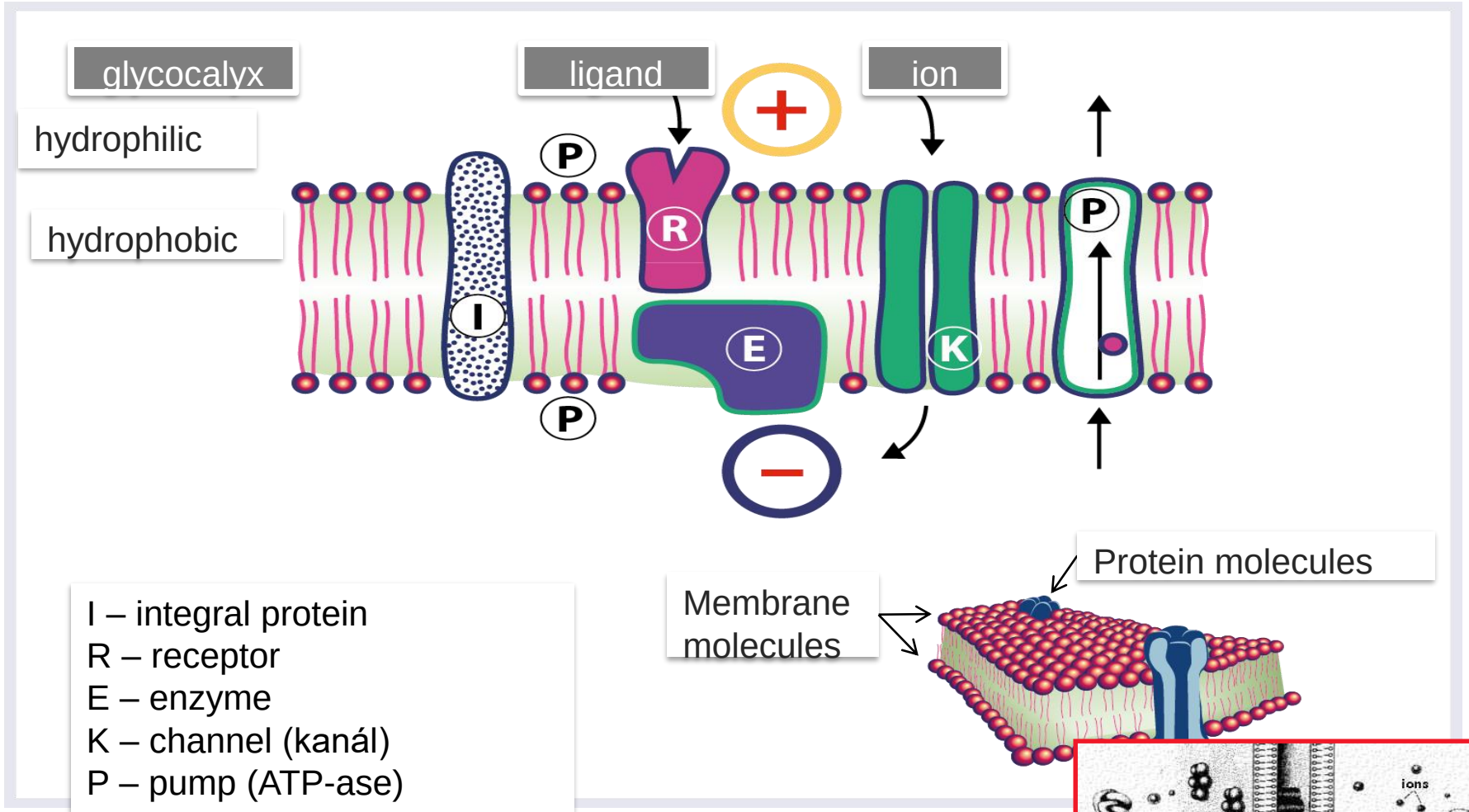
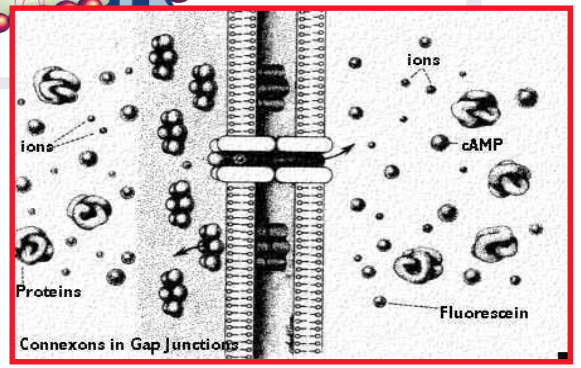
MUNI
MED

MEMBRANE OF EXCITABLE CELL. ELECTRICAL TRANSMISSION OF INFORMATION.

