Membrane Transportation, Membrane Potential

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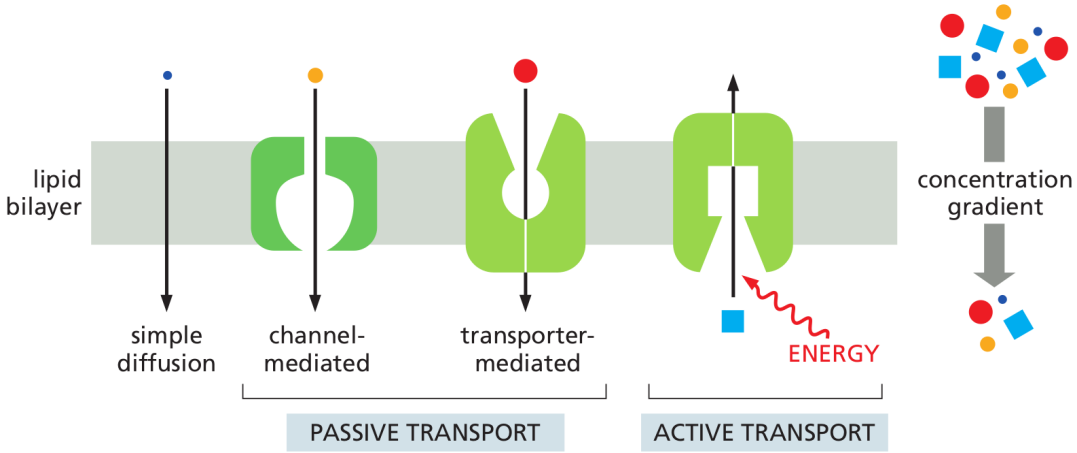
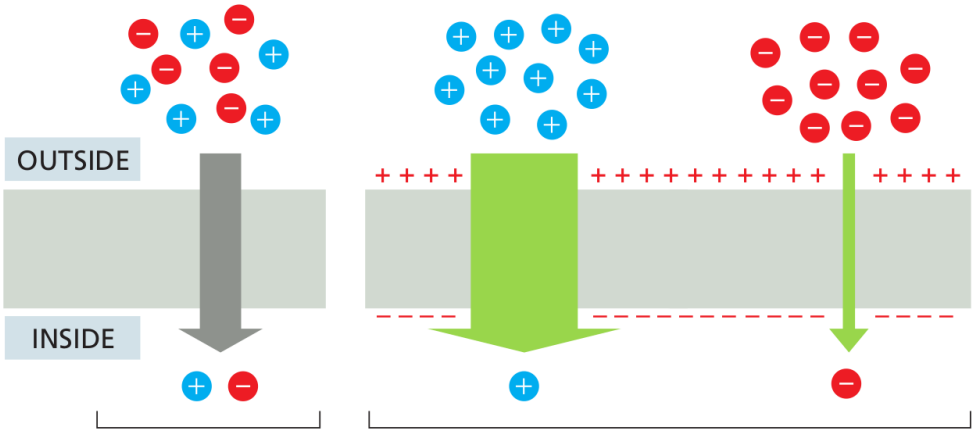
2025/26

Membrane Transport



Alberts B. et al. Molecular Biology of the Cell (2022)

