

Table 1: Details of statistical analyses for the main figures.								
Figure	Data type	Sample size (<i>n</i> , <i>N</i>) n = individual experiments, N = sample size	Statistical test	Statistics (df)	<i>P</i> value	Level	Effect size	CI 95%
1B	Median, IQR	n = 3 individual cultures						
		BL/6 vs RIN1-KO: <i>N</i> = 13, 13 neurons	Kruskal-Wallis test followed by Dunn's post-hoc test	H(2) = 35	0.001	Neuron	rank-biserial <i>r</i> = -0.834	-1 to -0.538
						Animal	rank-biserial <i>r</i> = -1	-1 to -1
		WT vs RIN1-KO: <i>N</i> = 9, 13 neurons			0.0003	Neuron	rank-biserial <i>r</i> = -0.897	-1 to -0.641
						Animal	rank-biserial <i>r</i> = -1	-1 to -1
1D	Mean ± SEM	n = 3 individual cultures						
		Mushroom						
		BL/6 vs RIN1-KO: <i>N</i> = 11, 12 neurons	Two-way ANOVA followed by Šidák post-hoc test	F(2,78)= 79,26	< 0.0001	Neuron		
			Welch's test		0.036	Animal	Δ frac = -0.143	-0.27 to -0.016
		WT vs RIN1-KO: <i>N</i> = 6, 12 neurons	Two-way ANOVA followed by Šidák post-hoc test	F(2,78)= 79,26	< 0.0001	Neuron		
			Welch's test		0.016	Animal	Δ frac = -0.225	-0.361 to -0.088
		Thin						
		BL/6 vs RIN1-KO: <i>N</i> = 11, 12 neurons	Two-way ANOVA followed by Šidák post-hoc test	F(2,78)= 79,26	< 0.0001	Neuron		
			Welch's test		0.003	Animal	Δ frac = 0.15	0.088 to 0.213
		WT vs RIN1-KO: <i>N</i> = 6, 12 neurons	Two-way ANOVA followed by Šidák post-hoc test	F(2,78)= 79,26	< 0.0001	Neuron		
			Welch's test		0.001	Animal	Δ frac = 0.176	0.12 to 0.232
		Stubby						
		BL/6 vs RIN1-KO: <i>N</i> = 11, 12 neurons	Two-way ANOVA followed by Šidák post-hoc test	F(2,78)= 79,26	0.989	Neuron		
			Welch's test		0.971	Animal	Δ frac = -0.001	-0.06 to 0.058
		WT vs RIN1-KO: <i>N</i> = 6, 12 neurons	Two-way ANOVA followed by Šidák post-hoc test	F(2,78)= 79,26	0.416	Neuron		
			Welch's test		0.049	Animal	Δ frac = 0.057	0 to 0.115
1E	Median, IQR	n = 3 individual cultures						
		BL/6 vs RIN1-KO: <i>N</i> = 221, 463 spines	Kruskal-Wallis test followed by Dunn's post-hoc test	H(2)=37.86	<0.0001	Spine	rank-biserial <i>r</i> = -0.271	-0.343 to -0.2
			Welch's test		0.102	Animal	animal mean Δ = -0.101 μm	-0.248 to 0.046
		WT vs RIN1-KO: <i>N</i> = 211, 463 spines	Kruskal-Wallis test followed by Dunn's post-hoc test	H(2)=37.86	0.002	Spine	rank-biserial <i>r</i> = -0.185	-0.271 to -0.094
			Welch's test		0.237	Animal	animal mean Δ = -0.075 μm	-0.224 to 0.075
2B	Mean ± SEM	BL/6 vs RIN1-KO: n = 4, 3 mice <i>N</i> = 19, 18 neurons	Mann-Whitney U	U=31	0.776	Neuron	rank-biserial <i>r</i> = 0.776	-1.33 to 0.813
2C	Mean ± SEM	BL/6 vs RIN1-KO: n = 4, 3 mice, <i>N</i> = 19, 18 neurons	Unpaired t-test	t(35)=0.478	0.636	Neuron	η² = 0.006	-2.482 to 4.009
2E	Mean ± SEM	BL/6 vs RIN1-KO: n = 6, 4 mice, <i>N</i> = 18, 19 neurons	Unpaired t-test	t(35)=0.234	0.816	Neuron	η² = 0.002	-0.327 to 0.413

Figure	Data type	Sample size (<i>n, N</i>) n = individual experiments, N = sample size	Statistical test	Statistics (df)	<i>P</i> value	Level	Effect size	CI 95%
