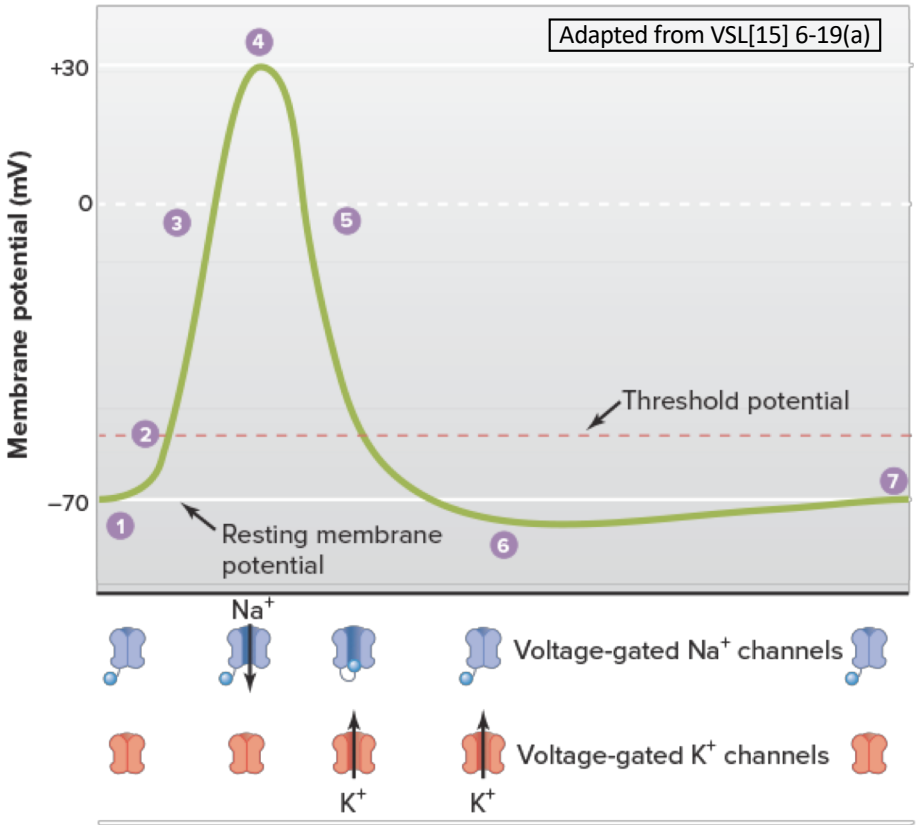
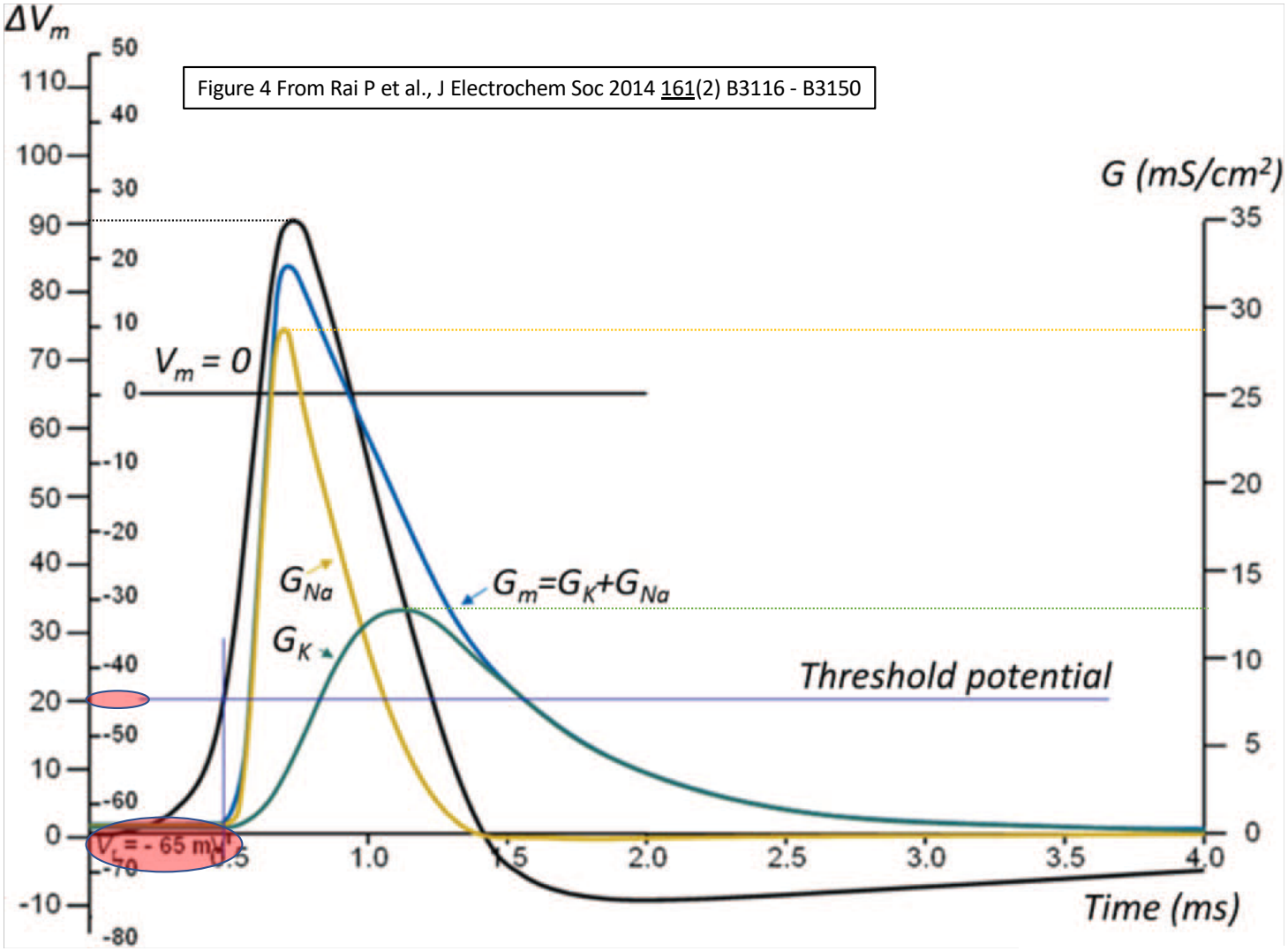
Revised/Additional Slides