Chamical and Electrochemical Potential



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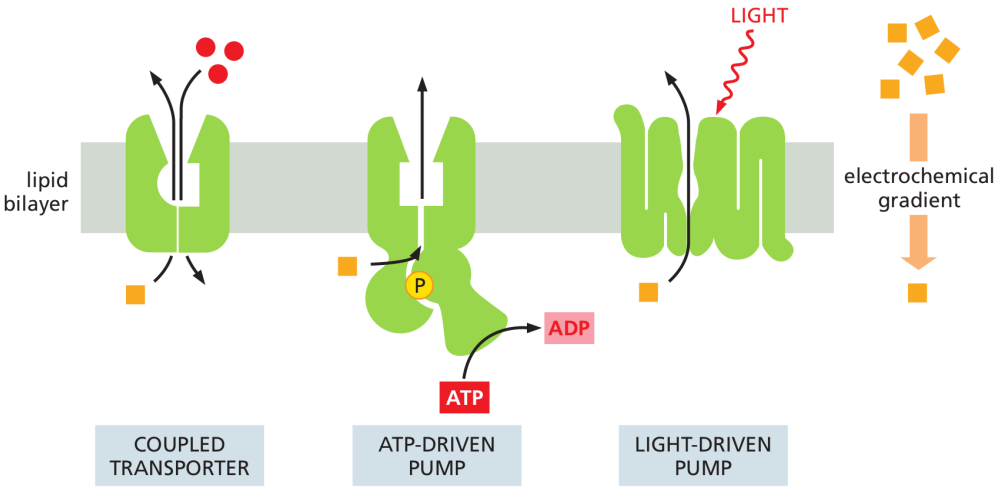
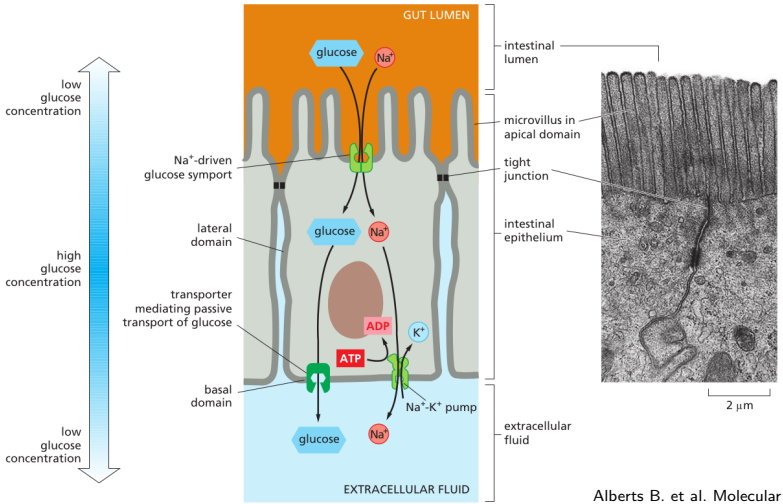
Active Trasport



Alberts B. et al. Molecular Biology of the Cell (2022)

Example: Ingestion of Glucose



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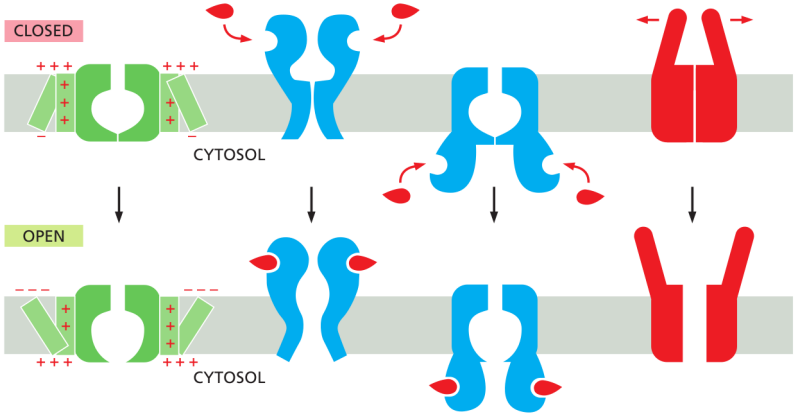
Control of Ion Channels



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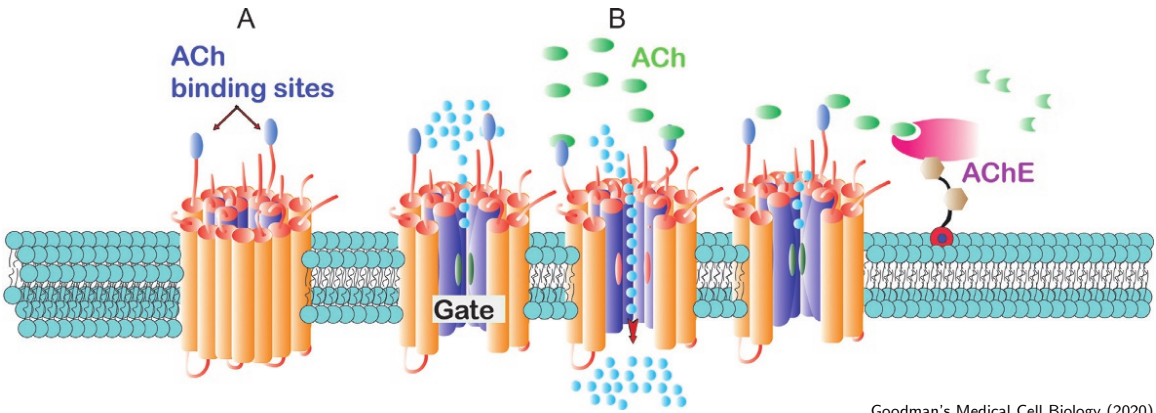
Example: Sodium Channel Controlled by Acetylcholin

