SUPPLEMENTAL FIGURE LEGENDS

Figure S1. Maf is not expressed in oligodendrocytes - related to Figure 1.

Maf LacZ/+ mouse was subjected to whole mount X-gal staining.

Figure S2. Deletion efficiency in ΔMaf mice - related to Figure 2.

(A) Representative immunostaining images of sciatic nerve tissue of control and *ΔMaf* mice at P8. Note the efficient loss of Maf in *ΔMaf* mice. Remaining Maf positive cells in *ΔMaf* mice are mostly F4/80 positive macrophages. (B) Quantification of Maf positive cells among Egr2 positive cells (n=3). (C) Quantification of Maf positive cells among F4/80 positive cells (n=3). Scale bar, 20μm. Error bars indicate S.E.M. Unpaired two-tailed student t-test with 95% confidence interval. ***, $p < 0.001$.

Figure S3. Analysis of Maf mutant mice generated by *Dhh-Cre* or *Egr2-Cre* mediated ablation – related to Figure 2

(A, B) Electron microscope images of the femoralis nerves from control or *ΔMaf* mice at P90. **(C)** Quantification of myelin thickness from (A) and (B) (n=3). **(D, E)** Electron microscope images of sciatic nerves from Control or *Maf* $^{flox/flox}$*; Dhh-Cre* mice at P90. **(F)** Quantification of myelin thickness from (D) and (E) (n=3). **(G)** Number of axons per Remak bundle was quantified from control and *ΔMaf* mice (n=3). All differences are non-significant. **(H)** Sciatic nerves of control and *ΔMaf* mice at P90. **(I)** Western blotting analysis from sciatic nerve tissues. Each lysate was pooled from 3-4 mice of the same genotypes. Scale bars, 1μm. Error bars indicate S.E.M. Unpaired two-

tailed student t-test with 95% confidence interval. *, $p < 0.05$. **, $p < 0.01$. ***, $p < 0.001$. Except for (A-C), *Egr2-Cre* was used to ablate Maf.

Figure S4. Maf and ErbB2 regulates the expression of cholesterol biosynthesis genes in myelinating Schwann cells – related to Figure 3

(A) Gene Ontology analysis (biological processes) of genes in cluster 1 of Figure 3B. **(B)** mRNA level of Schwann cell lineage transcription factors and myelin proteins (n=3). All differences are non-significant. **(C)** Validation of microarray results by RT-qPCR at P30 (n >6). **(D)** mRNA level and new protein levels are positively correlated. Genes that are de-regulated in ΔMaf mice were surveyed in the Mass-Spectrometry dataset. Red, cholesterol biosynthesis proteins. Yellow, lipid metabolism proteins. **(E)** Sciatic tissue lysates of mice of indicated genotypes were analyzed by western blotting. Sciatic nerves from 3-4 mice of the same genotype were pooled. **(F)** Samples from Figure 3H were analyzed for indicated myelin genes (n=4). All differences are non-significant. Error bars indicate S.E.M. Unpaired two-tailed student t-test with 95% confidence interval. *, $p < 0.05$. **, $p < 0.01$.

Figure S5. Maf heterozygote mice do not display significant defect in myelination - related to Figure 5

Quantification of myelin thickness of *Maf flox/+; Egr2-Cre* mice compared to controls (n= 3). Error bars indicate S.E.M. All differences are non-significant.

