Supp. Tables

Supp. Table 1. Organization of compact myelin in DCC$^{-/-}$ and netrin-1$^{-/-}$ cerebellar slice cultures

	Periaxonal space (μm)	Periodicity (nm/wrap)	n
DCC$^{+/+}$ long-term	12.24±0.26	10.83±0.25	27
DCC$^{-/-}$ long-term	12.22±0.21	12.04±0.35*	32
Netrin-1$^{+/+}$ long-term	11.29±0.21	12.24±0.13	58
Netrin-1$^{-/-}$ long-term	11.43±0.29	11.96±0.15	42

As described in figure 2, the width of the periaxonal space is unaffected in both netrin-1 and DCC mutant slice cultures. Myelin periodicity is unchanged in netrin-1$^{-/-}$ cultures, but a small but significant increase in periodicity is observed in DCC$^{-/-}$ cultures. Asterisk denotes a significant difference between mutant-derived cultures and those derived from wild-type littermates for a given set of measurements. *:$p<0.05$.

Supp. Table 2. Ultrastructural paranodal abnormalities in DCC$^{-/-}$ and netrin-1$^{-/-}$ cerebellar slice cultures – fault percentage and mean number of faults.

	% TB Abnormal	% ID abnormal	% detached loops	% everted loops	mean faults/ paranode	n
DCC+/+ short-term	10.0	6.9	2.3	2.3	0.22±0.04	130
DCC-/- short-term	4.7	5.4	2.3	3.9	0.39±0.03	129
Netrin-1+/+ short-term	8.8	3.9	7.8	3.9	0.24±0.05	102
Netrin-1-/- short-term	8.5	13.7	7.7	3.4	0.33±0.07	117
DCC+/+ long-term	1.2	2.5	7.5	7.5	0.18±0.05	81
DCC-/- long-term	30.0	50.0	61.3	36.3	1.78±0.13**	80
Netrin-1+/+ long-term	8.0	5.3	9.4	1.4	0.27±0.05	113
Netrin-1-/- long-term	72.7	79.1	60.4	31.7	2.43±0.09**	139

Paranodal myelin in netrin-1$^{-/-}$ and DCC$^{-/-}$ cerebellar slice cultures is normal in short-term cultures, but becomes disorganized at later time points. Paranodes were scored for each of four faults (abnormal transverse bands, TB, abnormal interloop densities, the presence of detatched loops, and the presence of everted loops) described in figure 5A, and the quantification was presented in figures 5B-E and 8C,D,H,I. n represents one paranode. Asterisks denote a significant difference between mutant-derived cultures and those derived from wild-type littermates for a given set of measurements. **:$p<0.005$.

Supp. Table 3. Ultrastructural paranodal abnormalities in DCC$^{-/-}$ and netrin-1$^{-/-}$ cerebellar slice cultures – binned data.

	% Normal	% Mildly abnormal	% Moderately abnormal	% Severely abnormal
DCC+/+ short-term	80.8	16.9	2.3	0.0
DCC-/- short-term	84.5	14.7	0.8	0.0
Netrin-1+/+ short-term	79.4	16.7	3.9	0.0
Netrin-1-/- short-term	74.3	18.8	6.0	0.9
DCC+/+ long-term	84.0	13.6	2.5	0.0
DCC-/- long-term	12.5	33.8	23.8	30.0
Netrin-1+/+ long-term	76.1	21.2	2.7	0.0
Netrin-1-/- long-term	5.8	12.9	28.1	53.2

Paranodal myelin in netrin-1$^{-/-}$ and DCC$^{-/-}$ cerebellar slice cultures is normal in short-term cultures, but becomes disorganized at later time points. Using the analysis described in figure 5A and presented in figures 5F,G and 8E,J, paranodes were 'binned' according to the number of faults found in each. 'Normal' paranodes were scored to have 0 faults, 'mildly abnormal' paranodes have 1 fault, 'moderately abnormal' paranodes have 2 faults and 'severely abnormal' paranodes have 3 or 4 faults.

Supp. Table 4. Ultrastructural paranodal abnormalities in DCC$^{-/-}$ and netrin-1$^{-/-}$ cerebellar slice cultures – percentage of detached or everted loops.

	% of loops detached	% of loops everted	n
DCC+/+ 67 DIV	1.24±0.05	1.16±0.04	81
DCC-/- 67 DIV	7.81±0.12***	4.19±0.09***	80
Netrin-1+/+ 49 DIV	1.55±0.05	0.37±0.02	113
Netrin-1-/- 49 DIV	11.17±0.10***	4.31±0.06***	139

Paranodal myelin in netrin-1$^{-/-}$ and DCC$^{-/-}$ cerebellar slice cultures is normal in short-term cultures, but becomes disorganized at later time points. Individual paranodes were scored for the percentage of loops that were detached or everted per paranode analyzed. n represents one paranode. Asterisks denote significant difference between mutant-derived cultures and those derived from wild-type littermates for a given set of measurements. ***:$p<0.0005$.

Supp. Table 5. Disrupted domain organization in older netrin-1$^{-/-}$ and DCC$^{-/-}$ cerebellar slice cultures

	Na^+ch-Kv1.2 dist (μm)	n	Na^+ch domain length (μm)	n
DCC+/+ short-term	1.74±0.12	86	0.75±0.03	43
DCC-/- short-term	1.50±0.11	88	0.82±0.05	42
Netrin-1+/+ short-term	2.19±0.14	70	1.17±0.10	35
Netrin-1-/- short-term	2.08±0.18	66	1.11±0.09	29
DCC+/+ long-term	2.24±0.10	56	0.67±0.23	28
DCC-/- long-term	1.33±0.10**	96	0.72±0.06	29
Netrin-1+/+ long-term	2.34±0.18	56	0.98±0.09	28
Netrin-1-/- long-term	1.28±0.13**	58	1.56±0.22*	29

	nfc label length (μm)	n	Caspr label length (μm)	n
DCC+/+ short-term	7.24±0.30	31	2.74±0.11	64
DCC-/- short-term	6.95±0.35	30	2.63±0.10	68
Netrin-1+/+ short-term	7.11±0.27	28	2.21±0.13	60
Netrin-1-/- short-term	7.17±0.26	29	2.11±0.08	84
DCC+/+ long-term	7.75±0.30	28	2.84±0.14	50
DCC-/- long-term	7.34±0.33	28	4.99±0.28*	54
Netrin-1+/+ long-term	8.07±0.39	31	3.76±0.16	60
Netrin-1-/- long-term	8.02±0.29	39	5.47±0.29**	84

As described in figures 6-8 and S1-S4, the domain organization of paranodal myelin is disrupted in long-term, but not short-term, cerebellar slice cultures. For quantification of Na^+ch domain length and nfc label length, n represents measurements from one nodal region. For quantification of Na+ch-Kv1.2 distance and Caspr label length, n represents each of two measurements obtained per nodal region. Asterisks denote a significant difference between mutant-derived cultures and those derived from wild-type littermates for a given set of measurements. *:$p< 0.05$, **:$p<0.005$.