Table S1. Description of specific cNF presentation in each *NF1*$^{+/ex42del}$ Yucatan miniswine.

Animal ID	Sex	DOB	Age Tumor Initiation	Path Group	Tumor Description	Tumor Size	11M Gait	15M Gait	18M Gait	12M Tmaze	18M Tmaze
A4407	M	31-Mar-17	NA	14M	no growth						
A4464	M	4-Apr-17	NA	14M	no growth						
A5599	M	18-Oct-17	NA	14M	no growth						
A6159	M	18-Nov-17	NA	14M	small inflamed lesion-(non-tumor)						
A4404	M	29-Mar-17	NA	18M	no growth						
A5464	M	11-Sep-17	NA	18M	no growth						
A5465	M	11-Sep-17	12M	18M	Bump-middle of spine-Diffuse NF	2 cm in diameter; raised 0.5 cm		T	T	T	T
A5476	M	12-Sep-17	12.5M	18M	Small Bump - R. shoulder-Diffuse NF			T	T	T	T
A5601	M	18-Oct-17	11.5M	18M	Small bump - back L of spine-Diffuse NF	3 cm in diameter; raised 0.5 cm	T	T	T	T	T
A5603	M	18-Oct-17	17M	18M	Small bump- Back R. side-Diffuse NF	1cm in diameter; raised 0.5 cm			T		T
A5725	M	7-Nov-17	9M	18M	Two small bumps- R. shoulder-Diffuse NF	2 cm diameter - raised 0.5-1 cm	T	T	T	T	T
A6173	M	20-Nov-17	9M	18M	Bump, back L. side- Diffuse NF	6-7 cm diameter; raised 2 cm	T				