Figure S6. Nrg1- dependent calcium-calmodulin kinase regulates Maf transcription - related to Figure 6

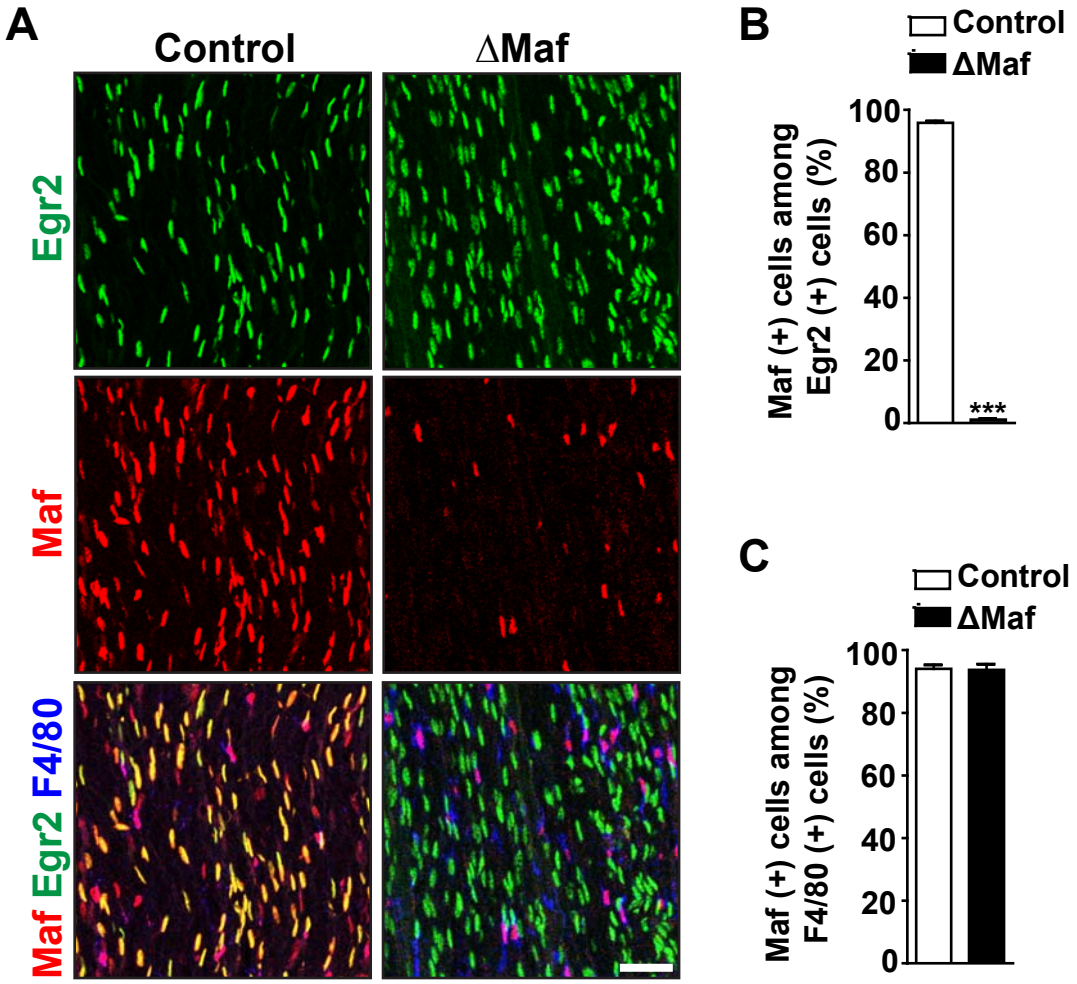
(A) Serum starved S16 cells were stimulated with 2 μM Ionomycin for indicated time points (n=3). **(B)** RT4 cells were incubated with the indicated inhibitors overnight (At least n=3 for all drugs). **(C)** RT4 cells were treated as indicated. **(D)** Nrg1/Serum/Insulin starved primary rat Schwann cells were stimulated with Nrg1 for 4 hours in the presence of indicated inhibitors. **(E)** RT4 and S16 cells were transduced with retrovirus containing Creb or Atf1, and Maf mRNA level was analyzed by RT-qPCR (n=3). **(F)** Samples from Figure 6E were analyzed by RT-qPCR (n=3). **(G)** Western blot analysis of sciatic nerve lysates from indicated ages of mice. 6-8 sciatic nerves were pooled for each age. Phosphorylated CaMKVI was normalized by total CaMKVI using densitometry. Error bars indicate S.E.M. Paired two-tailed student t-test with 95% confidence interval. *, $p < 0.05$. **, $p < 0.01$. ***, $p < 0.001$.

