Supplementary Table S1

Beam layout by region			
Region	**Beam Size**	**Isocenter location**	**Normalization point**
Skull & Cspine	**40mm square**	**center of brain**	**Center of brain**
C to T spine junction	**10mm square**	**above scapula**	**Above the spine body**
Sternum	**20mm square**	**below the sternum enough so edge of beam covers sternum**	**skin of the sternum**
Tpsine & Lspine	**20mm square**	**above the spine so the edge of the beam covers the spine**	**Above the spine body**
Pelvis	**20mm square**	**above the pelvis so the edge of the beam covers the pelvic girdle**	**above the pelvic crest**
Femurs	**20mm square**	**below the femur**	**BM of femur**
Spleen	**10mm square**	**within the spleen**	**spleen tissue**

Supplementary Table S1: Radiation beam layout by regions (beam size, isocenter location, normalization point).

Supplementary Table S2

Monte Carlo Parameters	
Isotropic voxel spacing spacing (mm)	0.4
Variance reduction settings	
N split	200
NRCYCL	0
ihowfarless	off
Electron range rejection	on
ESAVE_GLOBAL (MeV)	1
DOSXYZnrc settings	
Global Ecut (MeV)	0.736
Global Pcut (MeV)	0.01
Zero dose to air	on
EGSnrc settings	
Boundary crossing algorithm	PRESTA-I
Spin effects	off
Brems angular sampling	Simple Koch-Motz
Brems cross sections	NIST
Bound Compton Scattering	Impulse approximation
Radiative Compton corrections	off
Pair angular sampling	off
Pair production cross-sections	Bethe-Heitler
Photoelectron angular sampling	off
Rayleigh scattering	on
Atomic relaxations	off
Electron impact ionization	off
Photon cross sections	xcom

Supplemental Table S2: Parameters used for Monte Carlo simulation of TMI treatment plans

Supplementary Table S3

A

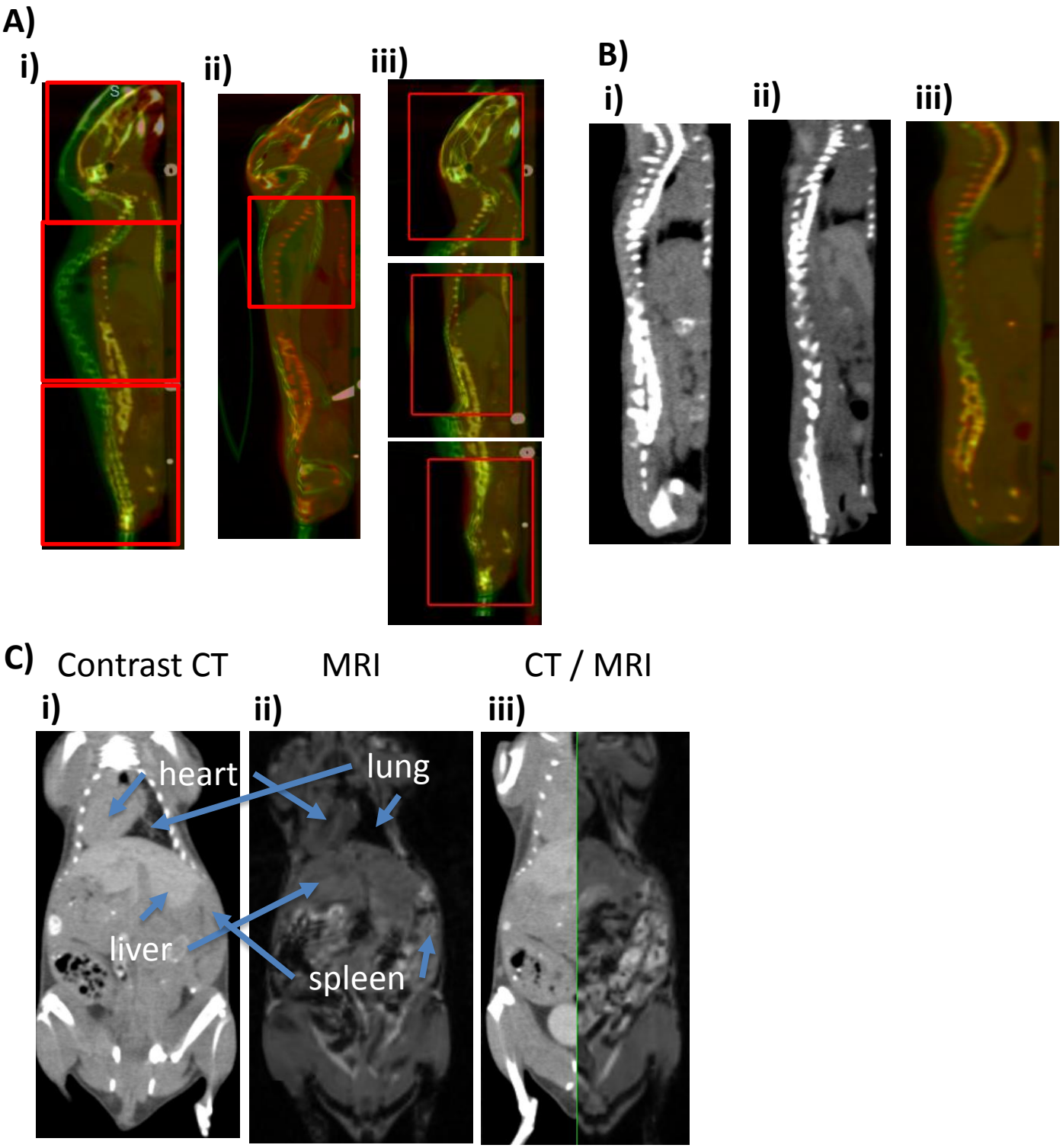
n=5	Dmean (Gy)			D95 (Gy)			D5 (Gy)		
	Prone	Supine	Signif?	Prone	Supine	Signif?	Prone	Supine	Signif?
Bone (PTV)	26.2 ± 1.5	26.2 ± 1.5	no	3.5 ± 4.2	3.5 ± 4.2	no	40.7 ± 2.9	40.7 ± 2.9	no
Lungs	5.1 ±0.8	5.6 ± 0.2	no	1.0 ± 0.1	1.1 ± 0.1	no	11.6 ± 0.4	11.2 ± 0.2	no
Gut	3.7 ± 0.7	3.3 ± 0.4	no	0.7 ± 0.1	0.7 ± 0.1	no	10.1 ± 0.7	10.7 ± 1.1	no
Liver	4.4 ± 0.5	4.5 ± 1.4	no	11.4 ± 1.3	1.0 ± 0.1	no	4.8 ± 3.9	12.7 ± 3.2	no

