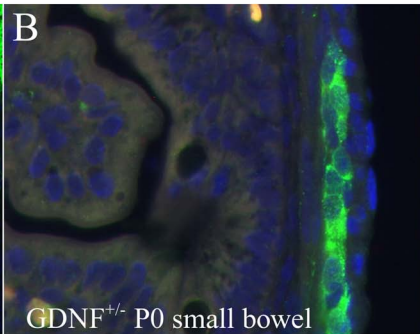
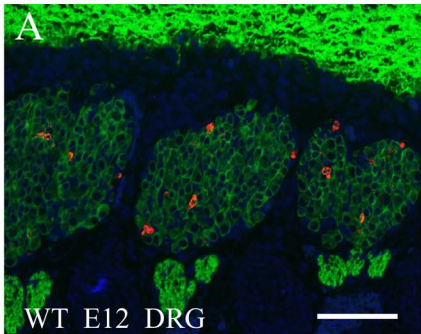


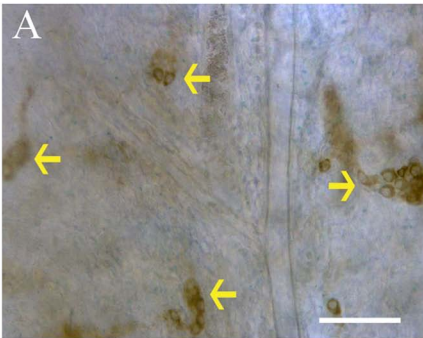
# Supplemental figure 1



# Supplemental figure 2

Bright field

Phase contrast



**Supplemental Table 1**  
**GFAP-Gdnf transgenic mice versus WT controls**

<b><u>Cell Density (cells/mm<sup>2</sup>)</u></b>	<b><u>WT</u></b>	<b><u>GFAP-Gdnf</u></b>	<b><u>Fold Change</u></b>	<b><u>P value</u></b>
Esophagus myenteric NADPH-d	6.8 ± 1.0	17.9 ± 2.4	2.63	<0.001
Small bowel myenteric Cuprolinic	104.8 ± 6.1	110.7 ± 8.7	-	0.56
Small bowel myenteric NADPH-d	39.7 ± 3.4	51.7 ± 3.3	1.3	0.017
Small bowel myenteric TH	0.12 ± 0.05	0.20 ± 0.07	-	0.336
Small bowel myenteric ChAT	59.2 ± 4.4	46.0 ± 6.4	-	0.148
Small bowel submucosal acetylcholinesterase	115.2 ± 4.7	137.3 ± 5.8	1.19	0.004
Colon myenteric Cuprolinic	185.2 ± 8.0	236.6 ± 9.4	1.28	< 0.001
Colon myenteric NADPH-d	87.4 ± 7.1	128.4 ± 6.8	1.47	<0.001
Colon myenteric ChAT	94.4 ± 17.6	104.4 ± 9.6	-	0.63
Colon submucosal acetylcholinesterase	24.3 ± 3.3	41.9 ± 4.7	1.7	0.007
<b><u>Cell Size (micrometers squared)</u></b>				
Esophagus myenteric NADPH-d	214.0 ± 9.8	318.3 ± 9.9	1.49	<0.001
Small bowel myenteric Cuprolinic	206.5 ± 9.3	260.8 ± 9.6	1.26	<0.001
Small bowel myenteric NADPH-d	170.5 ± 4.4	202.7 ± 6.2	1.18	<0.001
Small bowel myenteric TH	1099.7 ± 158.7	1107 ± 132.1	-	0.261
Small bowel submucosal acetylcholinesterase	254.5 ± 6.9	269.7 ± 7.9	-	0.181
Colon myenteric Cuprolinic	213.1 ± 8.7	229.3 ± 7.1	1.07	0.028
Colon myenteric NADPH-d	192.9 ± 5.6	245.4 ± 7.2	1.27	<0.001
Colon submucosal acetylcholinesterase	451.1 ± 17.0	453.9 ± 16.1	-	0.909
<b><u>Fiber density</u></b>				
Esophagus myenteric NADPH-d fiber bundles	0.0 ± 0.0	1.96 ± 0.2	**	<0.001
Esophagus myenteric NADPH-d single fibers	1.94 ± 0.2	4.86 ± 0.6	2.52	<0.001
Esophagus submucosal NADPH-d	35.8 ± 7.0	84.6 ± 14.8	2.36	0.018
Small bowel myenteric NADPH-d fiber bundles	3.2 ± 0.2	4.2 ± 0.2	1.31	<0.001
Small bowel myenteric NADPH-d single fibers	38.6 ± 1.6	41.4 ± 1.4	-	0.162
Small bowel myenteric TH fiber bundles	4.4 ± 0.1	4.4 ± 0.1	-	0.823
Small bowel myenteric TH single fibers	12.2 ± 0.3	11.2 ± 0.4	0.92	0.035
Small bowel myenteric ChAT fiber bundles	4.4 ± 0.4	5.4 ± 0.2	1.23	0.02
Small bowel myenteric ChAT single fibers	10.6 ± 1.0	8.2 ± 1.2	-	0.07
Small bowel myenteric acetylcholinesterase fiber bundles	4.0 ± 0.2	4.5 ± 0.2	1.13	0.04
Small bowel myenteric acetylcholinesterase single fibers	44.6 ± 1.2	46.4 ± 1.4	-	0.292
Colon myenteric NADPH-d fiber bundles	4.0 ± 0.2	5.5 ± 0.2	1.37	<0.001
Colon myenteric NADPH-d single fibers	51.0 ± 2.0	46.6 ± 1.2	-	0.059
Colon myenteric acetylcholinesterase fiber bundles	5.2 ± 0.2	5.7 ± 0.2	-	0.108
Colon myenteric acetylcholinesterase single fibers	45.4 ± 1.4	44.0 ± 1.0	-	0.448