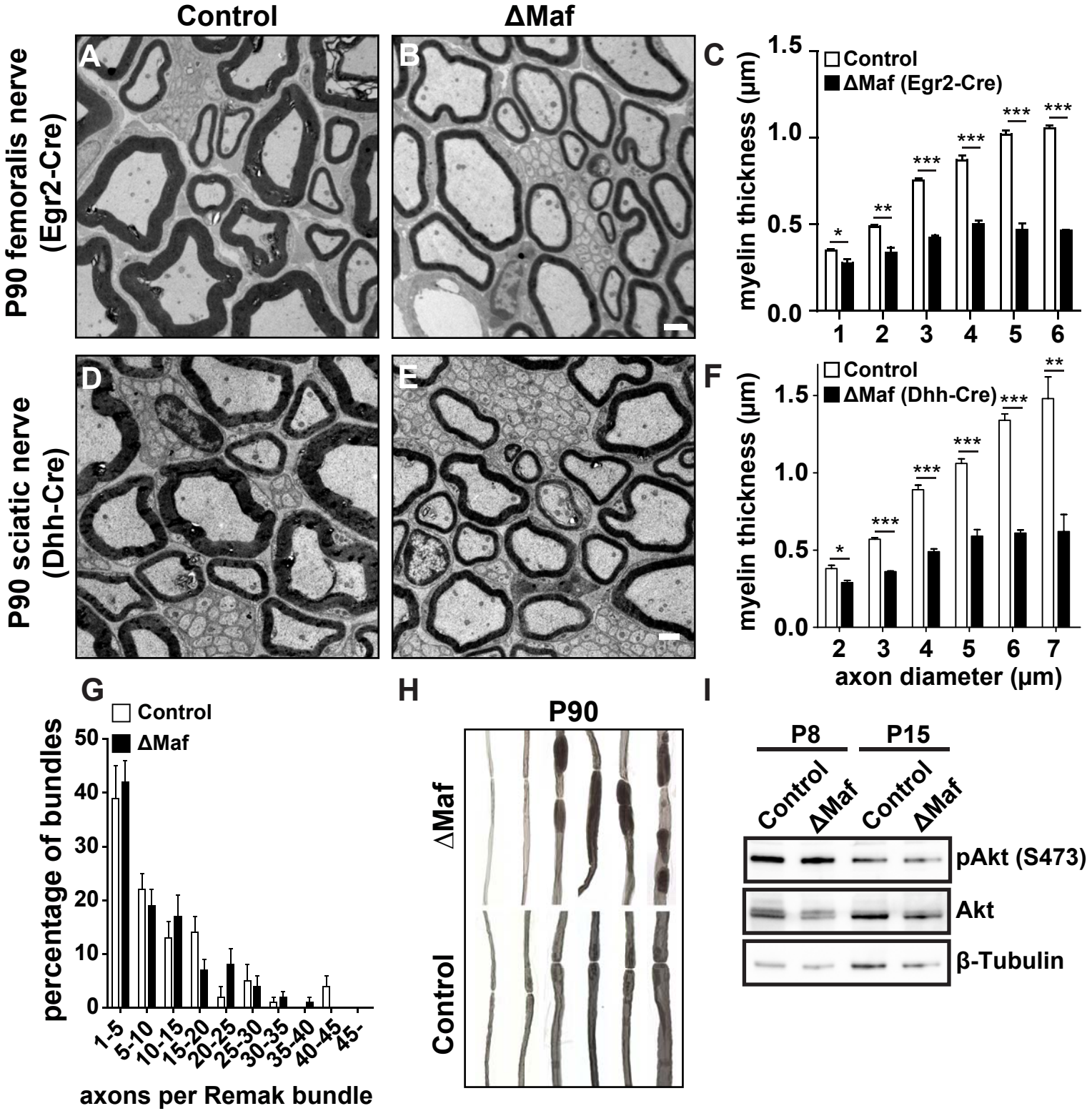
Figure S7. MAPK pathway stabilizes Maf in Schwann cells - related to Figure 7

