

# Impact of cannabis use on brain metabolism using <sup>31</sup>P and <sup>1</sup>H magnetic resonance spectroscopy

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**Suppl\_Table6: T1 and T2 relaxation for Proton MRS**

T1 (ms)	NAA	Cr	Cho	ml	Glx	Brain water	CSF
WM	1400	1300	1100	1000	1100	1000	4000
GM	1500	1400	1300	1000	1100	1500	4000

T2 (ms)	NAA	Cr	Cho	ml	Glx	Brain water	CSF
WM	280	150	200	200	180	75	1500
GM	250	150	230	200	180	95	1500

T1 and T2 values used for relaxation correction of proton metabolite values

Suppl\_Table7: Results of 1H MRS - Comparison between groups

FGM		overall comparison of groups (multivariate)						
		Statistics MANOVA: Wilks-Lambda: p = 0.047						
omnibus p-value		pairwise group comparison (post-hoc Scheffé test)						
		fN (n=21) mean ± SD	Δmf rel. diff. p-value		mN (n=26) mean ± SD	ΔCN rel. diff. p-value		mC (n=40) mean ± SD
tNAA	0.728	22.6 ± 3.5	1%	0.990	22.7 ± 3.1	-3%	0.759	22.1 ± 3.0
tCr	0.484	15.5 ± 2.4	4%	0.651	16.1 ± 2.8	1%	0.984	16.2 ± 1.8
tCho	<b>0.029</b>	4.1 ± 0.8	12%	0.057	4.6 ± 0.8	-1%	0.973	4.5 ± 0.5

r_TH		overall comparison of groups (multivariate)						
		Statistics MANOVA: Wilks-Lambda: p = 0.455						
omnibus p-value		pairwise group comparison (post-hoc Scheffé test)						
		fN (n=20) mean ± SD	Δmf rel. diff. p-value		mN (n=25) mean ± SD	ΔCN rel. diff. p-value		mC (n=39) mean ± SD
tNAA	0.495	13.5 ± 1.9	2%	0.886	13.7 ± 2.3	-4%	0.500	13.1 ± 1.8
tCr	0.450	7.9 ± 1.3	5%	0.459	8.3 ± 1.1	-3%	0.712	8.1 ± 1.0
tCho	0.204	2.4 ± 0.3	8%	0.205	2.6 ± 0.4	-3%	0.610	2.5 ± 0.3

r_TL		overall comparison of groups (multivariate)						
		Statistics MANOVA: Wilks-Lambda: p = 0.480						
omnibus p-value		pairwise group comparison (post-hoc Scheffé test)						
		fN (n=20) mean ± SD	Δmf rel. diff. p-value		mN (n=25) mean ± SD	ΔCN rel. diff. p-value		mC (n=39) mean ± SD
tNAA	0.508	15.8 ± 3.1	-3%	0.853	15.4 ± 2.9	-3%	0.846	15.0 ± 2.3
tCr	0.947	10.0 ± 2.0	-1%	0.972	9.9 ± 1.9	2%	0.950	10.0 ± 1.9
tCho	0.606	2.9 ± 0.7	7%	0.640	3.1 ± 0.6	-1%	0.978	3.0 ± 0.7

r_FWM		overall comparison of groups (multivariate)						
		Statistics MANOVA: Wilks-Lambda: p = 0.593						
omnibus p-value		pairwise group comparison (post-hoc Scheffé test)						
		fN (n=19) mean ± SD	Δmf rel. diff. p-value		mN (n=23) mean ± SD	ΔCN rel. diff. p-value		mC (n=39) mean ± SD
tNAA	0.244	14.7 ± 1.6	4%	0.451	15.3 ± 1.7	-4%	0.272	14.7 ± 1.2
tCr	0.385	8.2 ± 1.0	5%	0.480	8.6 ± 1.1	0%	0.997	8.5 ± 1.0
tCho	0.791	2.7 ± 0.5	3%	0.795	2.8 ± 0.4	-1%	0.962	2.8 ± 0.4

Absolute mean concentration values ± standard deviation of tNAA, tCr and tCho are given as mmol/kg brain tissue.

