

Corrections to Essentials of Neurophysiology

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1 Answers to the Exercises Chapter 2

- Question 2.5 The correct answer is: $V_m = -21.5$ mV (at 37 degrees C). At T=27 degrees C you will find that $V_m = -20.8$ mV.
- Question 2.8. Use for this exercise the data from Table 2.3 (skeletal muscle of the frog) at T=20 degrees C. You will then find that $V_m = -85.422$ mV and lowering it to 5 mmol/l results in -85.417 mV. Similar (i.e. very small) changes will be found for neurons.
- Question 2.9. Use data from Table 2.3, and assume that initially the intracellular K^+ is 150 mmol/l.
- Question 2.15.
 - b) This answer can be more exact. For the capacitance, you will find $C = 1.59 \times 10^{-8}$ F. Then using $dQ = CdV$, we find that the change in charge, $dQ = 1.6 \times 10^{-9}$ C. This is equivalent to approximately 10^{10} electrons.
 - c) Volume is 3.14×10^{-11} m³. Given the intracellular sodium Na=15 mmol/l, and using 1 mol (N) = 6×10^{23} particles, the total number N_{tot} of particles (sodium ions) is $N_{\text{tot}} = 15 \times N \times V = 2.83 \times 10^{14}$ ions of Na. Relative change is then $dQ/N_{\text{tot}} = 10^{10}/(2.83 \times 10^{14}) = 3.54 \times 10^{-4}$. Note: the answers you find may slightly differ, depending on values of the constants used (k, T, q).

2 Corrections to Exercises Chapter 4

In Table 4.1 there are mistakes in the (main) location of the synapses.

The inhibitory synapses are mainly located on the axon hillock and the soma, while the excitatory synapses are mostly located at the soma. Dendrites receive both excitatory and inhibitory inputs. This also affects the answer to question 4.2. The correct answer is d, as synapses are present on cell bodies, dendrites and also the axon hillock.

3 Corrections to Exercises Chapter 5

Question 5.6. The electrode surface for the electrode in the hand should read 10 cm². in the caption of the table, the values refer to an electrode size of 1 cm².