2F, G	Linear regression fit	n = 3 individual cultures						
		BL/6: <i>N</i> = 208 spines, <i>r_s</i> = 0.563, slope = 0.471, intercept = 0.017 <i>y</i> = 0.4711 <i>x</i> + 0.01725	Spearman's rank correlation			Spine	Spearman <i>r</i> =0.543	0.426 to 0.641
							LME slope = 0.453	0.147 to 0.257
		RIN1-KO: <i>N</i> = 372 spines, <i>r_s</i> = 0.291, slope = 0.193, intercept = 0.069 <i>y</i> = 0.1942 <i>x</i> + 0.06848				Spine	Spearman <i>r</i> =0.286	0.188 to 0.379
							LME slope = 0.208	0.154 to 0.264
		Slope	ANCOVA followed by Holm-Bonferroni's post-hoc test					
		BL/6 vs RIN1-KO:		t(426)=6.12	< 0.0001	Spine		
		Intercept						
		BL/6 vs RIN1-KO:		t(417)=-2.61	0.009	Spine		
3C	Mean	WT vs GFP: n= 4, 3	One-way ANOVA followed by Dunnett's post hoc test	F(6, 20)=6,828	<0.0001	Replicate	Hedges g=2.218	0.323 to 4.113
		WT vs S351A: n = 4,			0.052	Replicate	Hedges g=1.212	-0.296 to 2.719
		WT vs S292A: n = 4			0.102	Replicate	Hedges g=1.033	-0.443 to 2.508
		WT vs QM: n = 4,			0.001	Replicate	Hedges g=1.9	0.23 to 3.57
		WT vs E574A: n = 4			0.078	Replicate	Hedges g=0.996	-0.473 to 2.466
3E	Mean	WT vs GFP: n= 5	One-way ANOVA followed by Dunnett's post hoc test	F(6,28)=12,05	< 0.0001	Replicate	Hedges g=2.895	1.121 to 4.668
		WT vs S351A: n = 5			0.0004	Replicate	Hedges g=2.006	0.486 to 3.525
		WT vs S292A: n = 5			0.885	Replicate	Hedges g=0.37	-0.88 to 1.62
		WT vs QM: n = 5,			< 0.0001	Replicate	Hedges g=2.594	0.912 to 4.276
		WT vs E574A: n = 5			0.0002	Replicate	Hedges g=2.008	0.488 to 3.528
4B	Median, IQR	n = 3 individual cultures	Kruskal–Wallis test followed by Dunn's post hoc test	H(5)=30.94				
		GFP vs WT: <i>N</i> = 13, 9 neurons			0.002	Neuron	rank-biserial <i>r</i> =0.897	0.641 to 1
						Animal	rank-biserial <i>r</i> =1	1 to 1
		GFP vs S292A: <i>N</i> = 13, 11 neurons			<0.0001	Neuron	rank-biserial <i>r</i> =0.902	0.664 to 1
						Animal	rank-biserial <i>r</i> =1	1 to 1
		GFP vs S351A: <i>N</i> = 13,10 neurons			0.259	Neuron	rank-biserial <i>r</i> =0.723	0.354 to 0.969
						Animal	rank-biserial <i>r</i> =0.778	0.111 to 1
4D	Mean	GFP vs QM: <i>N</i> = 13, 11 neurons			> 0.999	Neuron	rank-biserial <i>r</i> =0.077	-0.413 to 0.566
						Animal	rank-biserial <i>r</i> =0.333	-0.778 to 1
		GFP vs E574A: <i>N</i> = 13, 11 neurons			> 0.999	Neuron	rank-biserial <i>r</i> =0.077	-0.427 to 0.594
						Animal	rank-biserial <i>r</i> =0.111	-1 to 1
		n = 3						
		Mushroom						
		GFP vs WT: <i>N</i> = 12, 9 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	< 0.0001	Neuron		
			Welch's test		0.016	Animal	Δ frac = −0.225	−0.361 to −0.088
		GFP vs S292A: <i>N</i> = 12, 9 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	< 0.0001	Neuron		
			Welch's test		0.014	Animal	Δ frac = −0.199	−0.33 to −0.069
		GFP vs S351A: <i>N</i> = 12, 11 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.866	Neuron		