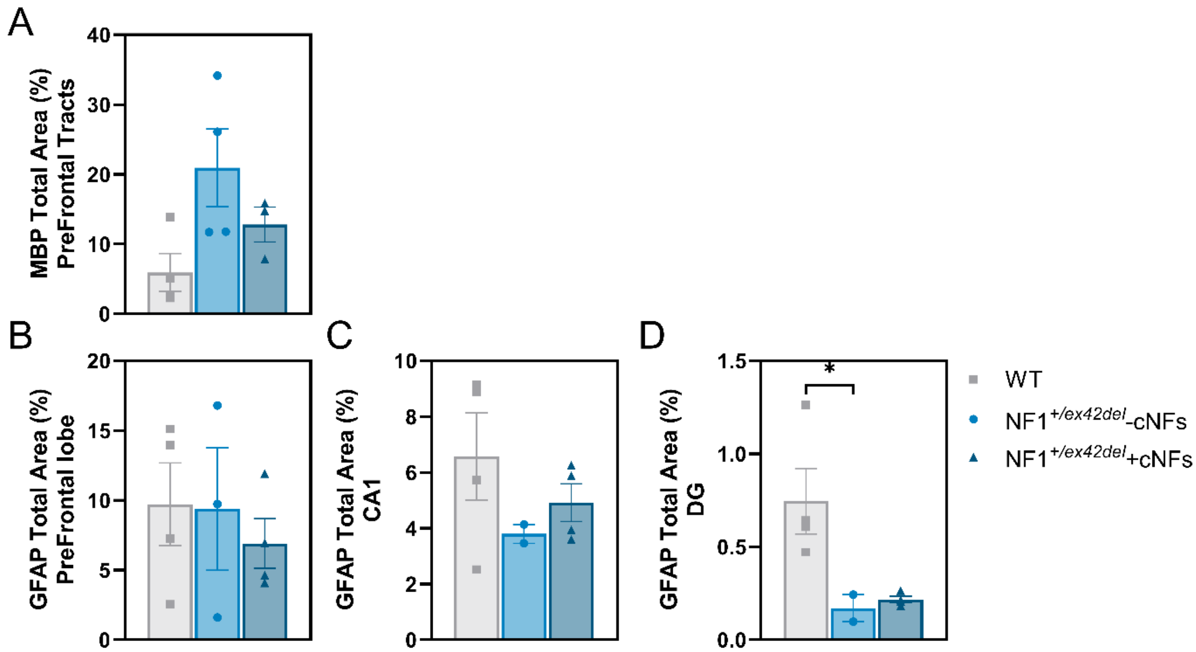

Figure S1. Inconsistent MBP$^+$ mature oligodendrocytes expression and GFAP$^+$ astrocyte expression in prefrontal lobe and hippocampus in male *NF1$^{+/ex42del}$* miniswine with cNFs burden at 18 months of age. A. MBP$^+$ analysis in prefrontal tracts indicating no significant differences between *NF1$^{+/ex42del}$* miniswine with or without cNF burden and wild type counterparts at 18 months of age. B. GFAP$^+$ analysis of prefrontal tracts indicating no significant difference regardless of cNF burden in male *NF1$^{+/ex42del}$* miniswine at 18 months of age. C. GFAP$^+$ analysis of the CA1 region of the hippocampus indicating no significant difference regardless of cNF burden in male *NF1$^{+/ex42del}$* miniswine at 18 months of age. D. GFAP$^+$ analysis of the dentate gyrus indicating a decrease in male *NF1$^{+/ex42del}$* miniswine with no cNF burden at 18 months of age. n=3-4 *NF1$^{+/ex42del}$* +cNFs; n=2-4 *NF1$^{+/ex42del}$* -cNFs; n=3-4 WT. One-way ANOVA, Tukey post-hoc. *$p<0.05$, **$p<0.01$, ***$p\leq0.001$. Mean ± SEM.

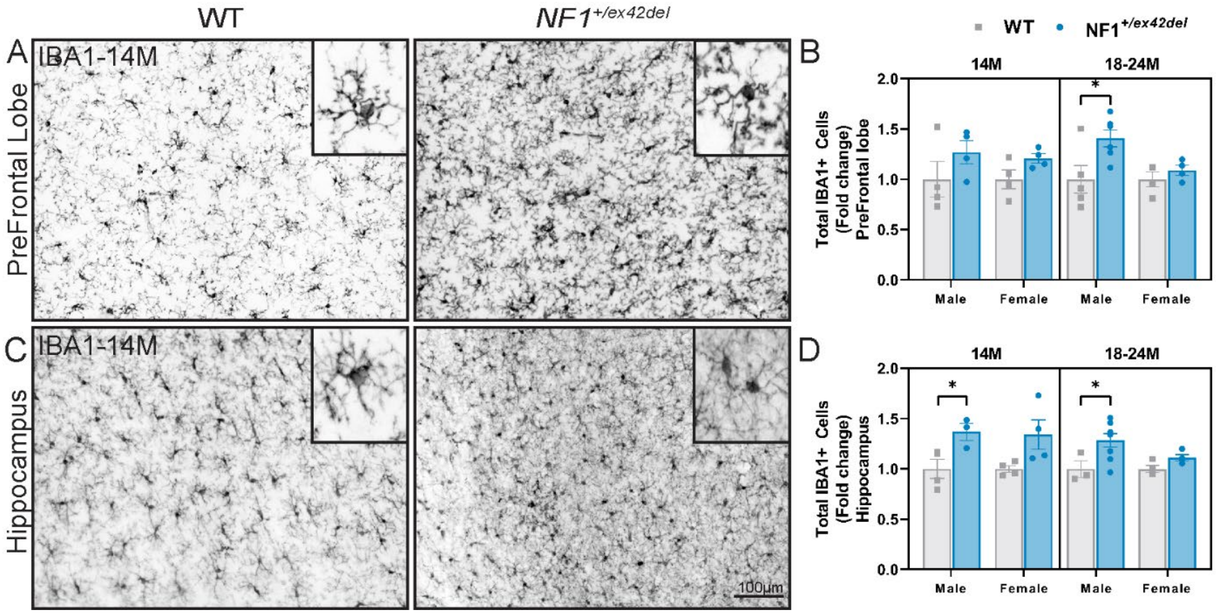

Figure S2. Increased Iba1^{+} microglia in prefrontal lobe and hippocampus of *NF1$^{+/ex42del}$* miniswine. A. Representative images of Iba1^{+} microglia in prefrontal lobe of 14-month-old wild type and *NF1$^{+/ex42del}$* miniswine. B. Iba1^{+} analysis of prefrontal lobe indicating significant increase in 18-month -old male *NF1$^{+/ex42del}$* miniswine. C. Representative images of Iba1+ microglia in the hippocampus of 14-month-old animals. D. Iba1^{+} analysis of hippocampus sustained increase in the number of microglia in 14- and 18-month-old male *NF1$^{+/ex42del}$* miniswine. Unpaired t-tests. n=3-4/group, *$p<0.05$. Mean ± SEM. Scale bar=100µm.

