Supplementary Materials

Topoisomerase IIIβ Deficiency Induces Neuro-Behavioral Changes and Brain Connectivity Alterations in Mice

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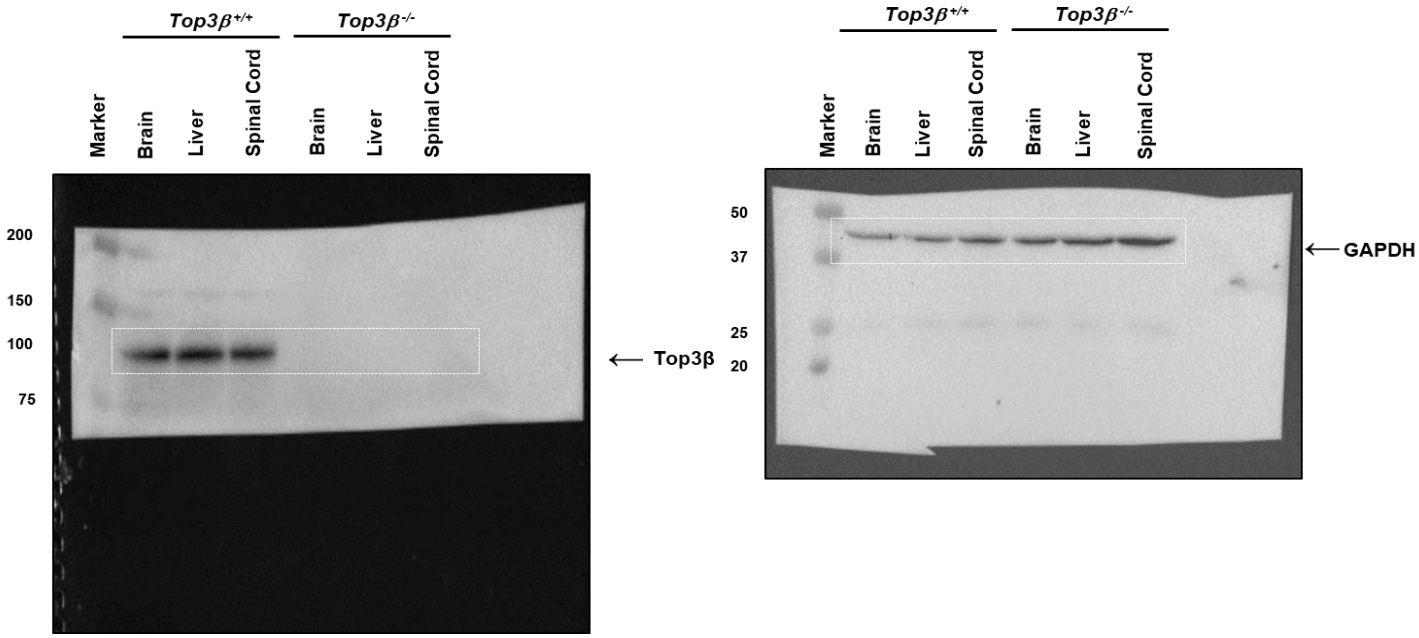


Figure S1. Full blot images of Top3β and GAPDH expression. Full blot images of Top3β (upper panel) and GAPDH (lower panel) expression in brain, liver, and spinal cord lysates of *Top3β*$^{+/+}$ and *Top3β*$^{-/-}$ mice are shown.