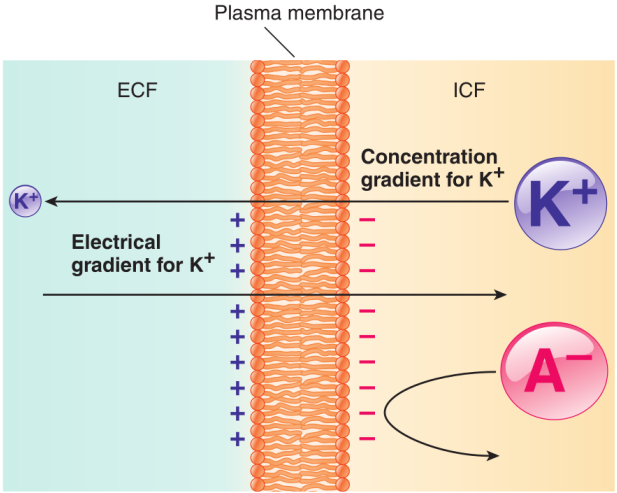


Goodman's Medical Cell Biology (2020)

Membrane Potential

- In fact, it is a „membrane voltage“...
- Consequence of limited permeability of the membrane
- Some cell types use it for spreading of informations

Resting Membrane Potential: Potassium



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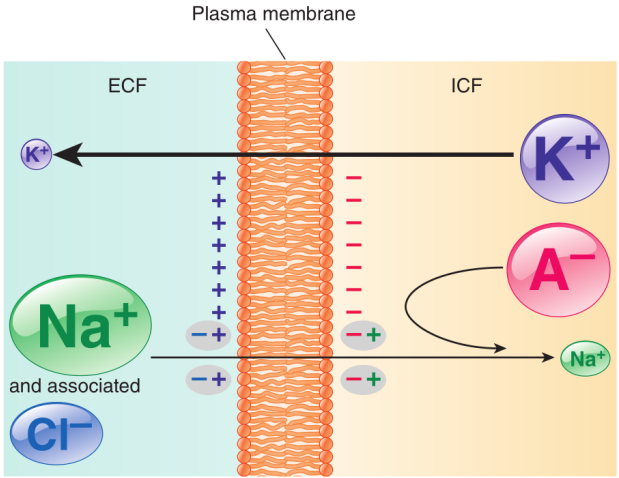
Resting Membrane Potential: Potassium and Sodium



Resting membrane potential = −70 mV

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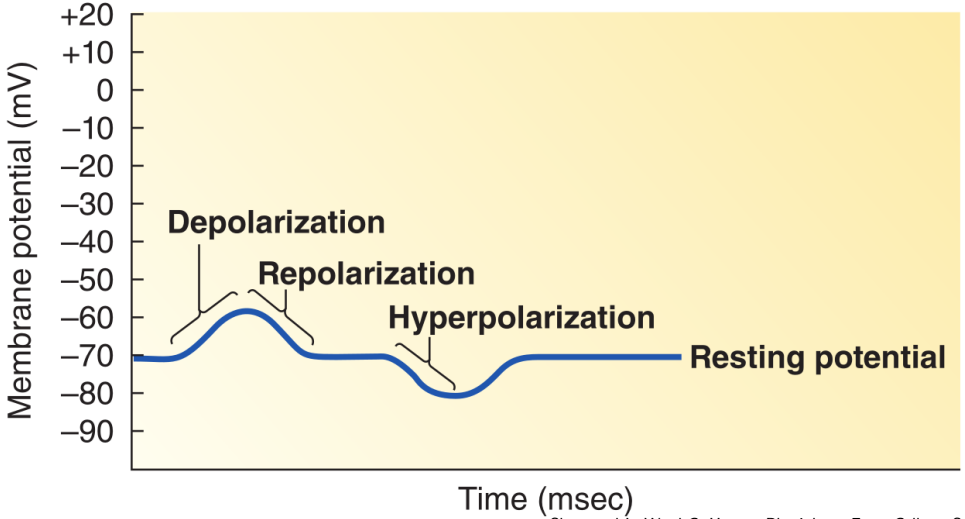
Intensity of Electrical Field

$$E = \frac{U}{d} \approx \frac{70 \cdot 10^{-3}}{10 \cdot 10^{-9}}\ Vm^{-1} = 7 \cdot 10^{6}\ Vm^{-1}$$

