Table 3.2. PROPERTIES OF EXCITATION IN NERVE CELLS AND FIBERS. Most determinations were made with intracellular electrodes. The values are selected as being probably most representative of tissues in good condition; they are not always means or extremes. Accommodation is used as rise of threshold depolarization (change from resting polarization) under maintained or slowly rising predepolarization, therefore only indirectly related to λ. Pacemaker sensitivity is expressed as (i) impulses per second at twice rheobasic maintained current, (ii) impulses per second per 10^{-9} A measured during the low current part of the frequency/current curve. Other quantities are conventionally defined.

A	B	C	D	E	F	G	H	I	J	K	L
Preparation	Rheobase		Chronaxie[a] (msec)	Absolute Refractory Period[a] (msec)	Accommodation	Capacity (μf/cm^2)	Resistance of Resting Membrane (ohm-cm^2)	Time Constant of Membrane (msec)	Pacemaker Sensitivity	Velocity[b] (m/sec)	Diameter (μ)
	A x 10^{-9}	mv									
NERVE CELL BODIES											
1 *Aplysia*, giant cell, visceral ganglion	10–20 (50–200/cm^2)	2–30	20–100	5–10	none for 200 msec	11	4000	10–80	(i) 7.5–45 (ii) 0.7–4.5	–	178
2 *Panulirus*, large cell in cardiac ganglion[c]	4–100	2.5–11				(0.003–0.03 per cell)	(0.14–1.4 x $10^6\Omega$ per cell)	3–16	(i) 15 (ii) 3	–	50
3 *Limulus*, eccentric cell in retina	0.5	4–9	< 6		slight in 1 sec		(6 x $10^6\Omega$ per cell)		(i) 7.7 (ii) 4–26	–	25
4 *Sphaeroides* (puffer fish) supramedullary ganglion cell	220 (Bennett et al.)	18–25		3	none	5–15 (30, Bennett et al.)	500–1000 (0.6–2.5 x $10^6\Omega$ per cell)	4–6 (10–20, Bennett et al.)		–	250
5 *Bufo*, dorsal root ganglion cell	1.2	17	2			1.1	2200–4000[d]	2–5		–	90
6 *Bufo*, spinal motoneuron soma	1.4	8–11	4.6		none for 10 msec; 25% at 25 msec;	18	270[e] (4.5 x $10^6\Omega$ per cell)	4.3		–	30
Initial segment of axon	1.3	6.5–8.5	2.0		begins at 8 msec, 250% at 25 msec						
7 *Felis*, spinal motoneuron	2–18 (initial axon)	30 (soma) 10	0.76	about 1.5	none for 200 msec, then small from 200–1000 msec	5	600[f] (1.2 x $10^6\Omega$ per cell) 1000–3000[g]	3.1 4[g]	(ii) 2.5	–	70

NERVE FIBERS

8	*Loligo*, giant axon		8–10	1.5		none for about 5 msec, then considerable	1.1	1500	1.6	iteration brief or absent	33 (23° C)	500
9	*Sepia*, giant axon						1.2	9200	14		7 (16° C)	200
10	*Carcinus*, leg nerve isolated axons, Types I, II, and III					I, none for 17 + sec II, slow III, fast	1.1	8000	9	I(i) 33–105 (ii) 5–144 II(i) 150–225 (ii) 30–60 III, no iteration	3–4 (21° C)	30
11	*Cambarus*, claw nerve											
	fast-closer axon:		81	0.2	2.1	rapid ($\lambda = 8$ msec)				no iteration	20	58
	slow-closer axon:		70	0.46	1.6	intermediate ($\lambda = 15$ msec)				brief iteration	10	41
	opener axon:		41	0.65	2.2	slow or small ($\lambda = 48$ msec)				long iteration	8	36
			(relative values only – external electrodes)									
12	*Rana*, sciatic nerve, single nodal fiber	0.6	10–15	0.1 (at node) 0.2 max (internode)	1.7	none for 25–40 msec, then slight	3.7 (at node = 1.5×10^{-6} μf per node) 5×10^{-3} (internode)	8–20 (at node = 40×10^{6} per node) 100,000 (internode)	0.06 (per node)		31	16
13	*Rana*, sciatic nerve											
	A fibers			0.05–0.3	0.8–0.9						14–50	
	B_1 fibers			0.35–0.45	0.9–1.1						8–16	
	B_2 fibers			3.0–4.0	3.5–3.7						3–4.5	
	C fibers			3.5–5.0	4.5–10						0.3–0.8 (20–25° C)	

a. Values are not strictly comparable; obtained with internal electrodes (except 11, 12 and 13) of various exposed lengths. Values not corrected for differences in temperature of measurement. Higher temperature within a physiological range decreases chronaxie and refractory period, increases accommodation and velocity, does not change others, generally. For additional values, with external electrodes, see Schaefer (1940), Table 18; Lullies (1932); Rosenberg (1925).

b. Values given have usually been measured with very little saline shunt and would be appreciably higher—up to 50%—in sea water or in the animal.

c. The spike neither arises in nor invades the cell; therefore the stimuli injected into it are attenuated by some unknown amount before acting at the spike-initiating locus.

d. Surface area of soma = 1.1×10^{-4} to 2.5×10^{-4} cm²; values given are for larger cells; lower resistance is for cathodal current, higher for anodal.

e. Assuming that surface area of soma and large dendrites = 6,000 μ² (6×10^{-5} cm²).

f. Assuming that surface area of soma and large dendrites = 50,000 μ² (5×10^{-4} cm²).

g. According to Rall (1959).

References: 1. Tauc (1956), personal communication (1957). 2. Otani and Bullock (1959). 3. Fuortes (1958, 1959). 4. Hagiwara and Saito (1957); Bennett, Craig, and Grundfest (1959). 5. Ito (1957, 1959). 6. Araki and Otani (1955, 1959). 7. Frank and Fuortes (1960); Eccles (1957); Coombs, Eccles, and Curtis (1959); 8. Hodgkin, Huxley, and Katz (1952); Hagiwara and Oomura (1958, 1959). 9. Weidmann (1951). 10. Hodgkin (1947, 1948). 11. Wright et al. (1954, 1955). 12. Hodler, Stämpfli, and Tasaki (1952); Tasaki (1955, 1959). 13. Schaefer (1940).