(A) Nrg1β acutely stabilizes transfected Flag-Maf protein, but not Flag-Tomato. The asterisk indicates a non-specific band. **(B)** MAPK is required for Maf stabilization by Nrg1. Serum starved S16 or Nrg1/Serum/Insulin starved primary rat Schwann cells were pre-treated with indicated inhibitors for 30 minutes, and then stimulated with Nrg1 for 30 minutes. **(C)** Individual Ser/Thr sites were restored from Maf^{4SA} mutant construct. After transfecting wild-type, 4SA or four different reversion mutants to RT4 cells, cells were overnight incubated with ErbB2 inhibitor and analyzed by western blot. S.E, Short exposure. L.E, Long exposure.

X-Gal

Maf LacZ/+ mice

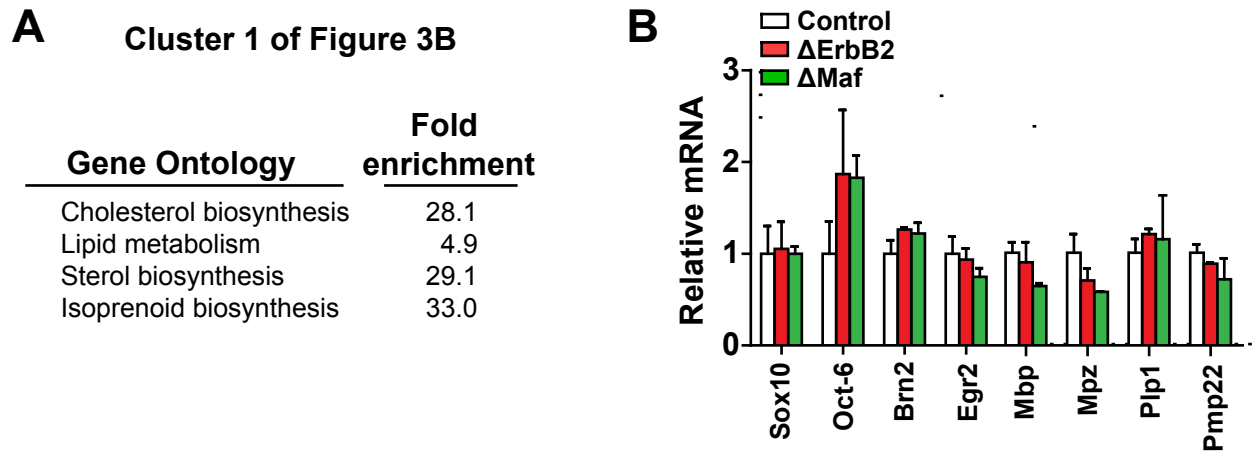

A
Control
ΔMaf
Egr2
Maf
Maf Egr2 F4/80
B
Control
ΔMaf
Maf (+) cells among Egr2 (+) cells (%)
100
80
60
40
20
0
***
C
Control
ΔMaf
Maf (+) cells among F4/80 (+) cells (%)
100
80
60
40
20
0

