Supplementary Table 1: Neonatal MRI protocol

Sequence	Plane	AT (min)	TR (ms)	TE (ms)	Voxel Size (mm)	FOV (mm)	Matrix (slices)
T1 SE (2D)	Axial	03:07	400	15	0.83x1.05x3.00	120x120x90	144x115x30
T1 (3D)	Sagittal	03:46	25	7.6	0.75x0.75x2.00	120x120x99	160x160x99
T2 TSE (2D)	Axial	01:48	3000	140	0.94x1.06x3.00	120x120x102	128x113x34
T2 TSE (2D)	Sagittal	01:48	3000	140	0.94x1.06x3.00	120x120x108	128x113x36
T2 TSE (2D)	Coronal	01:48	3000	140	0.94x1.06x3.00	110x110x108	116x103x36
SWI (2D)	Axial	03:35	51	12	0.85x1.00x2.00	170x139x90	200x138x90
DWI (2D)	Axial	01:34	4066	90	1.14x1.15x3.00	200x200x92	176x170x28

AT: Acquisition time

DWI: Diffusion-weighted imaging

FOV: Field-of-view

SE: Spin echo

SWI: Susceptibility-weighted imaging

TE: Echo time

TR: Repetition time

TSE: Turbo spin echo

Supplementary Table 2: Intra-class correlation coefficient

	Female				Male			
	ICC							
ROI	**FA**	**ADC**	**T1R**	**T2R**	**FA**	**ADC**	**T1R**	**T2R**
Medulla Oblongata	.994 (.982–.998)	.948 (.690–.985)	.942 (.747–.982)	.914 (.197–.979)	.983 (.955–.994)	.713 (.068–.902)	.942 (.756–.981)	.831 (.249–.948)
Pontine Tegmentum	.975 (.912–.991)	.846 (.580–.944)	.923 (.742–.974)	.913 (.672–.971)	.938 (.828–.977)	.605 (-.038–.851)	.986 (.962–.995)	.945 (.855–.979)
Midbrain	.952 (.847–.983)	.920 (.766–.972)	.962 (.898–.986)	.969 (.916–.989)	.975 (.930–.991)	.895 (.480–.968)	.941 (.814–.979)	.884 (.449–.964)
rPLIC	.828 (.529–.937)	.743 (.270–.908)	.939 (.604–.983)	.941 (.837–.979)	.865 (.646–.949)	.830 (.556–.936)	.945 (.846–.980)	.960 (.894–.985)
lPLIC	.777 (.023–.933)	.604 (-.001–.852)	.933 (.791–.977)	.901 (.730–.964)	.827 (.118–.949)	.787 (-.063–.939)	.925 (.804–.972)	.891 (.710–.959)

Numbers in parentheses are 95% confidence intervals

ADC: Apparent diffusion coefficient

FA: Fractional anisotropy

ICC: Intra-class correlation coefficient

lPLIC: Left posterior limb of the internal capsule

ROI: Region of interest

rPLIC: Right posterior limb of the internal capsule

T1R: T1-relaxation time

T2R: T2-relaxation time

Supplementary Table 3: Pearson's correlation analysis

	Female				Male			
	Pearson's Correlation							
ROI	**FA vs. T1R**	**FA vs. T2R**	**ADC vs. T1R**	**ADC vs. T2R**	**FA vs. T1R**	**FA vs. T2R**	**ADC vs. T1R**	**ADC vs. T2R**
Medulla Oblongata	*r*=.084 (*p*=.749)	*r*=.167 (*p*=.521)	*r*=-.507 (*p*=.038)	*r*=-.465 (*p*=.060)	*r*=-.090 (*p*=.723)	*r*=-.046 (*p*=.856)	*r*=.228 (*p*=.364)[a]	*r*=-.062 (*p*=.806)[a]
							r=.323 (*p*=.192)[b]	*r*=-.010 (*p*=.969)[b]
Pontine Tegmentum	*r*=-.198 (*p*=.447)	*r*=.080 (*p*=.761)	*r*=-.014 (*p*=.958)	*r*=-.227 (*p*=.381)	*r*=-.105 (*p*=.679)	*r*=-.084 (*p*=.740)	*r*=-.107 (*p*=.672)[a]	*r*=-.150 (*p*=.553)[a]
							r=.284 (*p*=.254)[b]	*r*=.380 (*p*=.120)[b]
Midbrain	*r*=-.009 (*p*=.974)	*r*=-.117 (*p*=.654)	*r*=-.516 (*p*=.034)	*r*=-.318 (*p*=.214)	*r*=.115 (*p*=.651)	*r*=-.025 (*p*=.921)	*r*=-.016 (*p*=.951)	*r*=.456 (*p*=.057)
rPLIC	*r*=-.023 (*p*=.931)	*r*=.053 (*p*=.841)	*r*=.073 (*p*=.780)[a]	*r*=-.096 (*p*=.715)[a]	*r*=-.114 (*p*=.651)	*r*=-.176 (*p*=.485)	*r*=.433 (*p*=.073)	*r*=.484 (*p*=.042)
			r=.340 (*p*=.182)[b]	*r*=.202 (*p*=.436)[b]				
lPLIC	*r*=-.454 (*p*=.067)	*r*=-.451 (*p*=.069)	*r*=.277 (*p*=.282)[a]	*r*=.077 (*p*=.768)[a]	*r*=-.084 (*p*=.739)	*r*=-.250 (*p*=.317)	*r*=.335 (*p*=.174)	*r*=.492 (*p*=.038)
			r=.397 (*p*=.115)[b]	*r*=.216 (*p*=.405)[b]				