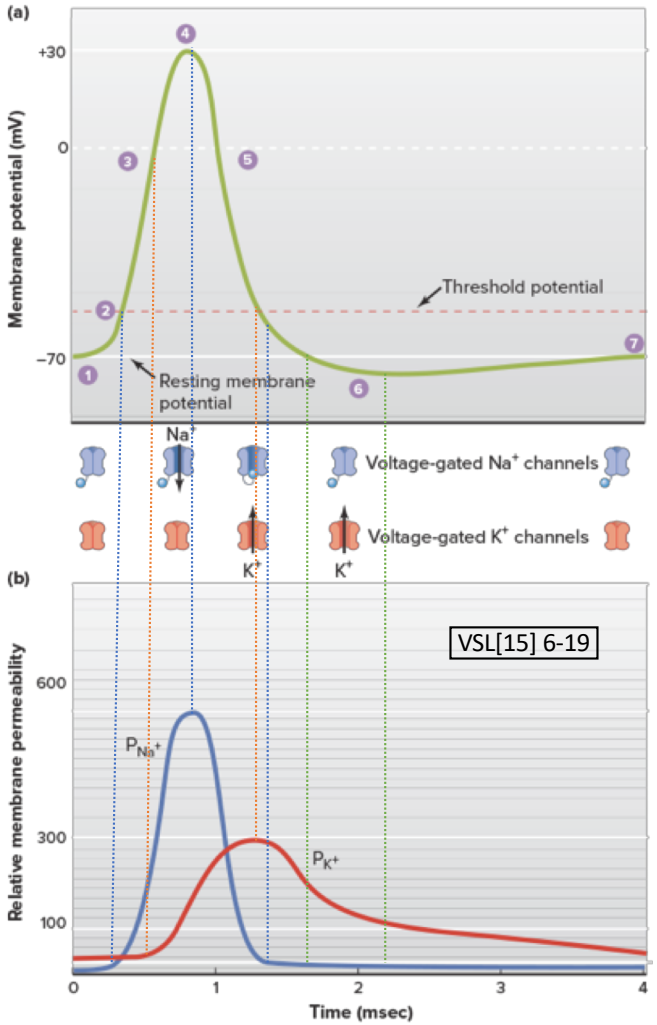
EN.585.601, Module 2, Video 1, Rev 1



1. Steady resting membrane potential is near E_K, $P_K > P_{Na}$, due to leak K^+ channels.
2. Local membrane is brought to threshold voltage by a depolarizing stimulus.
3. Current through opening voltage-gated Na^+ channels rapidly depolarizes the membrane, causing more Na^+ channels to open.
4. Inactivation of Na^+ channels and delayed opening of voltage-gated K^+ channels halt membrane depolarization.
5. Outward current through open voltage-gated K^+ channels repolarizes the membrane back to a negative potential.
6. Persistent current through slowly closing voltage-gated K^+ channels hyperpolarizes membrane toward E_K; Na^+ channels return from inactivated state to closed state (without opening).
7. Closure of voltage-gated K^+ channels returns the membrane potential to its resting value.



Insert after #4


(a)
+30
0
−70
Membrane potential (mV)
Threshold potential
Resting membrane potential
Na+
K+
Voltage-gated Na+ channels
Voltage-gated K+ channels
(b)
600
300
100
Relative membrane permeability
PNa+
PK+
0
1
2
3
4
Time (msec)
VSL[15] 6-19

END

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EN.585.601, Module 2, Video 1, Rev 1