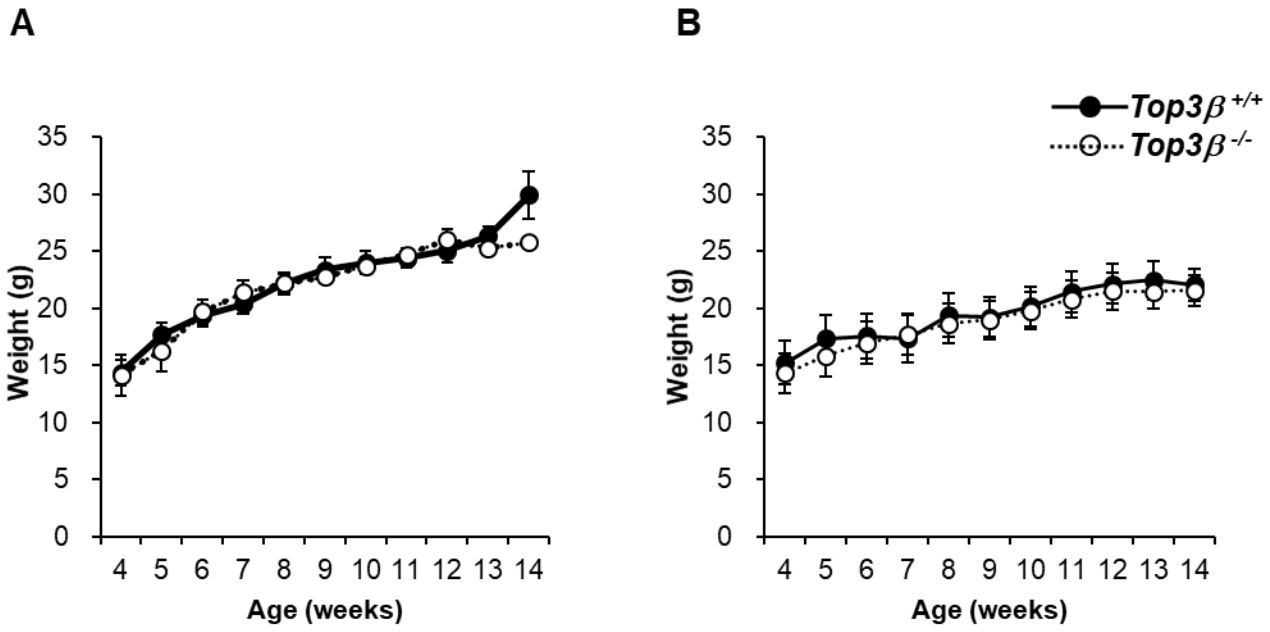


Figure S2. Body weight gain curve of *Top3β*$^{-/-}$ mice. Body weight gains were measured every week from 4 to 16 weeks of age for both sexes of *Top3β*$^{-/-}$ and wild type mice. A, male; B, female. N = 6 for each male group and N = 5 for each female group.