Excitable Tissues: Nonstability of Membrane Potential



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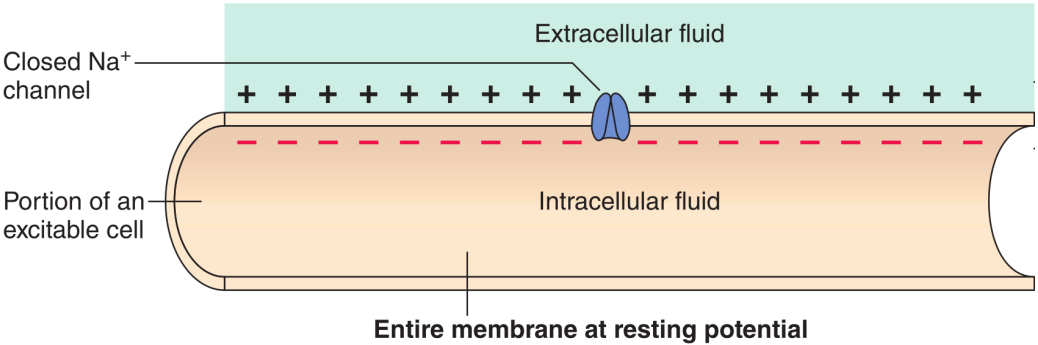
Excitabile Tissues: Generation and Spreading of a Disturbance



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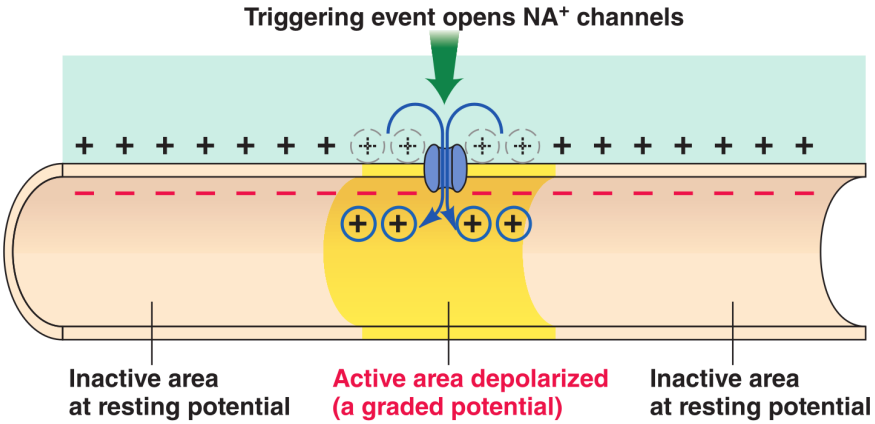

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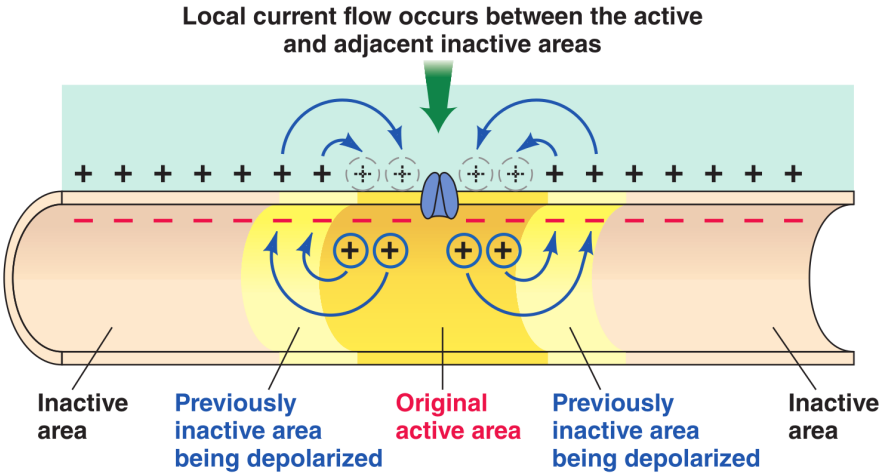