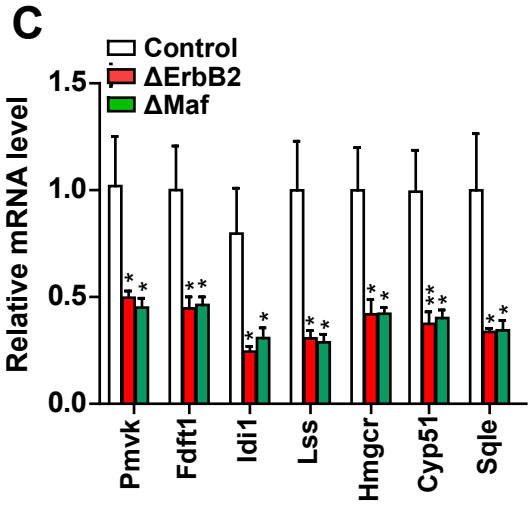

Control
ΔMaf
P90 femoralis nerve (Egr2-Cre)
P90 sciatic nerve (Dhh-Cre)
A
B
C
D
E
F
G
H
I
myelin thickness (μm)
Control
ΔMaf (Egr2-Cre)
ΔMaf (Dhh-Cre)
axon diameter (μm)
percentage of bundles
axons per Remak bundle
1-5
5-10
10-15
15-20
20-25
25-30
30-35
35-40
40-45
45-
P90
ΔMaf
Control
P8
P15
pAkt (S473)
Akt
β-Tubulin

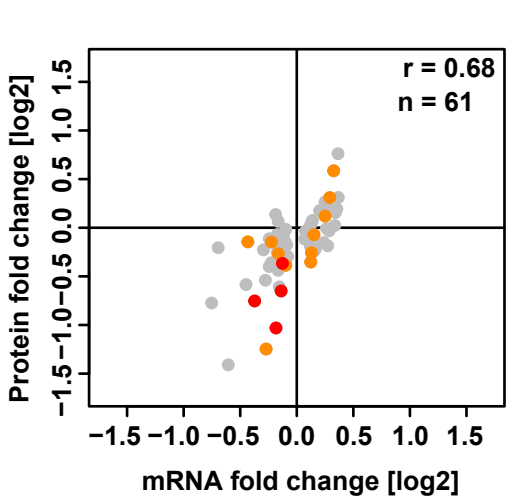
A

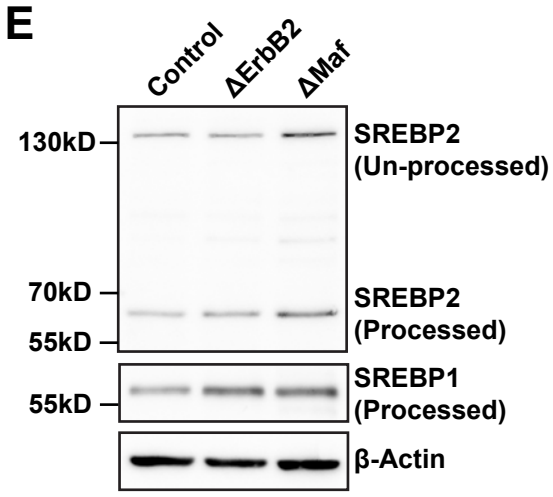
Cluster 1 of Figure 3B

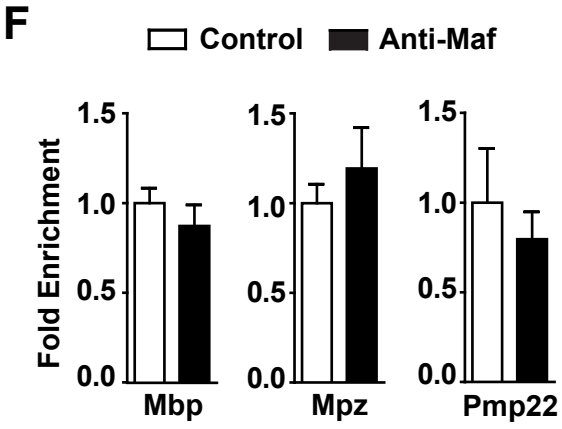
Gene Ontology	Fold enrichment
Cholesterol biosynthesis	28.1
Lipid metabolism	4.9
Sterol biosynthesis	29.1
Isoprenoid biosynthesis	33.0