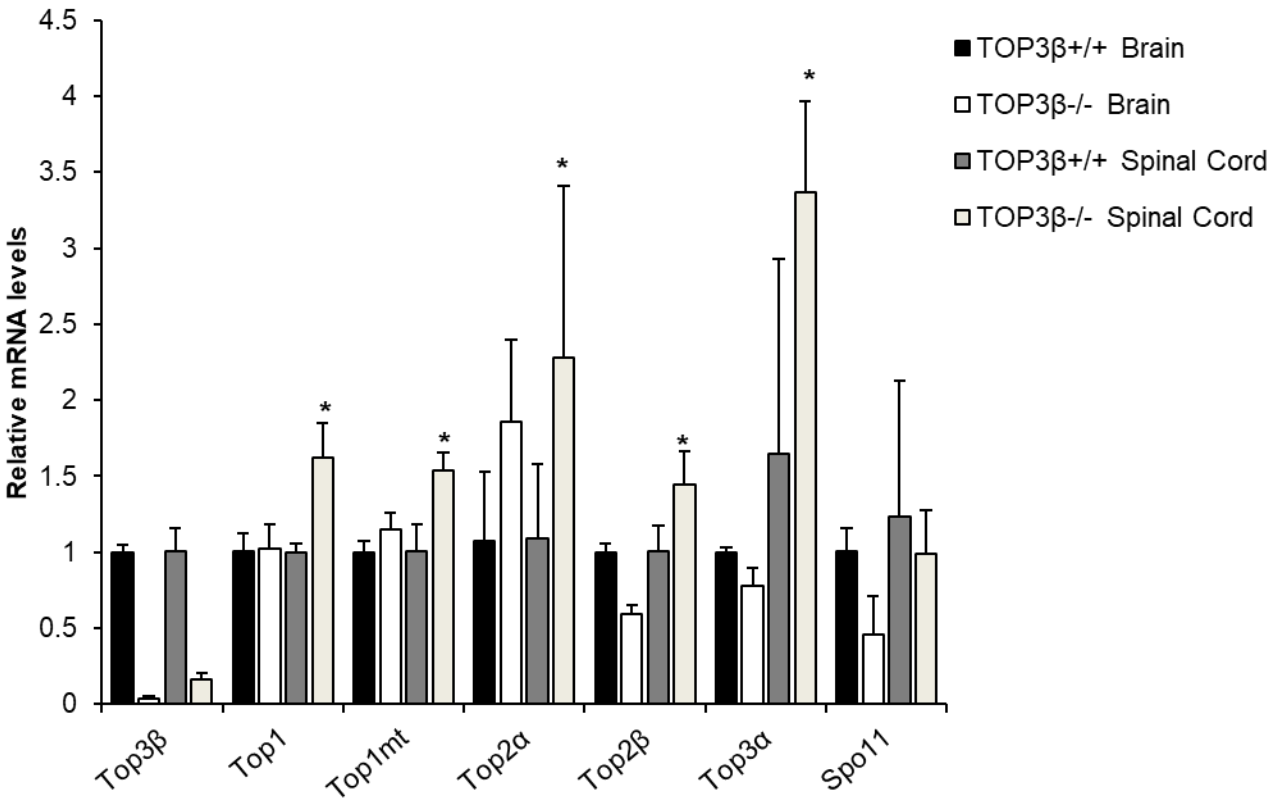


Figure S3. Comparative expression analysis of different topoisomerase enzymes in *Top3β*$^{+/+}$ and *Top3β*$^{-/-}$ mice. Expression analysis of mRNA encoding Top3β, Top1, Top1mt, Top2α, Top2β, Top3α, and Spo11 in brains and spinal cords of *Top3β*$^{+/+}$ and *Top3β*$^{-/-}$ mice (as measured by qRT-PCR). *, $p < 0.05$.