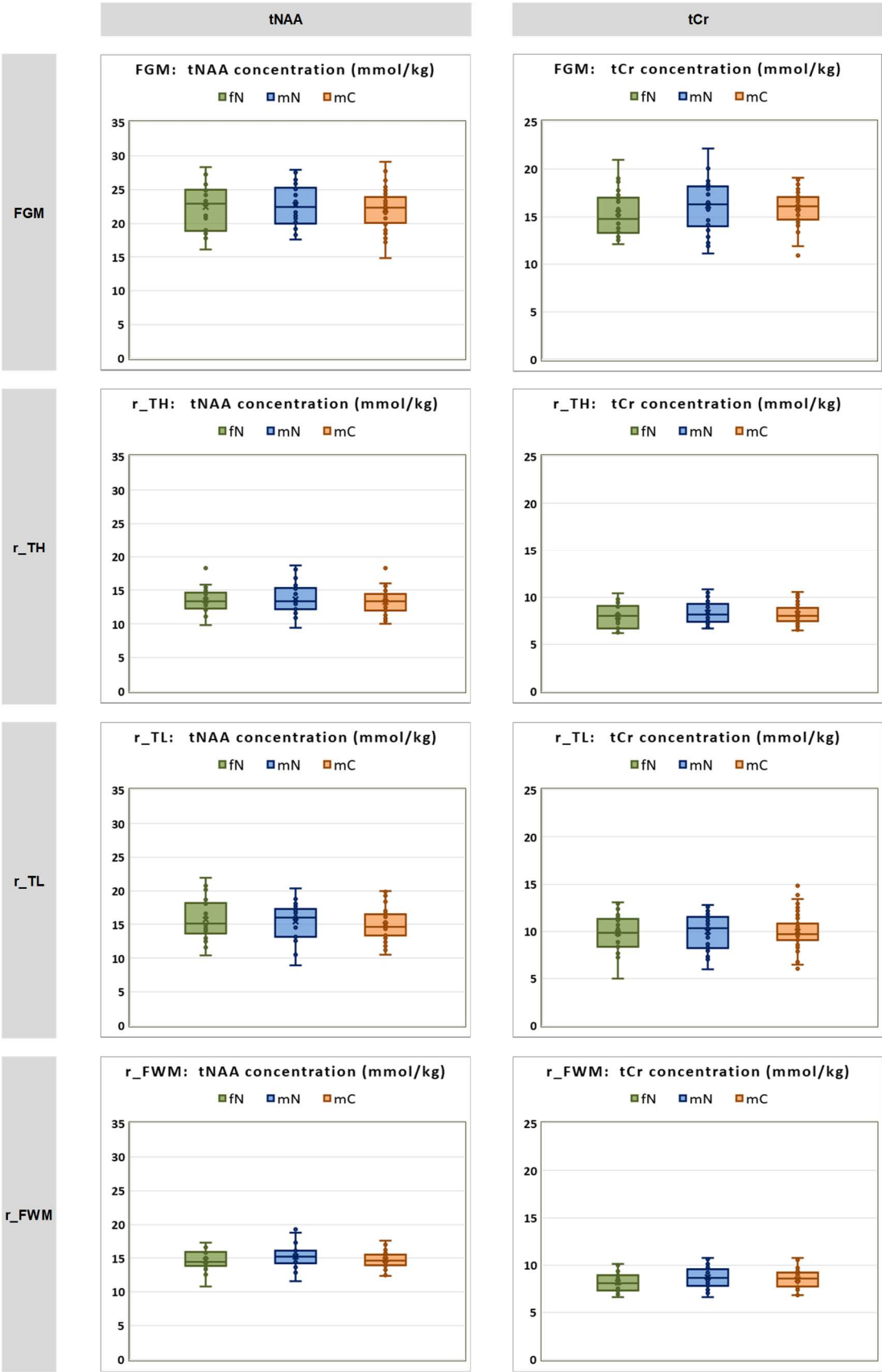
Δmf indicates the relative difference of metabolite values between fN and mN:  $\Delta mf = \frac{(mN - fN)}{fN}$ .

ΔCN indicates the relative difference of metabolite values between mN and mC:  $\Delta CN = \frac{(mC - mN)}{mN}$ .

The Wilks-Lambda test reflects the overall effect of the three groups on all three metabolite values included in the MANOVA. Post-hoc Scheffé test was used for paired comparison of groups.