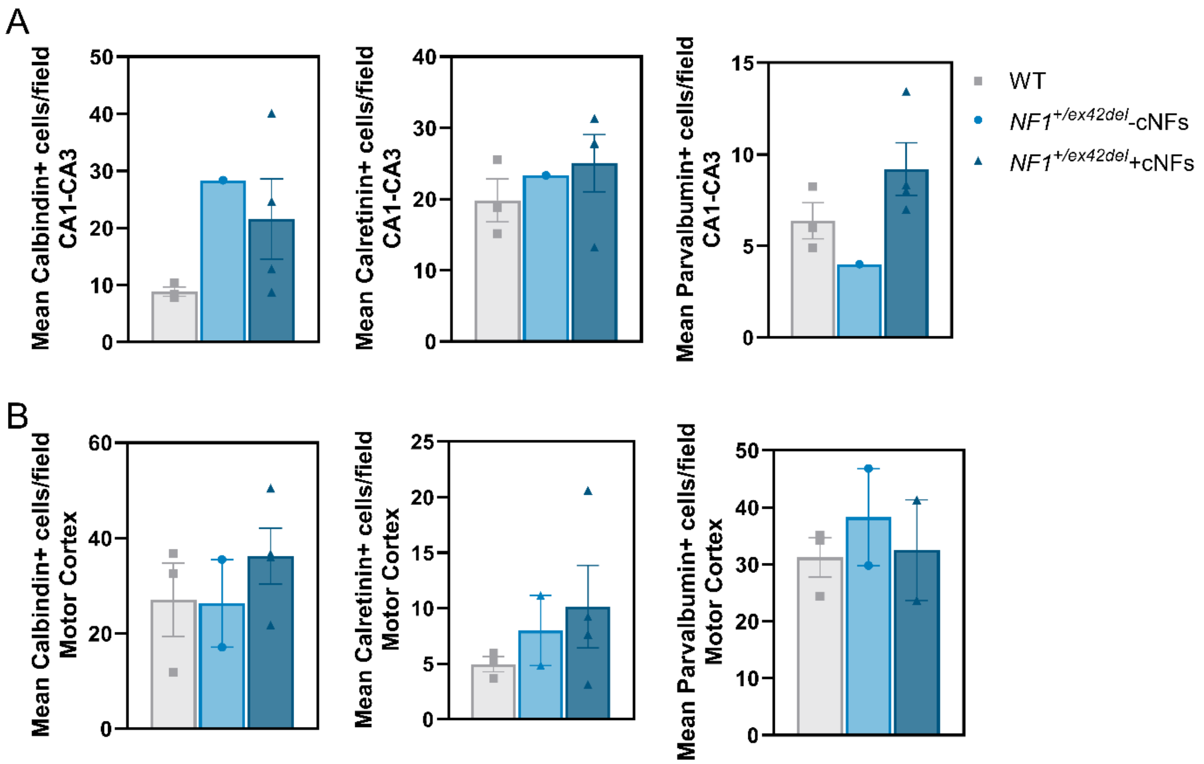

Figure S3. No consistent differences in GABAergic interneurons in hippocampus or motor cortex of male *NF1*$^{+/ex42del}$ miniswine with and without cNF burden at 18 months of age. A. Calbindin^{+}, calretinin^{+}, and parvalbumin^{+} interneuron analysis in hippocampus indicating no significant different of male *NF1*$^{+/ex42del}$ miniswine with and without cNFs and wild type miniswine at 18 months of age. B. Calbindin^{+}, calretinin^{+}, and parvalbumin^{+} interneuron analysis in motor cortex indicating no significant different of male *NF1*$^{+/ex42del}$ miniswine with and without cNFs and wild type miniswine at 18 months of age. n=2-3 *NF1*$^{+/ex42del}$ +cNFs; n=1-2 *NF1*$^{+/ex42del}$ -cNFs; n=2-3 WT. One-way ANOVA, Tukey post-hoc. Mean ± SEM.