B

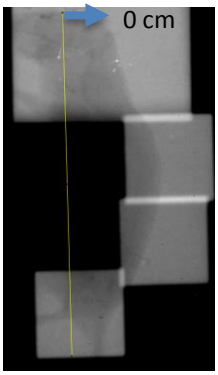
n=5	**Dmean (Gy)**			**D95 (Gy)**			**D5 (Gy)**		
	16-18g (4-6 weeks)	**29g-31g (14+ weeks)**	**20g (8-10 weeks)**	**16-18g (4-6 weeks)**	**29g-31g (14+ weeks)**	**20g (8-10 weeks)**	**16-18g (4-6 weeks)**	**29g-31g (14+ weeks)**	**20g (8-10 weeks)**
Bone (PTV)	**28.5 ± 0.3**	**27.4 ± 0.6**	**26.2 ± 1.5**	**3.8 ± 3.2**	**1.3 ± 0.1**	**3.6 ± 4.2**	**42.2 ± 1.3**	**51.3 ± 4.6**	**40.7 ± 2.9**
Lungs	**5.2 ± 1.0**	**3.9 ± 1.0**	**5.1 ± 0.8**	**1.1 ± 0.2**	**1.1 ± 0.1**	**5.1 ± 0.8**	**12.0 ± 1.4**	**10.6 ± 1.5**	**11.6 ± 0.5**
Gut	**3.4 ± 0.6**	**2.7 ± 0.4**	**3.7 ± 0.7**	**0.6 ± 0.1**	**0.2 ± 0.4**	**0.7 ± 0.1**	**10.4 ± 0.3**	**10.4 ± 1.4**	**10.2 ± 0.7**
Liver	**5.1 ± 0.1**	**3.8 ± 0.5**	**4.4 ± 0.5**	**0.9 ± 0.1**	**0.8 ± 0.1**	**0.8 ± 0.1**	**12.1 ± 1.4**	**12.7 ± 0.8**	**11.4 ± 1.3**

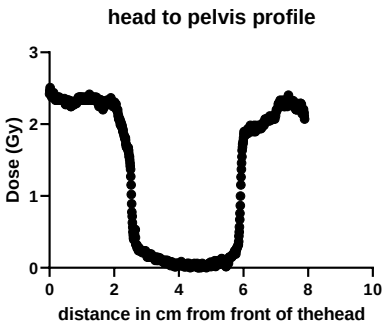
Supplement Table S3. Effect of position and weight on TMI planning. 11Gy reference plan

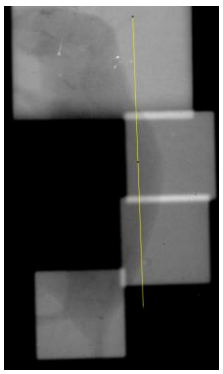
Supplement Figure S1

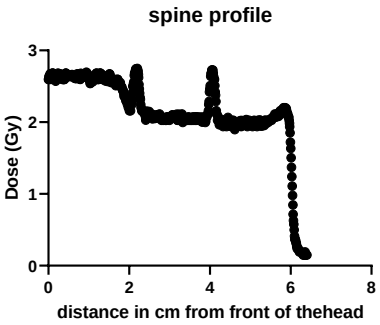


Supplementary Figure S1: Identification of soft tissue structures using imaging techniques.