**GDNF injected mice versus PBS injected controls**

<b><u>Cell Density (cells/mm<sup>2</sup>)</u></b>	<b><u>Control</u></b>	<b><u>GDNF</u></b>	<b><u>Fold change</u></b>	<b><u>P value</u></b>
Esophagus myenteric NADPH-d	19.5 ± 1.4	30.1 ± 3.5	1.54	0.031
Small bowel myenteric Cuprolinic	214.8 ± 41	216.7 ± 49	-	0.978
Small bowel myenteric NADPH-d	53.7 ± 1.2	84.5 ± 7.2	1.57	0.006
Small bowel submucosal acetylcholinesterase	209.6 ± 5.7	513.5 ± 20.7	2.44	<0.001
Colon myenteric Cuprolinic	592 ± 83	501 ± 25	-	0.356
Colon myenteric NADPH-d	313.5 ± 24	266.8 ± 12	-	0.133
Colon submucosal acetylcholinesterase	42.3 ± 5.6	131.6 ± 18.2	3.1	0.003
<b><u>Cell Size (micrometers squared)</u></b>				
Esophagus myenteric NADPH-d	181.5 ± 6	311.8 ± 7	1.72	<0.001
Small bowel myenteric Cuprolinic	203.7 ± 6	241.5 ± 7	1.19	<0.001
Small bowel myenteric NADPH-d	183.4 ± 6	229.8 ± 6	1.25	<0.001
Small bowel submucosal acetylcholinesterase	243.5 ± 6	265.7 ± 6	1.09	0.002
Colon myenteric Cuprolinic	214.3 ± 6	245.6 ± 7	1.14	0.002
Colon myenteric NADPH-d	203.1 ± 4	233.7 ± 5	1.15	<0.001
Colon submucosal acetylcholinesterase	396.7 ± 14	420.4 ± 14	-	0.142
<b><u>Fiber density</u></b>				
Esophagus myenteric NADPH-d fiber bundles	0.0 ± 0.0	4.8 ± 0.26	**	<0.001
Esophagus myenteric NADPH-d single fibers	4.0 ± 0.4	8.4 ± 0.6	2.07	<0.001
Small bowel myenteric NADPH-d fiber bundles	3.6 ± 0.1	4.3 ± 0.1	1.19	0.002
Small bowel myenteric NADPH-d single fibers	47.8 ± 1.0	46.6 ± 0.6	-	0.228
Small bowel myenteric TH fiber bundles	4.2 ± 0.1	4.1 ± 0.1	-	0.809
Small bowel myenteric TH single fibers	14.1 ± 0.3	14.5 ± 0.4	-	0.431
Small bowel myenteric acetylcholinesterase fiber bundles	4.7 ± 0.1	5.2 ± 0.2	1.11	0.018
Small bowel myenteric acetylcholinesterase single fibers	43.6 ± 0.8	45.4 ± 1.0	-	0.257
Colon myenteric NADPH-d fiber bundles	6.7 ± 0.1	6.3 ± 0.1	0.94	0.031
Colon myenteric NADPH-d single fibers	41.2 ± 0.6	44.8 ± 0.8	1.09	<0.001
Colon myenteric acetylcholinesterase fiber bundles	5.8 ± 0.2	6.1 ± 0.1	-	0.242
Colon myenteric acetylcholinesterase single fibers	44.8 ± 0.8	45.8 ± 0.8	-	0.317
Colon myenteric TH fiber bundles	6.0 ± 0.2	5.8 ± 0.2	-	0.337
Colon myenteric TH single fibers	12.6 ± 0.2	12.0 ± 0.2	-	0.147