PLASMATIC MEMBRANE



Nexus (gap junction) →



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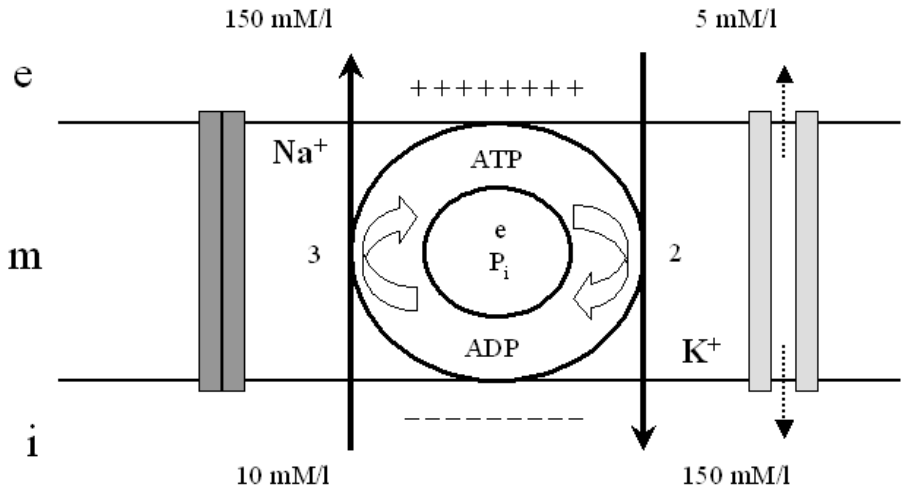
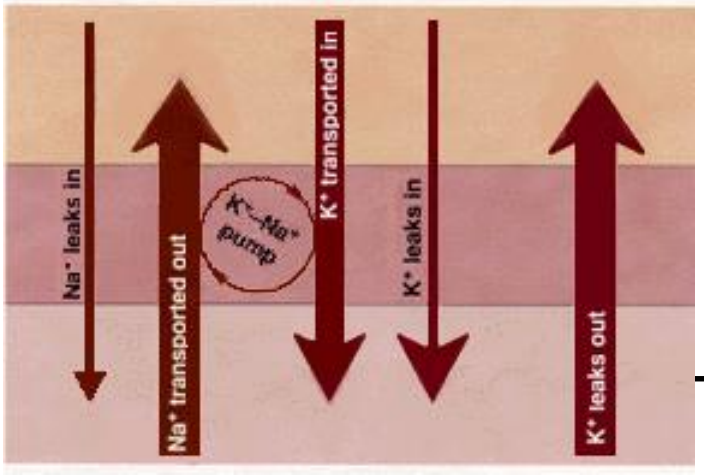
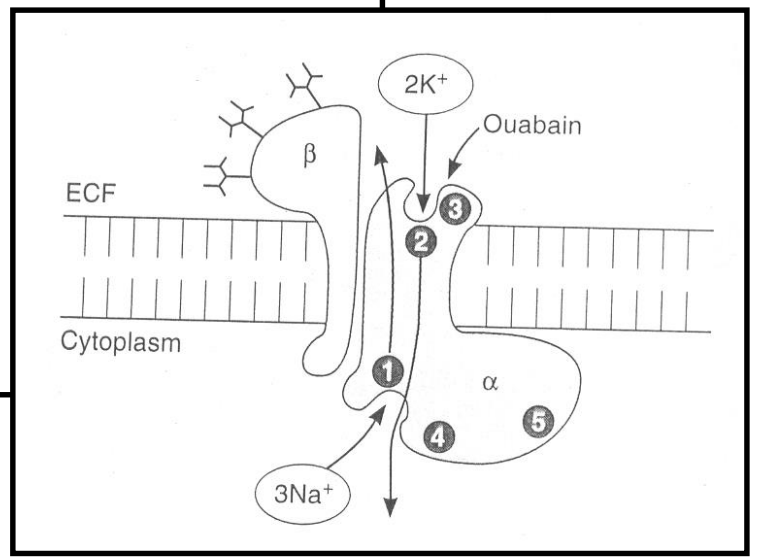
SODIUM-POTASSIUM EXCHANGER