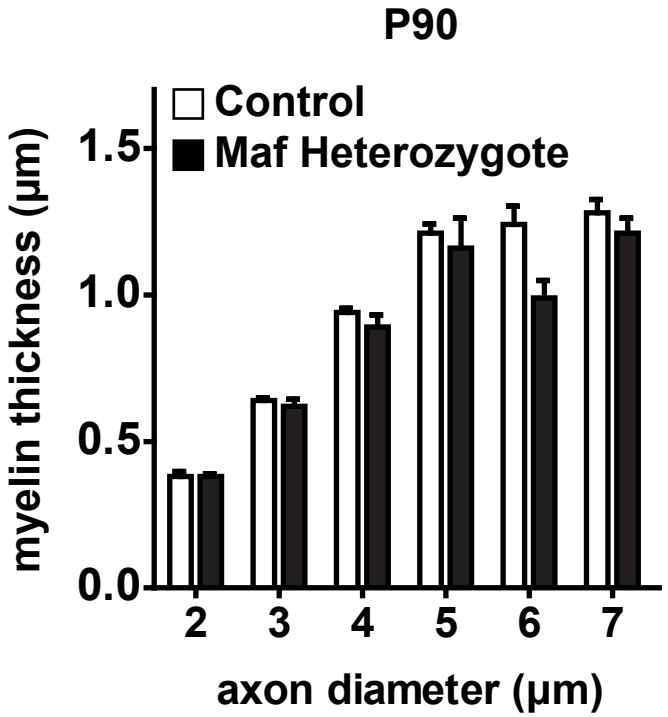


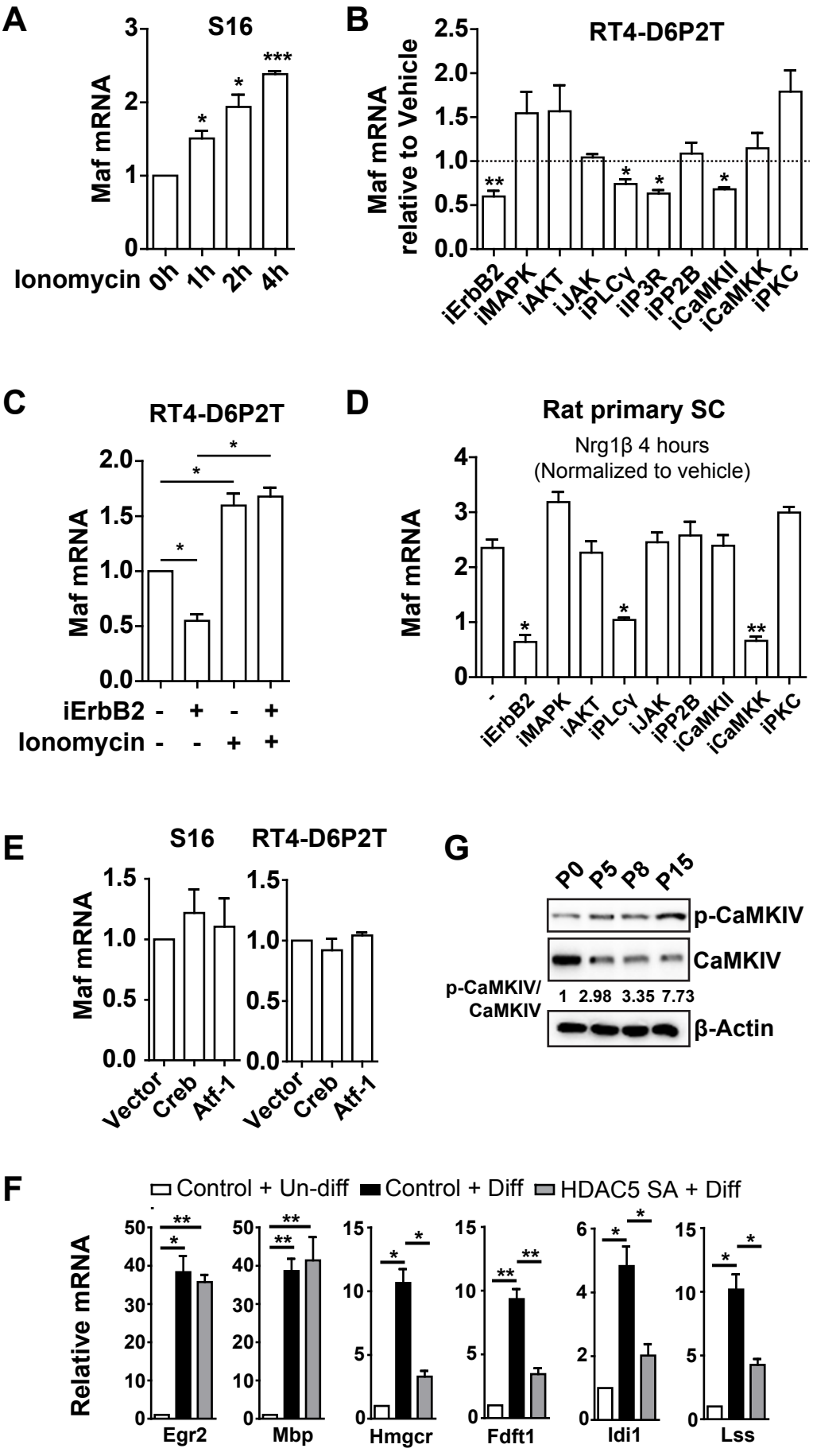


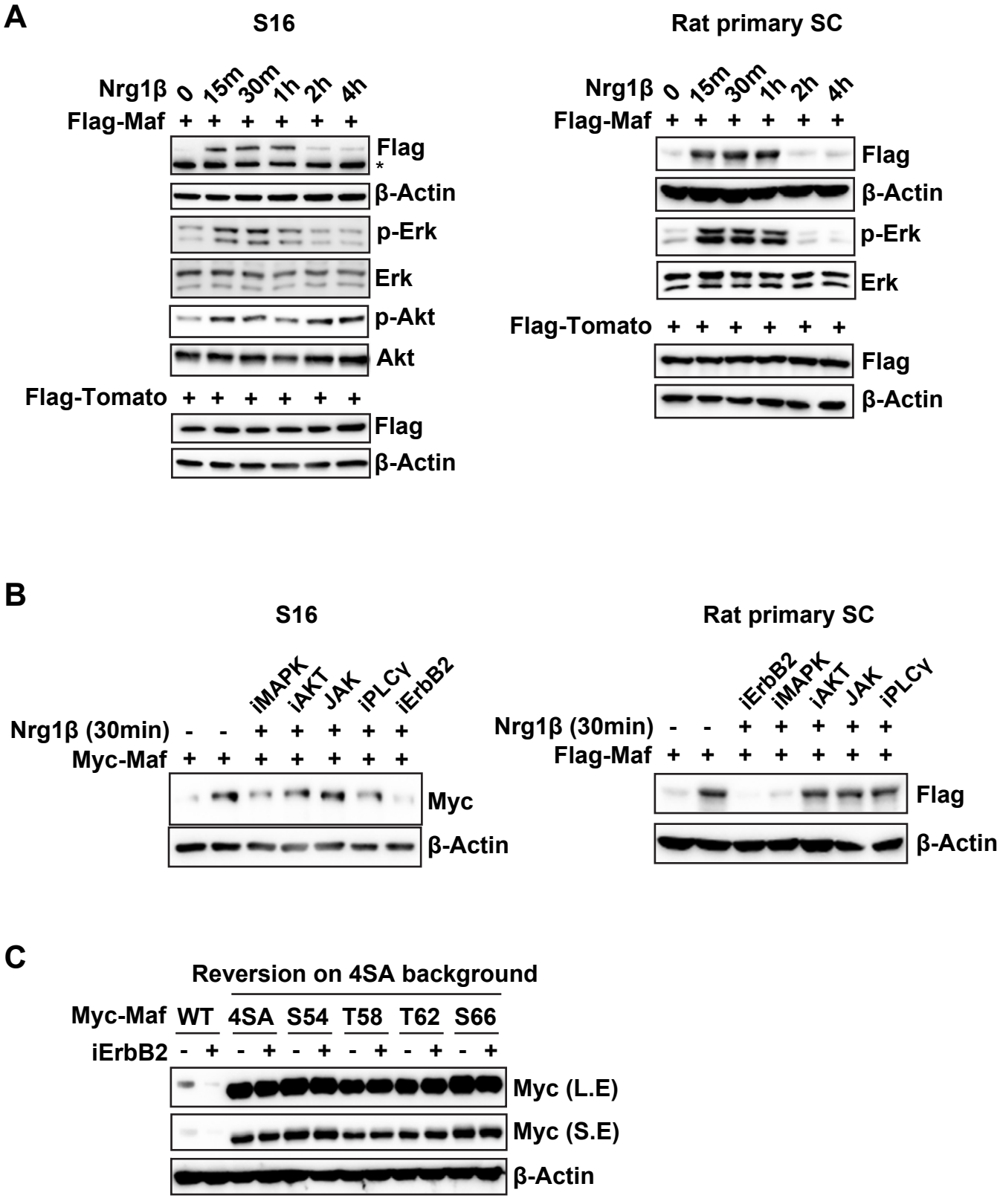







P90
Control
Maf Heterozygote
myelin thickness (μm)
1.5
1.0
0.5
0.0
2
3
4
5
6
7
axon diameter (μm)


A
S16
Maf mRNA
Ionomycin 0h 1h 2h 4h
B
RT4-D6P2T
Maf mRNA relative to Vehicle
iErbB2 iMAPK iAKT iJAK iPLCγ iIP3R iPP2B iCaMKII iCaMKK iPKC
C
RT4-D6P2T
Maf mRNA
iErbB2 - + - +
Ionomycin - - + +
D
Rat primary SC