			Welch's test		0.693	Animal	Δ frac = −0.017	−0.149 to 0.116
		GFP vs QM: <i>N</i> = 12, 11 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.999	Neuron		
			Welch's test		0.765	Animal	Δ frac = 0.016	−0.123 to 0.154
		GFP vs E574A: <i>N</i> = 12, 12 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.015	Neuron		
			Welch's test		0.116	Animal	Δ frac = −0.088	−0.219 to 0.042

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4D	Mean	Thin						
		GFP vs WT: N = 12, 9 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	< 0.0001	Neuron		
			Welch's test		0.001	Animal	$\Delta \text{ frac} = 0.176$	0.12 to 0.232
		GFP vs S292A: N = 12, 9 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	< 0.0001	Neuron		
			Welch's test		0.029	Animal	$\Delta \text{ frac} = 0.166$	0.034 to 0.299
		GFP vs S351A: N = 12, 11 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.216	Neuron		
			Welch's test		0.037	Animal	$\Delta \text{ frac} = 0.063$	0.006 to 0.12
		GFP vs QM: N = 12, 11 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.951	Neuron		
			Welch's test		0.633	Animal	$\Delta \text{ frac} = -0.024$	-0.184 to 0.135
		GFP vs E574A: N = 12, 12 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.344	Neuron		
			Welch's test		0.074	Animal	$\Delta \text{ frac} = 0.048$	-0.008 to 0.104
		Stubby						
		GFP vs WT: N = 12, 9 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.390	Neuron		
			Welch's test		0.049	Animal	$\Delta \text{ frac} = 0.057$	0 to 0.115
		GFP vs S292A: N = 12, 9 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.746	Neuron		
			Welch's test		0.192	Animal	$\Delta \text{ frac} = 0.045$	-0.037 to 0.128
		GFP vs S351A: N = 12, 11 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.761	Neuron		
			Welch's test		0.322	Animal	$\Delta \text{ frac} = -0.036$	-0.13 to 0.058
		GFP vs QM: N = 12, 11 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.989	Neuron		
			Welch's test		0.464	Animal	$\Delta \text{ frac} = 0.017$	-0.042 to 0.076
		GFP vs E574A: N = 12, 12 neurons	Two-way ANOVA followed by Dunnett's post hoc test	F(2,174)=264,1	0.559	Neuron		
			Welch's test		0.125	Animal	$\Delta \text{ frac} = 0.045$	-0.02 to 0.11
4E	Median, IQR	n = 3						
		GFP vs WT: N = 463, 211 spines	Kruskal–Wallis test followed by Dunn's post hoc test	H(5)=92.51	0.003	Spine	rank-biserial r = -0.185	-0.271 to -0.094
			Welch's test		0.237	Animal	animal mean $\Delta = -0.0748 \mu\text{m}$	-0.2242 to 0.0747
		GFP vs S292A: N = 463, 191 spines	Kruskal–Wallis test followed by Dunn's post hoc test	H(5)=92.51	< 0.0001	Spine	rank-biserial r = -0.357	-0.434 to -0.275
			Welch's test		0.048	Animal	animal mean $\Delta = -0.1311 \mu\text{m}$	-0.2601 to -0.0021
		GFP vs S351A: N = 463, 504 spines	Kruskal–Wallis test followed by Dunn's post hoc test	H(5)=92.51	> 0.999	Spine	rank-biserial r = 0.03	-0.037 to 0.097
			Welch's test		0.994	Animal	animal mean $\Delta = 0.0003 \mu\text{m}$	-0.1388 to 0.1395
