

Cell, Volume 180

Supplemental Information

Saltatory Conduction along Myelinated

Axons Involves a Periaxonal Nanocircuit

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Table S1, related to Figure 1 | Boundaries of the cable parameter solution space

Parameter	Lower Bound	Upper Bound
R_i (Ω cm)	50 ^a	400 ^b
R_m ($k\Omega$ cm ²)	0.1 ^c	200 ^b
C_m (μ F cm ⁻²)	0.5 ^d	2 ^e
R_{my} ($k\Omega$ cm ²)	20 ^f	1600 ^f
C_{my} (μ F cm ⁻²)	0.005	0.2
r_{pa} ($G\Omega$ cm ⁻¹) ^g	5	2.5×10^7
r_{pn} ($T\Omega$ cm ⁻¹) ^g	0.05	2.5×10^6

^a(Fenstermacher et al., 1970). ^b(Major et al., 1994). ^c(Rapp et al., 1994; Tasaki, 1955). ^d(Major et al., 1994). ^e(Rapp et al., 1994). ^f(Bakiri et al., 2011; Chan et al., 2013). ^gThe r_{pa} and r_{pn} parameter apply to double cable models only.

Table S2, related to Figure 1 | Optimal cable parameters for single cable models

Cell (#)	R_i (Ω cm)	R_m ($k\Omega$ cm ²)	C_m (μ F cm ⁻²)	R_{my} ($k\Omega$ cm ²)	C_{my} (μ F cm ⁻²)
1	93.1	22.9	0.953	50.5	0.185
2	134	23.9	1.08	1180	0.154
3	376	23.3	1.77	37.6	0.163
4	243	23.3	1.24	73.0	0.189
5	211	23.5	1.19	991	0.187
6	144	22.0	1.45	842	0.166
Average	200	23.1	1.28	530	0.174
SEM	35.2	0.218	0.101	184	0.00510

Cable parameter solutions for neuronal (R_i , R_m and C_m) and myelin sheath parameters (R_{my} and C_{my}).

Table S3, related to Figure 1 | Optimal cable parameters for somato-somatic, somato-dendritic, and somato-AIS recordings

Cell (#)	V_{inj} location	V_{rec} location	R_i (Ω cm)	R_m ($k\Omega$ cm ²)	C_m (μ F cm ⁻²)
7	Soma	Soma	155	19.1	1.31
8	Soma	Soma	111	21.9	1.37
9	Soma	Soma	83.9	21.5	0.902
10	Dend	Soma	139	31.1	1.18
11	Soma	Dend	150	24.5	1.01
12	AIS	Soma	75.3	29.4	0.838
Average			119	24.6	1.10
SEM			14.0	1.94	0.0893

Table S4, related to Figure 1 | Optimal electrical parameters for double cable models

Cell (#)	R_i (Ω cm)	R_m ($k\Omega$ cm ²)	C_m (μ F cm ⁻²)	r_{pa} ($G\Omega$ cm ⁻¹)	r_{pn} ($T\Omega$ cm ⁻¹)	R_{my} ($k\Omega$ cm ²)	C_{my} (μ F cm ⁻²)
1	230	18.9	1.23	84.4	1.50	467	0.0118
2	98.3	25.2	0.986	135	4.39	101	0.0115
3	261	25.2	1.37	141	3.56	579	0.00769
4	158	25.8	1.06	188	4.07	152	0.0161
5	109	27.7	1.01	105	0.877	75.2	0.0678
6	71.2	24.8	1.23	96.3	0.321	63.7	0.113
Average	155	24.6	1.15	125	2.45	240	0.0379
SEM	31.2	1.22	0.0617	0.155	0.719	91.6	0.0175

Cable parameter solutions for neuronal (R_i , R_m and C_m), submyelin (r_{pa} and r_{pn}) and myelin sheath parameters (R_{my} and C_{my}). The morphologies of cell#1 to #6 are shown in Figure S2.