March 25, 2013

General Announcements:
Due dates:
This week:
Simulation 7-Weds
Plant Lab-Thursday
Next week:
Sim 8 Monday, April 1
Midterm- April 2-Tuesday midnight
Citations, citations, citations!
Be concise!
Describe results in (more) detail
make a story out of it
use figures/tables to illustrate the story
quantitate whenever you can
Discussion (vivato = 2500 words)
Be well organized, don’t ramble
Each paragraph has 1 major point
We’re not impressed with a train of facts
Weds, April 3- Diseases of signal transmission; speed presentations
Thurs, April 4- Snail I Results

Hodgkin and Huxley I- Ionic currents underlying the AP

“This is in agreement with the hypothesis that the inward current is carried by Na+ ions, which as a result of a decrease in RP, are permitted to cross the membrane in both directions under a driving force that is the result of both the concentration difference and the electrical potential difference.”

Voltage clamp of squid giant axon


*Gold Cortex,* Greg Dunn, 2010
I/V plot for current flow with depolarizations

Measure $I_{m}$ (Na and H currents)

$V_{Clamp} \approx +55 \text{ mV}$

$RP = -55 \text{ mV}$

Change outside Na and see change inward current reversal

Predicted NaEq = Observed

<table>
<thead>
<tr>
<th>Axon no.</th>
<th>$T$ (C)</th>
<th>$[Na]_o$ (mM)</th>
<th>$I_{Na}$ (mA/cm²)</th>
<th>$V_{Na}$ (mV)</th>
<th>$V_{m}$ (mV)</th>
<th>$(V_{Na} - V_{m})$ (mV)</th>
<th>$I_{m}$ (mA/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.2</td>
<td>0.1</td>
<td>$-30$</td>
<td>$-75$</td>
<td>$+4$</td>
<td>$+30$</td>
<td>$+30$</td>
</tr>
<tr>
<td>20</td>
<td>0.2</td>
<td>0.1</td>
<td>$-95$</td>
<td>$-45$</td>
<td>$+4$</td>
<td>$+55$</td>
<td>$+55$</td>
</tr>
<tr>
<td>21</td>
<td>0.2</td>
<td>0.1</td>
<td>$-95$</td>
<td>$-45$</td>
<td>$+4$</td>
<td>$+95$</td>
<td>$+95$</td>
</tr>
</tbody>
</table>

Isolation of currents 1952

$I_{m} (\text{mA/cm}^2)$

$V_{m} (\text{mV})$
Quantification of inward and outward currents 2012

Calculation of conductances

How do we get Keq Potential?