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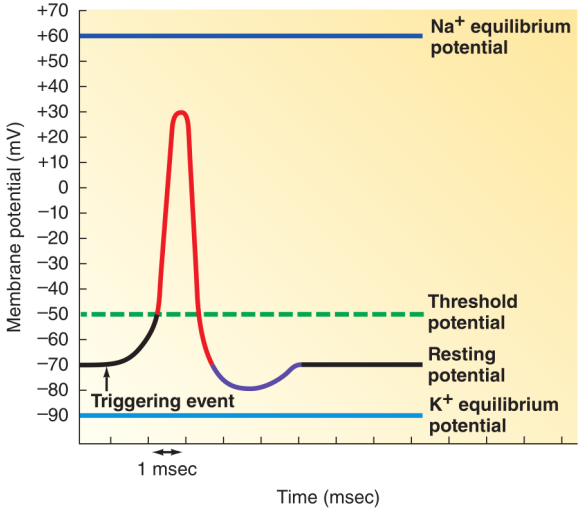
Action Potential



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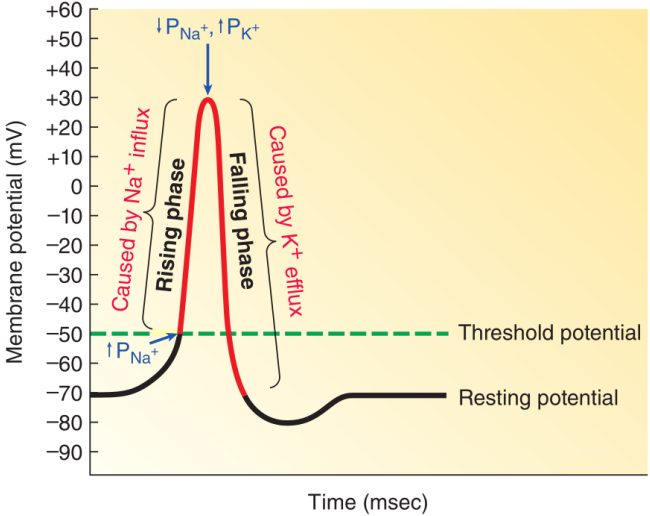

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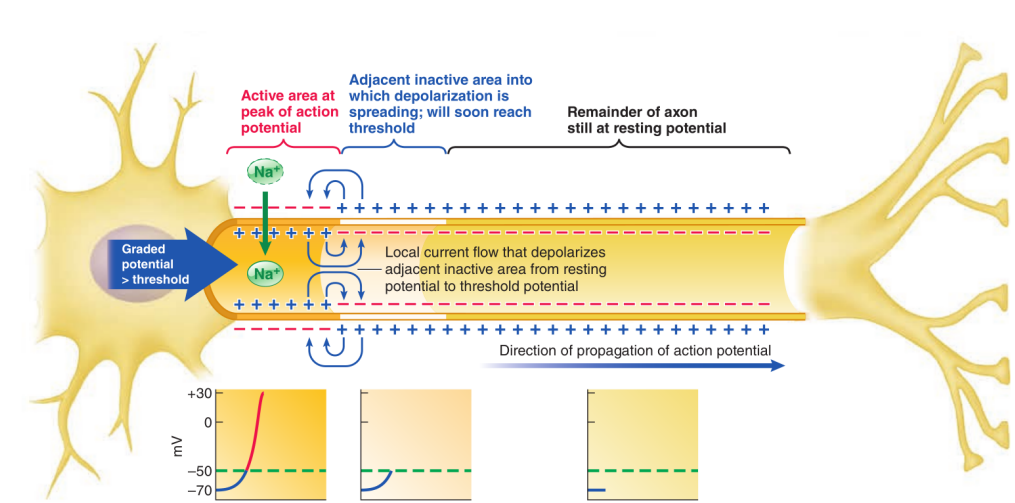
Continual Spreading of Action Potential



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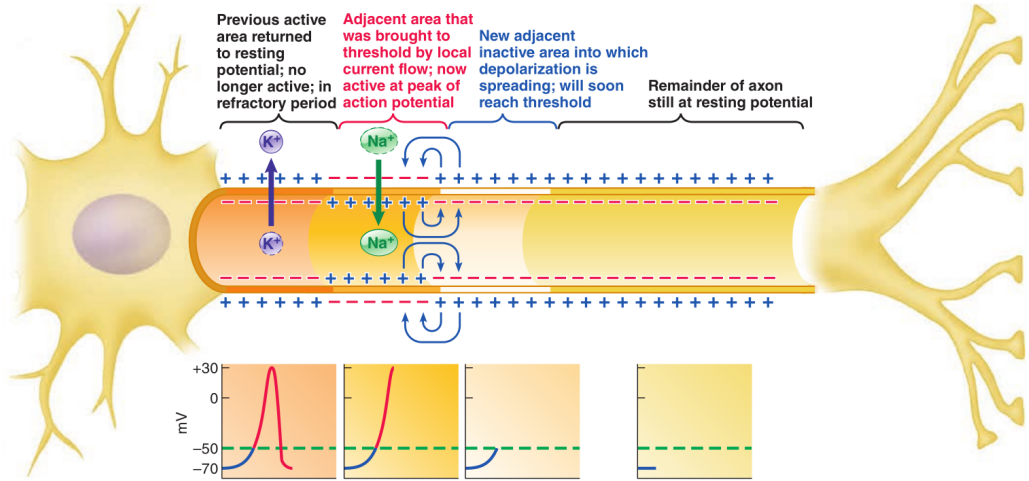