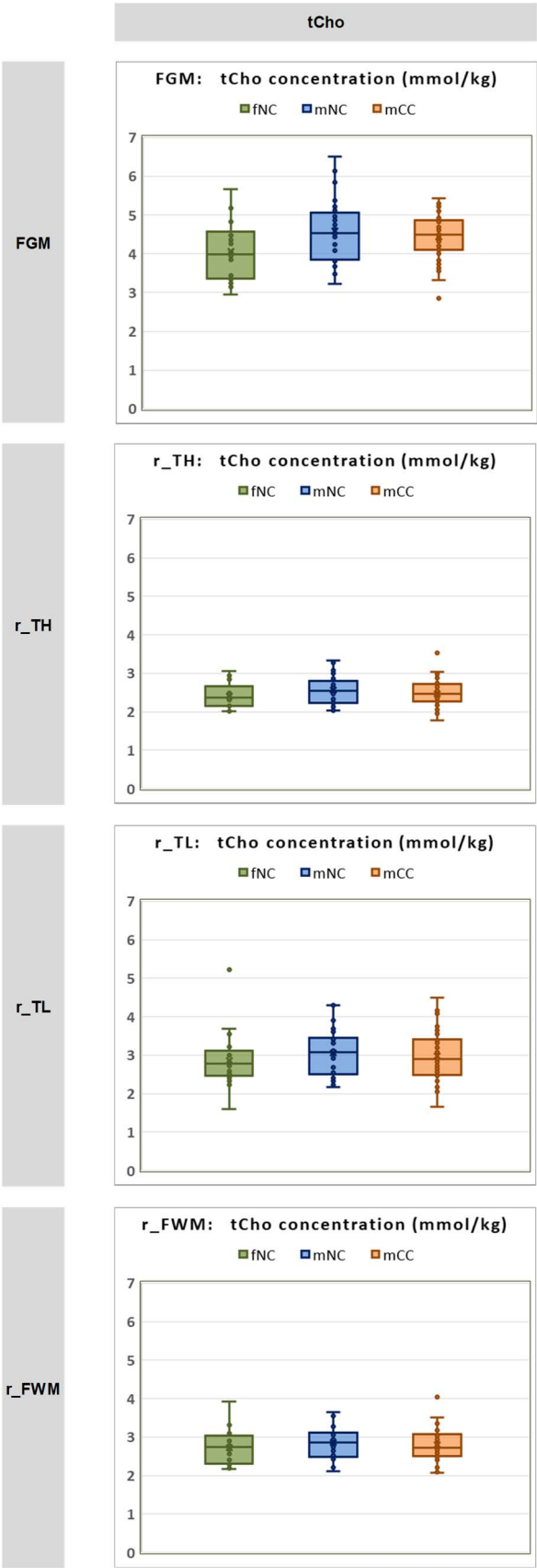
p-values < 0.05 are marked in bold.

Suppl\_Fig10a: Results of Proton MRS: concentration values - box plot



Box plots describing the variation of absolute metabolite concentration values of tNAA and tCr in four different regions of the brain. Asterisk marks significant differences (p < 0.05).

Suppl\_Fig10b: Results of Proton MRS: concentration values - box plot



Box plots describing the variation of absolute metabolite concentration values of tCho in four different regions of the brain. Asterisk marks significant differences (p < 0.05).

**Suppl\_Table8: Calculated ratio of concentrations PCr/Cr**

PCr/Cr	pairwise group comparison (t-test)						
	fN mean ± SD	Δmf rel. diff. p-value		mN mean ± SD	ΔCN rel. diff. p-value		mC mean ± SD
<b>FGM</b>	0.32 ± 0.09	-3%	0.695	0.31 ± 0.10	-6%	0.451	0.29 ± 0.06
<b>r_TH</b>	1.01 ± 0.47	-32%	<b>0.010</b>	0.68 ± 0.28	16%	0.160	0.79 ± 0.33
BG	-			-			-
<b>r_TL</b>	0.79 ± 0.23	15%	0.362	0.90 ± 0.57	-6%	0.678	0.85 ± 0.35
<b>r_FWM</b>	0.73 ± 0.19	-3%	0.696	0.70 ± 0.21	-3%	0.723	0.68 ± 0.19

Ratio of PCr and Cr concentrations. Cr concentration was obtained by:  $[Cr] = [tCr] - [PCr]$ .