Nrg1β 4 hours
(Normalized to vehicle)
Maf mRNA
- iErbB2 iMAPK iAKT iPLCγ iJAK iPP2B iCaMKII iCaMKK iPKC
E
S16
RT4-D6P2T
Maf mRNA
Vector Creb Atf-1 Vector Creb Atf-1
G
P0 P5 P8 P15
p-CaMKIV
CaMKIV
p-CaMKIV/ CaMKIV
1 2.98 3.35 7.73
β-Actin
F
Control + Un-diff
Control + Diff
HDAC5 SA + Diff
Relative mRNA
Egr2 Mbp Hmgcr Fdft1 Idi1 Lss


A
S16
Nrg1β 0 15m 30m 1h 2h 4h
Flag-Maf + + + + + +
Flag
*
β-Actin
p-Erk
Erk
p-Akt
Akt
Flag-Tomato + + + + + +
Flag
β-Actin
Rat primary SC
Nrg1β 0 15m 30m 1h 2h 4h
Flag-Maf + + + + + +
Flag
β-Actin
p-Erk
Erk
Flag-Tomato + + + + + +
Flag
β-Actin
B
S16
iMAPK iAKT JAK iPLCγ iErbB2
Nrg1β (30min) - - + + + + +
Myc-Maf + + + + + + +
Myc
β-Actin
Rat primary SC
iErbB2 iMAPK iAKT JAK iPLCγ
Nrg1β (30min) - - + + + + +
Flag-Maf + + + + + + +
Flag
β-Actin
C
Reversion on 4SA background
Myc-Maf WT 4SA S54 T58 T62 S66
iErbB2 - + - + - + - + - + - +
Myc (L.E)
Myc (S.E)
β-Actin