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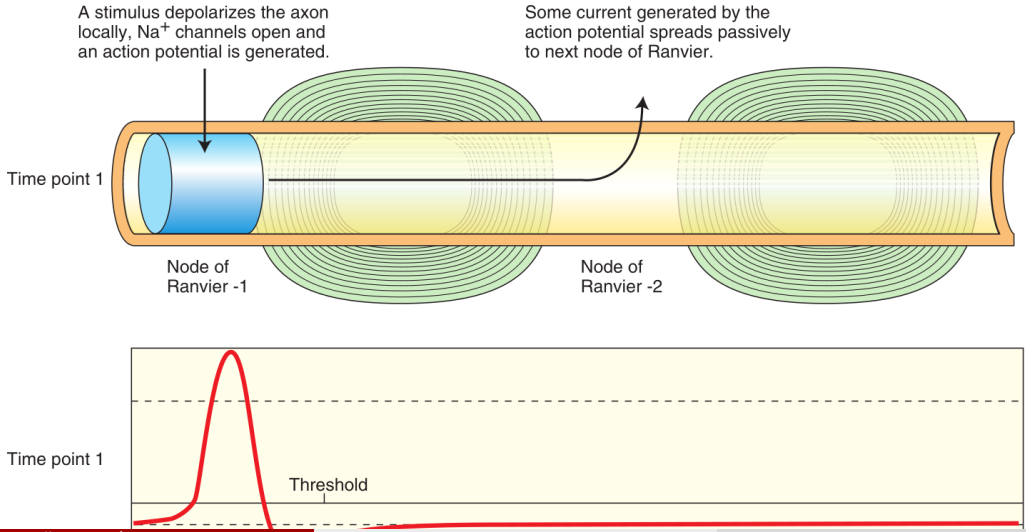
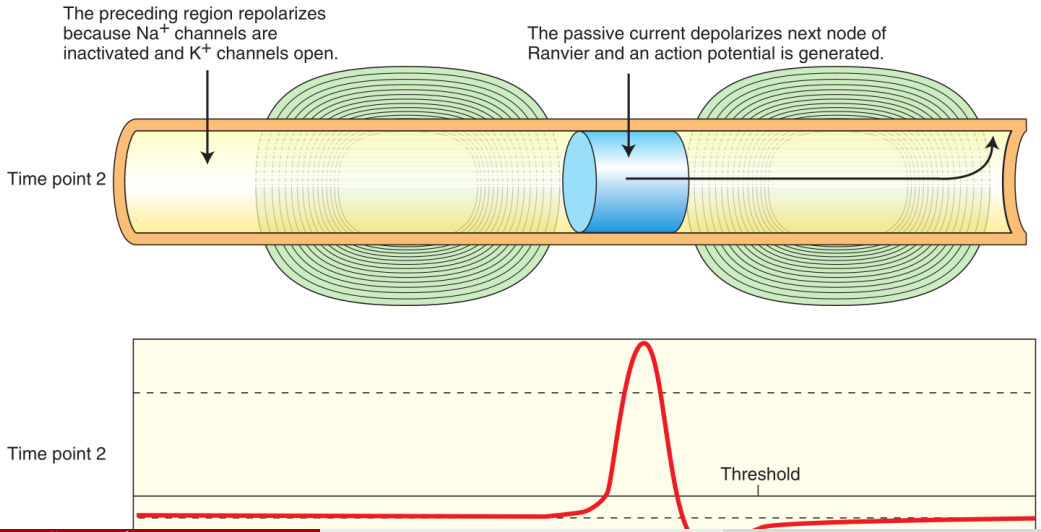
Saltatory Spreading of Action Potential



Saltatory Spreading of Action Potential



Time for Tea!

Claude Monet: Čajová souprava (1872)