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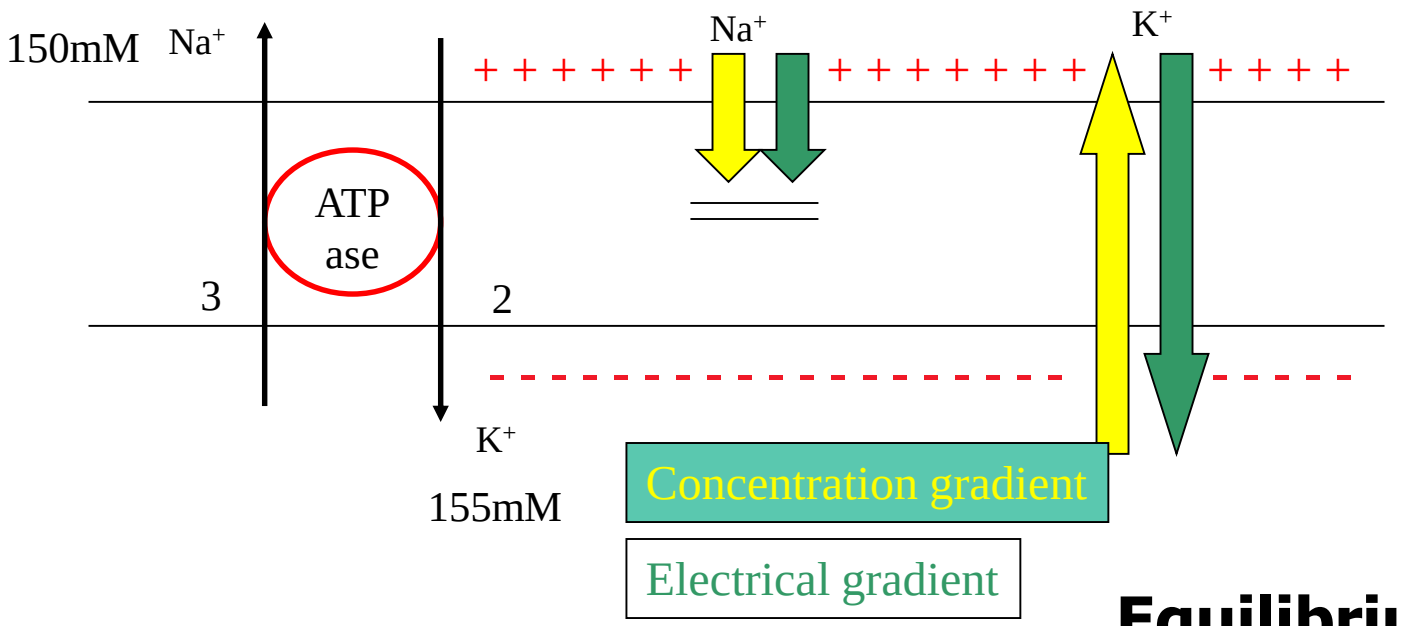
RESTING MEMBRANE VOLTAGE



Nernst equation:

$$E_x = \frac{R \cdot T}{F} \ln \frac{(Cx_{out})}{(Cx_{in})}$$

Equilibrium potential

E_{Na} = +40 mV

E_K = -90 mV

E_{Cl} = -70 mV

E_{Ca} = +60 mV

E_r = -85 mV

$$I_x = g_x \cdot (E - E_x)$$

I – current, E – voltage, g – specific voltage and time-dependent conductance

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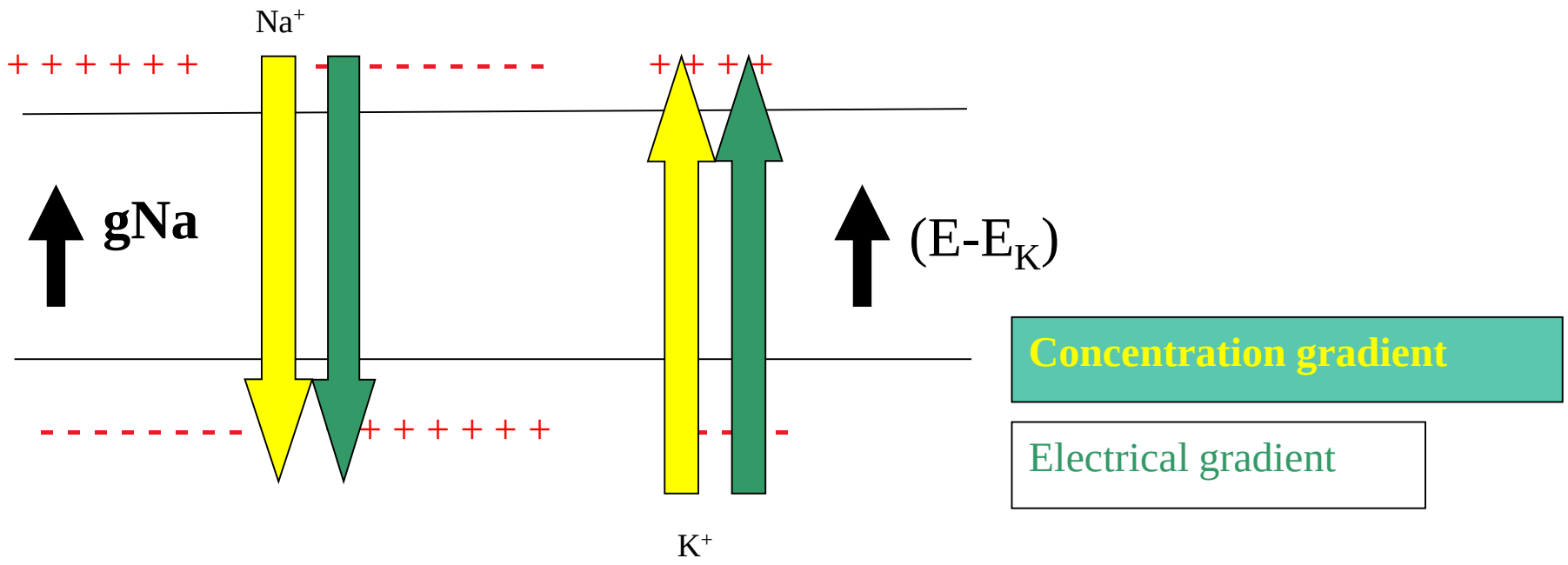
ACTION POTENTIAL



Depolarisation
Transpolarisation

Repolarisation

(Hyperpolarisation)

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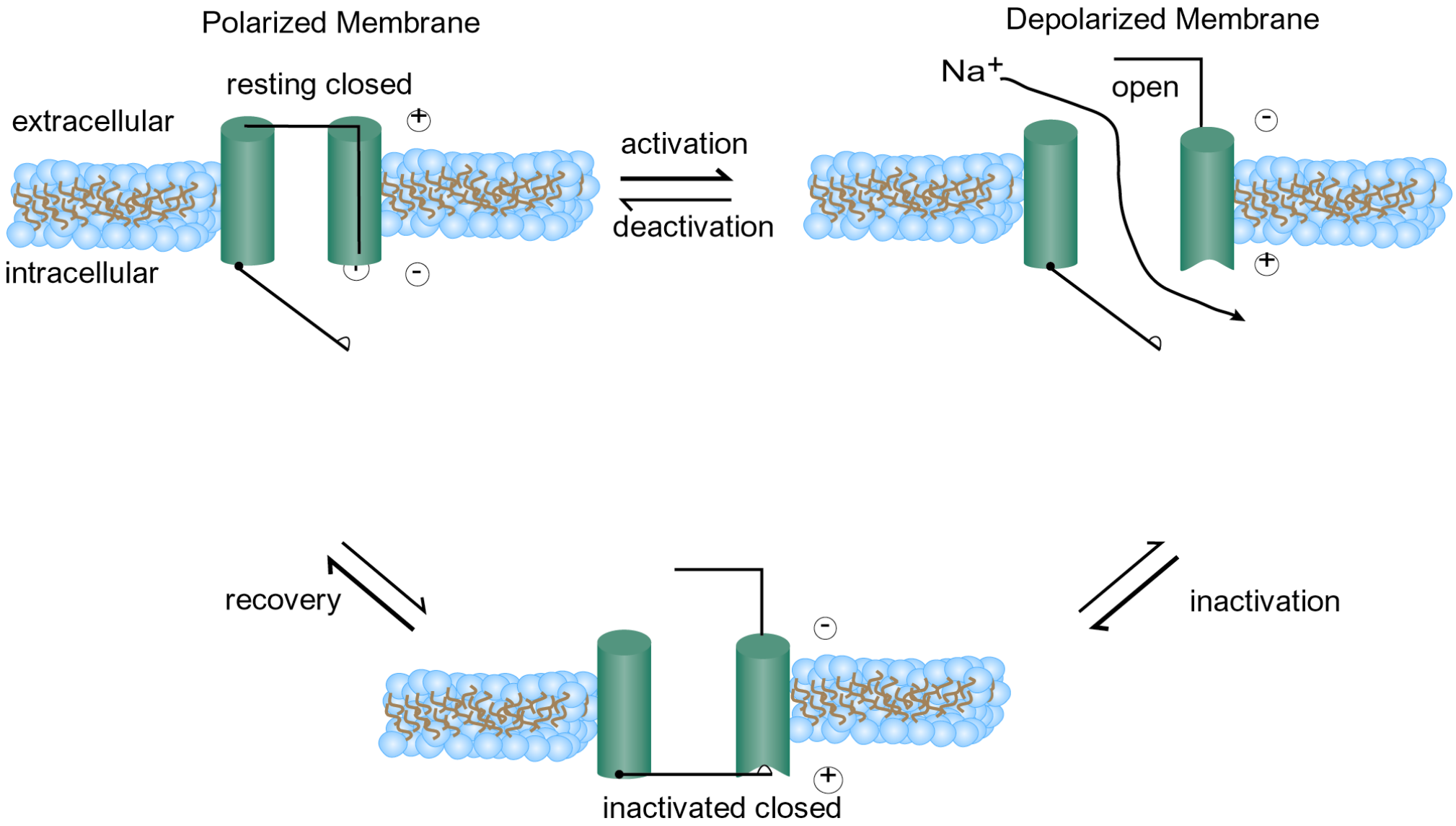
Polarized Membrane
resting closed
extracellular
intracellular
activation
deactivation
Depolarized Membrane
Na+
open
recovery
inactivation
inactivated closed