**Myo-Gdnf mice versus WT controls**

<b><u>Cell Density (cells/mm<sup>2</sup>)</u></b>	<b><u>Control</u></b>	<b><u>GDNF</u></b>	<b><u>Fold change</u></b>	<b><u>P value</u></b>
Esophagus myenteric NADPH-d (all neurons)	7.8 ± 1.0	14.5 ± 0.5	1.85	0.004
Small bowel myenteric Cuprolinic	125.3 ± 7.3	155.7 ± 18.2	-	0.197
Small bowel myenteric NADPH-d	32.3 ± 1.5	39.4 ± 1.5	-	0.325
Small bowel submucosal acetylcholinesterase	146.1 ± 7.8	135.3 ± 5.4	-	0.319
Colon myenteric Cuprolinic	289.9 ± 14.0	306.1 ± 43.1	-	1
Colon submucosal acetylcholinesterase	27.9 ± 3.6	34.6 ± 1.8	-	0.166

**Cell Size (micrometers squared)**

Esophagus myenteric NADPH-d	238.9 ± 24	296.1 ± 29	-	0.199
Small bowel myenteric Cuprolinic	182.1 ± 12	163.2 ± 25	-	0.531
Small bowel myenteric NADPH-d	212.0 ± 15	237.2 ± 45	-	0.626
Small bowel submucosal acetylcholinesterase	218.2 ± 9	214.0 ± 13	-	0.801
Colon myenteric Cuprolinic	189.2 ± 24	176.4 ± 31	-	0.762
Colon submucosal acetylcholinesterase	369.4 ± 32	324.9 ± 11	-	0.263

**Fiber density**

Esophagus myenteric NADPH-d single fibers	7.8 ± 2.4	37.4 ± 4.5	4.79	<0.001
Esophagus myenteric NADPH-d submucosal	22.6 ± 1.3	21.6 ± 1.3	-	0.598
Small bowel myenteric NADPH-d fiber bundles	6.9 ± 0.5	7.5 ± 1.0	-	0.573
Small bowel myenteric NADPH-d single fibers	45.4 ± 2.6	48.8 ± 2.6	-	0.385
Small bowel myenteric acetylcholinesterase fiber bundles	9.9 ± 0.8	9.6 ± 1.0	-	0.801
Small bowel myenteric acetylcholinesterase single fibers	45.0 ± 5.0	41.0 ± 4.2	-	0.584
Colon myenteric acetylcholinesterase fiber bundles	12.8 ± 1.4	12.1 ± 1.7	-	0.779
Colon myenteric acetylcholinesterase single fibers	37.6 ± 4.6	43.0 ± 3.2	-	0.387

**Gdnf +/- mice versus WT controls**

<b><u>Cell Density (cells/mm<sup>2</sup>)</u></b>	<b><u>Control</u></b>	<b><u>Gdnf +/-</u></b>	<b><u>Fold change</u></b>	<b><u>P value</u></b>
Esophagus myenteric NADPH-d	14.3 ± 1.0	3.6 ± 1.0	0.25	< 0.001
Small bowel myenteric NADPH-d	37.1 ± 4.9	20.1 ± 2.9	0.54	0.043
Small bowel myenteric ChAT	72.5 ± 4.2	34.5 ± 5.2	0.48	0.003

**Fiber density**

Esophagus myenteric NADPH-d single fibers	7.1 ± 1.4	2.6 ± 0.6	0.37	0.047
Small bowel myenteric NADPH-d single fibers	52.0 ± 2.0	42.4 ± 1.2	0.82	0.026