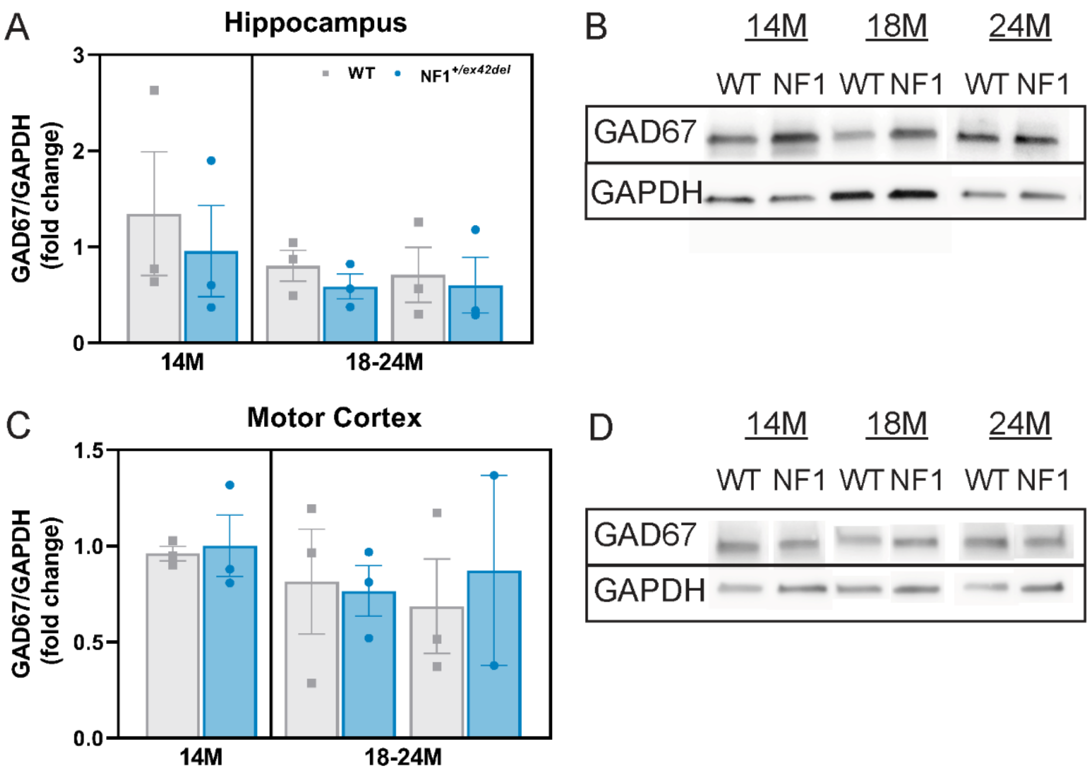

Figure S4. No differences in protein expression of GAD67. A. Fold change of GAD67 over GAPDH indicates no significant differences in GAD67 expression in the hippocampus of NF*1*$^{+/ex42del}$ miniswine compared to wild type counterparts. B. Representative western blot of GAD67 over GAPDH as loading control in wild type and *NF1*$^{+/ex42del}$ miniswine at 14, 18, and 24 months of age in the hippocampus. C. Fold change of GAD67 over GAPDH indicates no significant differences in GAD67 expression in the motor cortex of NF*1*$^{+/ex42del}$ miniswine compared to wild type counterparts. D. Representative western blot of GAD67 over GAPDH as loading control in wild type and *NF1*$^{+/ex42del}$ miniswine at 14, 18, and 24 months of age in the motor cortex. Unpaired t-tests. n=3/group. Mean ± SEM.

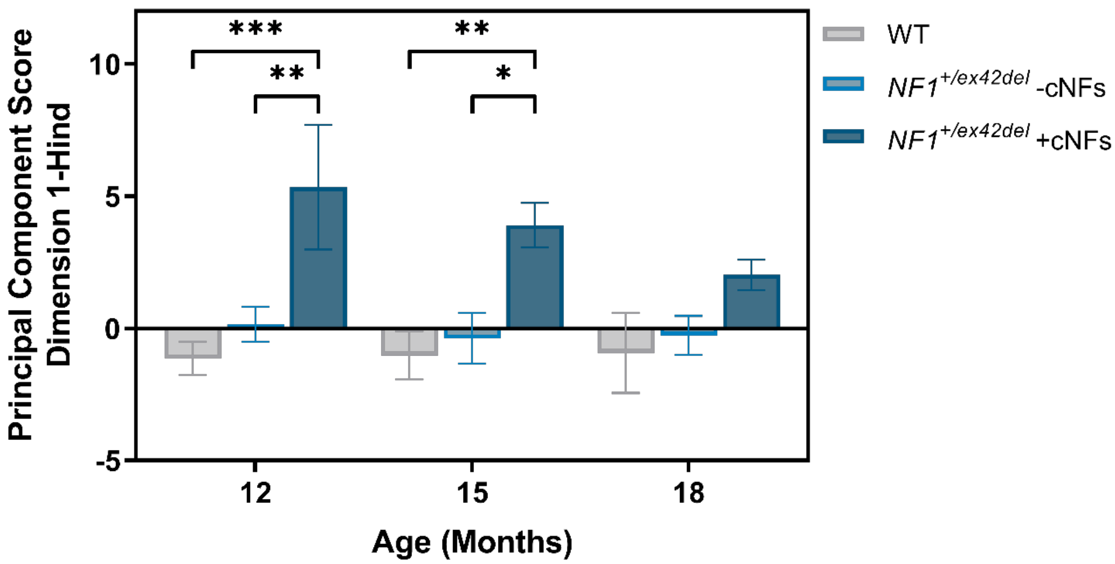

Figure S5. Male *NF1*$^{+/ex42del}$ miniswine with cNFs have a significantly different hind gait than wild type. Principal component score of most significant variables indicates that male *NF1*$^{+/ex42del}$ miniswine with cNFs have significant hind gait abnormalities at 12 and 15 months of age. PCA implemented in R utilizing the FactorMineR package. n=3-4 *NF1*$^{+/ex42del}$ +cNFs; n=6-22 *NF1*$^{+/ex42del}$ -cNFs; n=7-17 WT. One-way ANOVA, Tukey post-hoc. *$p<0.05$, **$p<0.01$, ***$p\leq0.001$. Mean ± SEM.