprotection
ed 3008973 ed 3008973 ed 3008973	6.00E+01 6.00E+01 6.00E+01						1.50E+01 2.00E+01 1.50E+01	2.50E-01 LINAC (EuroMeV and PMB-Alcen) 3.33E-01 LINAC (EuroMeV and PMB-Alcen) 2.50E-01 LINAC (EuroMeV and PMB-Alcen)	Electrons Electrons Electrons	4.50E+00 In VITRO 4.50E+00 In VITRO 4.50E+00 In VIVO	Human head and Turnour Inhibition of furno 4.00E+00 Human head and Turnour Inhibition of furno 4.00E+00 TC-1 cells (CS78 Turnour Turnor control as 4.00E+00		Good tumour control Good tumour control Good tumour control
ed 3008973	6.00E+01						2.80E+01	4.67E-01 LINAC (EuroMeV and PMB-Alcen)	Electrons	4.50E+00 In VIVO		5.00E+00	5.00E+00 Exhibits significantly better tumour control than CONV and radioprotection
12.101011	5.71E+05 5.95E+05 5.36E+05	2.86E+05 2.98E+05	3.50E+00 3.50E+00	2.00E+00 2.08E+00	2.85E+05 6	5 x 3.00E+00 12.	3.00E+00 5 x 3.00E+00	4 20E-05 Elekta Precise linear accelerator 6 30E-05 Elekta Precise linear accelerator	Electrons Electrons	1.00E+01 In VIVO 1.00E+01 In VIVO	Tumour AND Nor FLASH-RT result 4.00E+00 Tumour AND Nor FLASH-RT result 4.00E+00	2.00E+00 2.00E+00	3.00E+00 Same turnour control & level of radioprotection as CONV 3.00E+00 Same turnour control & level of radioprotection as CONV
22.101013	1.80E+02	2.68E+05 4.00E+05	3.50E+00 5.00E+00	1.88E+00 2.00E+00	9.00E+01	5.00E+00	x 3.00E+00 1.00E+01	8.40E-05 Elekta Precise linear accelerator 5.56E-02 LINAC	Electrons Electrons	1.00E+01 in VIVO 1.60E+01 in VIVO	Tumour AND Nor FLASH-RT result 4.00E+00 Female C578L/5 Normal Tasue Same skin score as CONV	2.00E+00 2.00E+00	3.00E+00 Same turnour control & level of radioprotection as CONV Same radioprotection as CONV Worse radioprotection than CONV
	1.80E+02 1.80E+02	4.00E+05 4.00E+05 4.00E+05	5.00E+00 5.00E+00 5.00E+00	2.00E+00 2.00E+00 2.00E+00	9.00E+01 9.00E+01	8.00E+00 1.00E+01	1.60E+01 2.00E+01	8.89E-02 LINAC 1.11E-01 LINAC	Electrons Electrons Electrons	1.60E+01 In VIVO 1.60E+01 In VIVO 1.60E+01 In VIVO		1.00E+00 4.00E+00	Worse radioprotection than CONV Slightly beer radioprotection than CONV Better radioprotection than CONV
-00090	1.80E+02 1.80E+02	4.00E+05	5.00E+00	2.00E+00 2.00E+00	9.00E+01 9.00E+01	1.50E+01 2.00E+01	3.00E+01 4.00E+01	1.67E-01 LINAC 2.22E-01 LINAC	Electrons	1.60E+01 In V/VO	Female CS7BLIS Normal Tissue Sightly better skin score than CONV Female CS7BLIS Normal Tissue Better skin score than CONV Female CS7BLIS Normal Tissue Better skin score than CONV	5.00E+00 5.00E+00	Better radioprotection than CONV
-00090 -00090 -00090	3.47E-01 8.70E+01	1.60E+06	1.80E+00	2.88E+00	8.99E+02 1		x 3.00E+00 4.00E+01	8.64E+01 eRTS/Cristron 4.60E-01 ProBeam, Varian	Electrons Protons	6.00E+00 In VIVO 2.50E+02 In VIVO	Female mice with Normal Tissue FLASH radiotherapy and unimadated cor Tumor bearing hi Tumour AND Nor Similar tumour ct 4.00E+00	5.00E+00 5.00E+00	High level of radioprotection, same as control, CONV was much worse 4.50E+00 Same furnour control & much better radioprotection than CONV