[a] Results based on the data determined by rater 1

[b] Results based on the data determined by rater 2

ADC: Apparent diffusion coefficient

FA: Fractional anisotropy

lPLIC: Left posterior limb of the internal capsule

ROI: Region of interest

rPLIC: Right posterior limb of the internal capsule

T1R: T1-relaxation time

T2R: T2-relaxation time

Supplementary Figure 1:

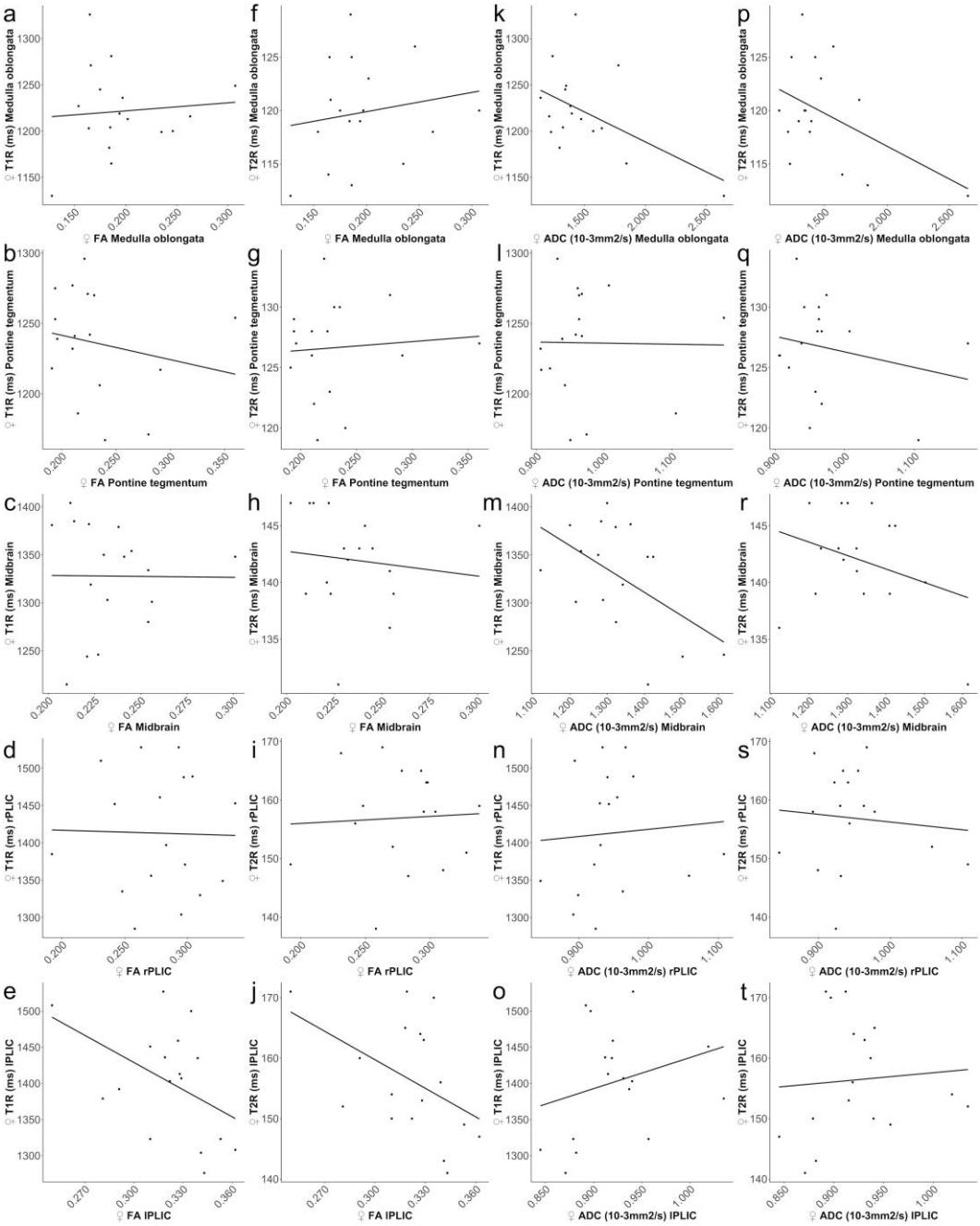

Illustration of the relationships between diffusion-tensor parameters [fractional anisotropy (FA); apparent diffusion coefficient (ADC) ($10^{-3}mm^2/s$)] (x-axis) and T1-/T2-relaxation time metrics [T1R (ms); T2R (ms)] (determined by rater 1 at term-equivalent ages) (y-axis) of the medulla oblongata (a, f, k, p), pontine tegmentum (b, g, l, q), midbrain (c, h, m, r), right posterior limb of the internal capsule (rPLIC) (d, i, n, s), and left posterior limb of the internal capsule (lPLIC) (e, j, o, t) in female neonates.