		GFP vs QM: N = 463, 535 spines	Kruskal–Wallis test followed by Dunn's post hoc test	H(5)=92.51	> 0.999	Spine	rank-biserial r = 0.043	-0.024 to 0.108
			Welch's test		0.724	Animal	animal mean $\Delta = 0.0161 \mu\text{m}$	-0.1137 to 0.1459
		GFP vs E574A: N = 463, 484 spines	Kruskal–Wallis test followed by Dunn's post hoc test	H(5)=92.51	> 0.999	Spine	rank-biserial r = 0.037	-0.03 to 0.107

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4E	Median, IQR	GFP vs E574A: N = 463, 484 spines	Welch's test		0.651	Animal	animal mean Δ = 0.0207 μm	-0.1094 to 0.1508
4F, G	Linear regression fit	n = 3	Spearman's rank correlation					
		WT: N = 199 spines, y = 0.3861x + 0.00943, slope = 0.386, intercept = -0.009					Spearman r = 0.603	0.502 to 0.690
		E574A: N = 197 spines, y = 0.4053x + 0.00394, slope = 0.405, intercept = -0.004					LME slope = 384	0.328 to 0.440
							Spearman r = 0.559	0.448 to 0.655
							LME slope = 0.380	0.302 to 0.457
		Slope	ANCOVA followed by Holm-Bonferroni's post-hoc test					
		WT vs RIN1-KO		t(481)=4.94	< 0.0001			
		E574A vs RIN1-KO		t(412)=4.94	< 0.0001			
		WT vs BL/6			0.072			
		E574A vs BL/6			0.192			
		Intercept						
		WT vs RIN1-KO		t(417)=-4.58	< 0.0001			
		E574A vs RIN1-KO		t(382)=-3.75	0.0004			
		WT vs BL/6			0.201			
		E574A vs BL/6			0.353			
5B	Median, IQR	n = 3 individual cultures						
		BL/6: Control vs 15 min, N = 32, 34 dendrites	Kruskal-Wallis test followed by Dunn's post hoc-test	H(2)=29.44	< 0.0001	Dendrite	rank-biserial r = 0.739	0.553 to 0.89
		BL/6: Control vs 1h, N = 32, 26 dendrites				Animal	rank-biserial r = 1	1 to 1
		BL/6: 15 min vs 1h, N = 34, 26 dendrites			0.011	Dendrite	rank-biserial r = 0.49	0.209 to 0.733
						Animal	rank-biserial r = 0.556	-0.333 to 1
5C	Frequency distribution	n = 3 independent cultures						
		BL/6: Control vs 15 min, N = 32, 34 dendrites	Kolmogorov-Smirnov test	D=0.607	< 0.0001	Dendrite		
		BL/6: Control vs 1h, N = 32, 26 dendrites		D=0.430	0.009	Dendrite		
		BL/6: 15 min vs 1h, N = 34, 26 dendrites		D=0.352	0.050	Dendrite		
5E	Median, IQR	n = 3 independent cultures						
		RIN1-KO: Control vs 15 min, N = 43, 27 dendrites	One-way ANOVA followed by Tukey's post-hoc test	F(2, 87)=10,67	< 0.0001	Dendrite	Hedges g = 1.176	0.657 to 1.696
			Welch test			Animal	Hedges g = 1.23	Δ 0.55 [-0.413 to 1.512]
		RIN1-KO: Control vs 1h, N = 43, 20 dendrites	One-way ANOVA followed by Tukey's post-hoc test	F(2, 87)=10,67	0.479	Dendrite	Hedges g = 0.295	-0.238 to 0.828
			Welch test			Animal	Hedges g = 0.748	Δ 0.216 [-0.313, 0.745]
		RIN1-KO: 15 min vs 1h, N = 27, 20 dendrites	One-way ANOVA followed by Tukey's post-hoc test	F(2, 87)=10,67	0.019	Dendrite	Hedges g = -0.798	- 1.398 to -0.197
5F	Frequency distribution	n = 3 independent cultures						
		RIN1-KO: Control vs 15 min, N = 43, 27 dendrites	Kolmogorov-Smirnov test	D=0.518	0.0003	Dendrite		
		RIN1-KO: Control vs 1h, N = 43, 20 dendrites		D=0.291	0.199	Dendrite		