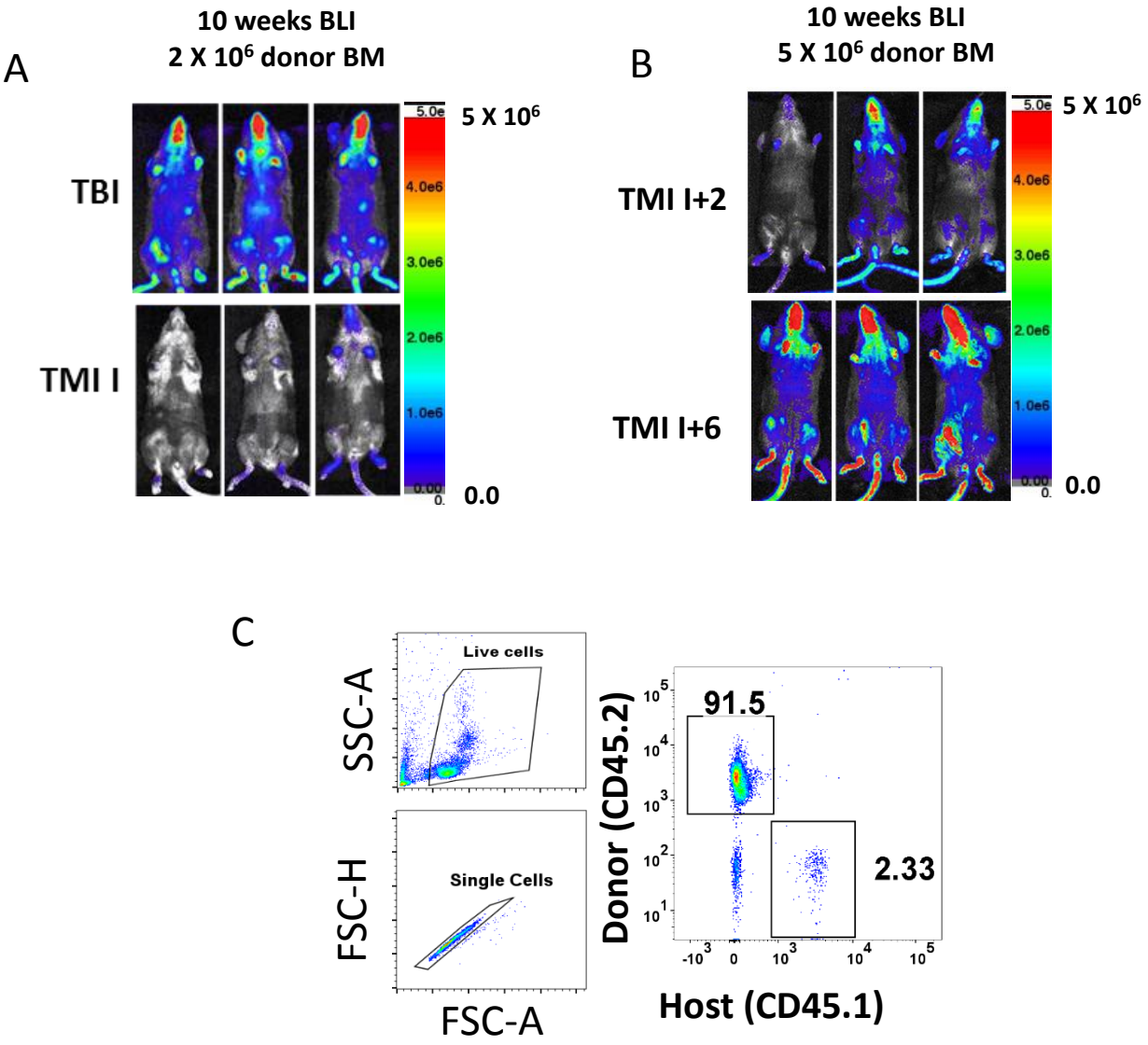




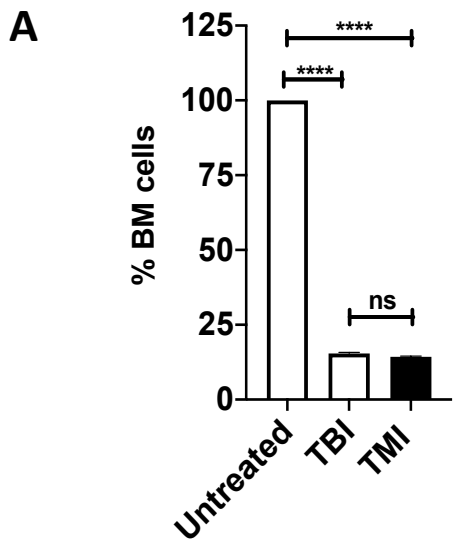




Supplementary Figure S2: Film profiles of TMI QA treatment plan.



Supplementary Figure S3: TBI and TMI donor cell engraftment



Supplementary Figure S4: Effect of TBI/TMI on bone marrow cellularity.