-00090 -00090 -00090 -00090 2023.109767							4.40E+01 4.70E+01	ProBeam, Varian ProBeam, Varian	Protons Protons	2.50E+02 In VIVO 2.50E+02 In VIVO	Tumor bearing hi Tumour AND Not Similar tumour cc 4.00E+00 Tumor bearing hi Tumour AND Not Slightly less tumo 3.00E+00	5.00E+00 5.00E+00	4.50E+00 Same tumour control & much better radioprotection than CONV 4.00E+00 Slightly poorer tumour control & much better radioprotection than CONV
-00090 -00090 -00090 -00090 2023.109767 1022.05.014							5.10E+01 5.40E+01	ProBeam, Varian ProBeam, Varian ProBeam, Varian	Protons Protons	2.50E+02 in VIVO 2.50E+02 in VIVO	Tumor bearing hi Tumour AND Nor Much less tumou 1.00E+00 Tumor bearing hi Tumour AND Nor Less tumou 2.00E+00 Tumor bearing hi Tumour AND Nor Less tumour cont 2.00E+00	4.00E+00 4.50E+00	4.00E-00 Segary power furnish control a mism seaso positions than CONV 2.50E+00 Much less turnour control than CONV & better radioprotection than CONV 3.3E+00 Less turnour control than CONV & better radioprotection than CONV
0-00090 0-00090 0-00090 0-00090 0-00090 20023,109767 2002,05,014 2002,05,014 2002,05,014							5.60E+01	ProBeam, Varian	Protons Protons	2.50E+02 In VIVO	Tumor bearing hi Tumour AND Nor Less tumour cont 2.00E+00	4.50E+00 3.50E+00	2.75E+00 Less turnour control than CONV & slightly better radioprotection than CONV
5-00990 5-00900 5-00900 5-00900 5-00900 5-00900 5-00900 5-00900 5-00900 5-00900 5-00900 5-0			5.58E-06	2.456-05	1.306+07	1.30E+06	8.00E+01 3.19E+01	8.40E-01 ProBeam, Varian 1.00E-01 ELBE electron accelerator	Protons Electrons	2.50E+02 In VIVO 3.00E+01 In VIVO	Tumor bearing in Tumour AND Nor Slightly less tume 3.00E+00 Zebrafish embryc Normal Tissue Much less pericardial edema and less spi	3.00E+00 5.00E+00	3.00E+00 Slightly less tumour control than CONV & somewhat better radioprotection than CONV High level of radioprotection
0-00090 0-00090 0-00090 0-00090 0-00090 1-0000 1-0000 1-0000 1-0000 1-0000 1-00000 1-0	7.14E+01 2.87E+02	4.40E+06		7.83E-03	2.52E+04 1.31E+07	4.13E+03 3.94E+03 1.22E+07	3.23E+01 3.21E+01	1.64E-01 ELBE electron accelerator 3.00E-04 ELBE electron accelerator	Electrons Electrons	3.00E+01 In VIVO 3.00E+01 In VIVO	Zebrafish embryc Normal Tassue Much less pericardial edema and less spi Zebrafish embryc Normal Tassue Less pericardial edema and less spinal ci	5.00E+00 4.50E+00	High level of radioprotection Higher level of radioprotection than CONV
80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-0000000 80-00000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-000000 80-0000000 80-0000000 80-0000000 80-0000000 80-00000000 80-00000000 80-0000000000	1.77E+02	1.40E+09	5.59E-06 5.44E-06	8.16E-03					Protons			5.00E+00	
20-00000 20-000000 20-000000 20-000000 20-000000 20-000000 20-000000 20-000000 20-000000 20-000000 20-00000000	1.77E+02 2.50E+05 3.00E+02	1.40E+09 1.50E+09 1.50E+03	5.44E-06 1.64E-03	8.16E-03 2.47E-06 1.20E-02	1.06E+08 2.50E+01	1.67E+03	3.01E+01 2.01E+01	1.15E-01 UPTO proton beam 6.70E+01 Varian Truebeam linac	Electrons	6.00E+00 In VITRO	Human blood Normal Tissue Same % tell as CONV	2.00E+00	High level of radioprotection Same furnour control as CONV