		RIN1-KO: 15 min vs 1h, N = 27, 20 dendrites		D=0.357	0.112	Dendrite		

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5H	Median, IQR	WT: Control vs 15 min, N = 38, 29 dendrites	Kruskal–Wallis test followed by Dunn's post-hoc test	H(2)=7.861	0.016	Dendrite	rank-biserial r = 0.388	0.111 to 0.646
						Animal	rank-biserial r = 0.333	-1 to 1
		WT: Control vs 1 h, N = 38, 26 dendrites			0.449	Dendrite	rank-biserial r = 0.225	-0.075 to 0.506
						Animal	rank-biserial r = 0.778	0.111 to 1
		WT: 15 min vs 1h, N = 29, 26 dendrites			0.705	Dendrite	rank-biserial r = -0.202	-0.501 to 0.109
						Animal	rank-biserial r = 0.111	-1 to 1
5I	Frequency distribution	n = 3 individual cultures	Kolmogorov-Smirnov test					
		WT: Control vs 15 min, N = 38, 29 dendrites		D=0.414	0.007	Dendrite		
		WT: Control vs 1h, N = 38, 26 dendrites		D=0.285	0.161	Dendrite		
		WT: 15 min vs 1h, N = 29, 26 dendrites		D=0.375	0.042	Dendrite		
5K	Median, IQR	n = 3 individual cultures	Brown–Forsythe and Welch ANOVA followed by Dunnett's T3 post-hoc test	W(2,000, 49,99) = 21,63				
		E574A: Control vs 15 min, N = 36, 27 dendrites			0.0002	Dendrite	rank-biserial r = 0.549	0.284 to 0.782
					0.0002	Animal	rank-biserial r = 0.556	-0.333 to 1
		E574A: Control vs 1 h, N = 36, 30 dendrites			< 0.0001	Dendrite	rank-biserial r = 0.7	0.491 to 0.88
					< 0.0001	Animal	rank-biserial r = 0.778	0.111 to 1
		E574A: 15 min vs 1h, N = 27, 30 dendrites			0.991	Dendrite	rank-biserial r = 0.022	-0.294 to 0.326
					0.991	Animal	rank-biserial r = 0.111	-1 to 1
5L	Frequency distribution	n = 3 individual cultures	Kolmogorov-Smirnov test					
		E574A: Control vs 15 min, N = 36, 27 dendrites		D=0.518	0.0005			
		E574A: Control vs 1h, N = 36, 30 dendrites		D=606	< 0.0001			
		E574A: 15 min vs 1h, N = 27, 30 dendrites		D=0.151	0.898			
6B	Mean ± SEM	BL/6 vs RIN1-KO: n = 6, 6 mice, N = 11, 11 neurons	Unpaired t-test	t(20)=2.137	0.045	Neuron	Hedges g = 0.877	0.002 to 1.752
6D	Mean ± SEM	RIN1-KO vs WT: n = 7 mice, N = 10 pairs	Wilcoxon paired	W=-45	0.020	Neuron	rank-biserial r=-0.818	-0.429 to -0.003
6F	Mean ± SEM	RIN1-KO vs QM: n = 6 mice, N = 8 pairs	Wilcoxon paired	W=-12	0.461	Neuron	rank-biserial r=-0.333	-0.381 to 0.288
6H	Mean ± SEM	RIN1-KO vs S351A: n = 7 mice, N = 9 pairs	Paired t test	t(8)=0.467	0.651	Neuron	Cohen dz = 0.157	-0.113 to 0.171
6J	Mean ± SEM	RIN1-KO vs E574A: n = 9 mice, N = 10 pairs	Paired t test	t(9)=0.083	0.936	Neuron	Cohen dz = -0.026	-0.2 to 0.186
6K	Mean ± SEM	RIN1-KO vs WT: n = 7 mice, N = 12 pairs	Paired t test	t(11)=0.578	0.575	Neuron	Cohen dz = 0.167	-31.86 to 54.53
		RIN1-KO vs QM: n = 7 mice, N = 10 pairs		t(9)=0.012	0.990	Neuron	Cohen dz = -0.004	-34.97 to 34.59
		RIN1-KO vs S351A: n = 8 mice, N = 11 pairs		t(12)=1.044	0.321	Neuron	Cohen dz = -0.315	-43.11 to 15.60
		RIN1-KO vs E574A: n = 7 mice, N = 13 pairs		t(12)=0.763	0.461	Neuron	Cohen dz = -0.211	-35.86 to 17.27