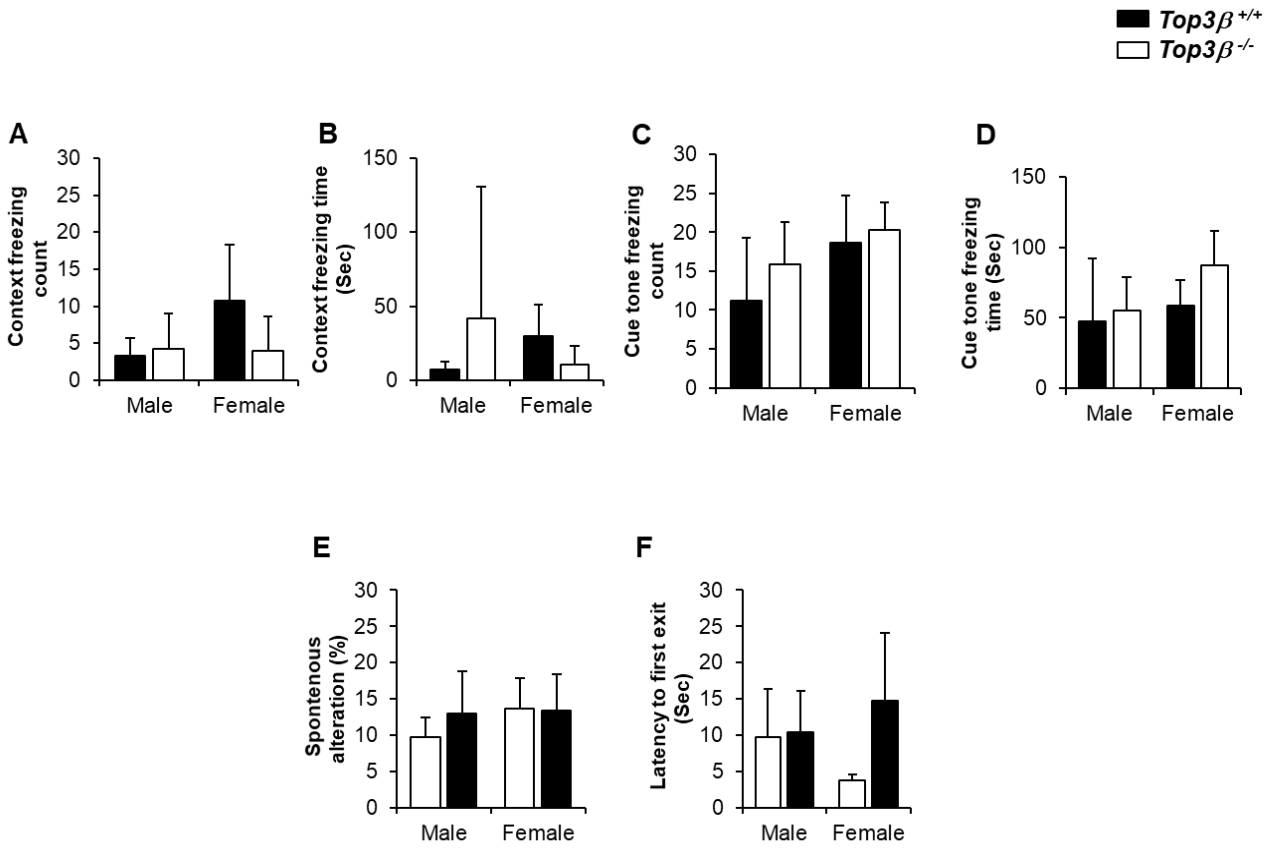


Figure S4. Fear conditioning and Y-Maze are normal in *Top3β*$^{-/-}$ mice. Significant differences in fear conditioning (A-D) and Y-maze tests (E-F) were not observed in 11 weeks old WT or *Top3β*$^{-/-}$ mice. N = 6 for each group.

Table S1. Primers used for real-time PCR in this study.

Species	Target name	Direction	Primer sequence	Source
Mouse	**Gapdh**	Forward	CGTGCCGCCTGGAGAAACC	(This study)
		Reverse	TGGAAGAGTGGGAGTTGCTGTTG	
	Top3β	Forward	GGAGATTGCACAGATGTTTTTAAAC	(Kelvin Y. Kwan and James C. Wang. et al. 2001)[16]
		Reverse	TTCTGTCCGTGGGTAGCTGATATAGC	
	Top1	Forward	GGTGAGAAGGACTGGCAGAAAT	(Liu, L.-M. et al. 2018)[62]
		Reverse	CTTGTCGATGAAGTACAGGGCTA	
	Top1mt	Forward	CCTTGACAAATGTGACTTCACG	(Douarre, C. et al. 2012)[63]
		Reverse	GACCACATCCTCTGGCATGAC	
	Top2*α*	Forward	CGGAATGACAAGCGAGAAGTAA	(Liu, L.-M. et al. 2018)[62]
		Reverse	GCATTGTAAAGATGTATCGTGGAC	
	Top2β	Forward	TGGTGAGATATTTGTGGTGGACAG	(Tiwari, V. K. et al. 2012)[64]
		Reverse	TGCCGGTGTTTTATCTGTTCCATT	
	Top3*α*	Forward	TCTCTGGACATTTGCTGGC	(Guiraldelli, M. F. et al. 2013)[65]
		Reverse	TGCTTCAAAGAGGACAAGGG	