80-00090 80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-00000 80-000000 80-00000000	1.77E+02 2.50E+05 3.00E+02 3.00E-01 1.00E+00 3.00E+00	1.50E+03 1.50E+03 1.50E+03 3.50E+04 1.20E+05 3.50E+05	5.44E-05 1.64E-03 3.43E-01 3.33E-01 3.43E-01	4.00E-02 1.20E-01	2.50E+01 2.50E+01	1.67E+03 5.01E+02 1.68E+02	2.01E+01 2.00E+01 2.01E+01	6.70E+01 Varier Trusbeem linec 2.00E+01 Varier Trusbeem linec 6.70E+00 Varier Trusbeem linec	Electrons Electrons	6.00E+00 In VITRO 6.00E+00 In VITRO 6.00E+00 In VITRO	Human blood Normal Tissue Same % tail as CONV Human blood Normal Tissue Higher % tail than CONV Human blood Normal Tissue Much higher % tail than CONV	2.00E+00 1.50E+00 1.00E+00	Same farrour control as CONV Werse radopretection than CONV Much werse radiopretection than CONV
10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-00000 10-000000 10-00000000	1.77E+02 2.50E+05 3.00E+02 3.00E-01 1.00E+00 3.00E+00	1.40E+00 1.50E+00 1.50E+03 3.50E+04 1.20E+05 3.50E+05	5.44E-06 1.64E-03 3.43E-01 3.33E-01 3.43E-01 3.37E-02	4.00E-02 1.20E-01 3.30E-02 1.00E-01	2.50E+01 2.50E+01 3.00E+02	1.67E+03 5.01E+02 1.68E+02 6.01E+02 2.01E+02	2.01E+01 2.00E+01 2.01E+01 2.00E+01 2.01E+01	6.70E+01 Varian Trusbeam linac 2.00E+01 Varian Trusbeam linac 6.70E+00 Varian Trusbeam linac 6.70E+00 Varian Trusbeam linac 6.70E+01 Varian Trusbeam linac	Electrons Electrons Electrons Electrons Electrons	6.00E+00 In VITRO 6.00E+00 In VITRO 6.00E+00 In VITRO 6.00E+00 In VITRO 6.00E+00 In VITRO	Human Blood Normal Tissue Saren % Isal as CONV Human Blood Normal Tissue Much higher % Isal than CONV Human Blood Normal Tissue Much higher % Isal than CONV Human Blood Normal Tissue Less % Isal than CONV Normal Tissue Less % Isal than CONV	2.00E+00 1.50E+00 1.00E+00 3.00E+00 4.00E+00	Same harvas crotel as CONV Worse redoperatection than CONV Mach worse adoperatection than CONV Stories adoperated to the CONV Stories have adoperated to than CONV Better adoperated on than CONV
0-00000 0-00000 0-00000 0-00000 0-00000 1-00001 1-0000	1.77E+02 2.50E+05 3.00E+02 3.00E-01 1.00E+00 3.00E+00	1.50E+03 1.50E+03 1.50E+03 3.50E+04 1.20E+05 3.50E+05	5.44E-05 1.64E-03 3.43E-01 3.33E-01 3.43E-01	4.00E-02 1.20E-01	2.50E+01 2.50E+01	1.67E+03 5.01E+02 1.68E+02 6.01E+02	2.01E+01 2.00E+01 2.01E+01	6.70E+01 Varier Trusbeem linec 2.00E+01 Varier Trusbeem linec 6.70E+00 Varier Trusbeem linec	Electrons Electrons Electrons Electrons	6.00E+00 In VITRO 6.00E+00 In VITRO 6.00E+00 In VITRO 6.00E+00 In VITRO	Human blood Normal Tasse Same % tell as CONV Human blood Normal Tasse Higher % tell than CONV Human blood Normal Tasse Much higher % tell than CONV Human blood Normal Tasse Moderately less % tell than CONV	2.00E+00 1.50E+00 1.00E+00	Same tumour control as CONV Winner adopted to that CONV Mutur worse adopted to that CONV Skirtly belter adopted to the TONV Skirtly belter adopted to the TONV

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	555555.56	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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