Supplementary Figure 2:

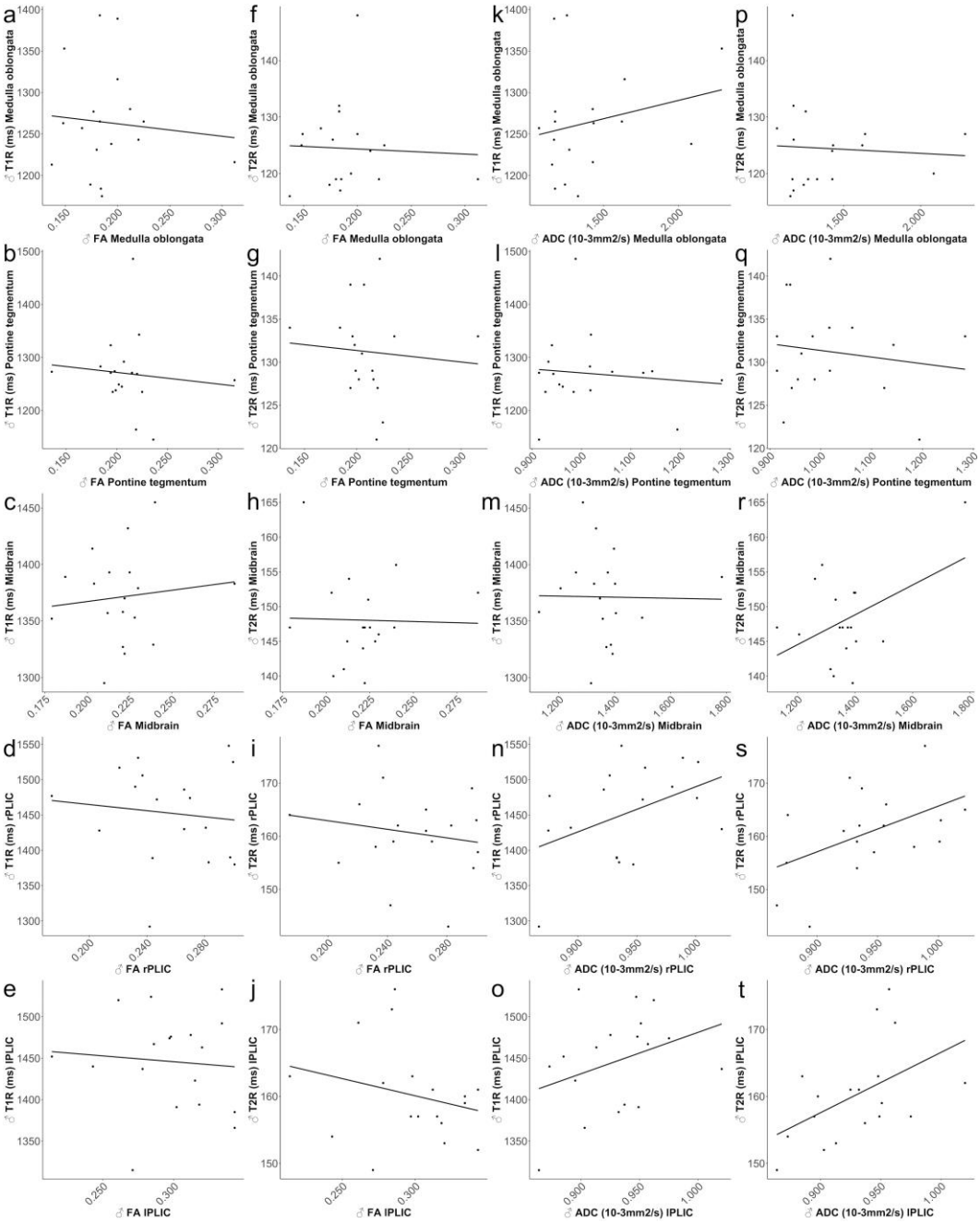

Illustration of the relationships between diffusion-tensor parameters [fractional anisotropy (FA); apparent diffusion coefficient (ADC) ($10^{-3}mm^2/s$)] (x-axis) and T1-/T2-relaxation time metrics [T1R (ms); T2R (ms)] (determined by rater 1 at term-equivalent ages) (y-axis) of the medulla oblongata (a, f, k, p), pontine tegmentum (b, g, l, q), midbrain (c, h, m, r), right posterior limb of the internal capsule (rPLIC) (d, i, n, s) and left posterior limb of the internal capsule (lPLIC) (e, j, o, t) in male neonates.