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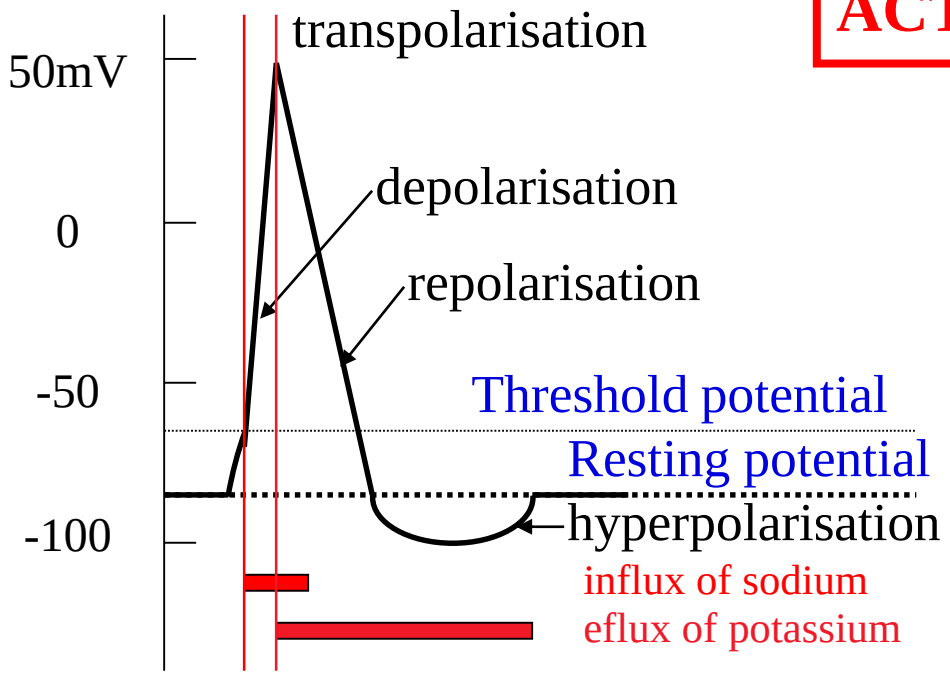
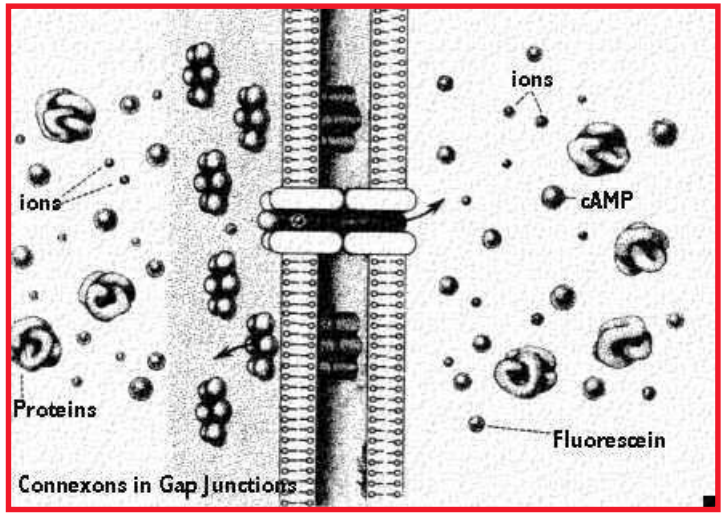
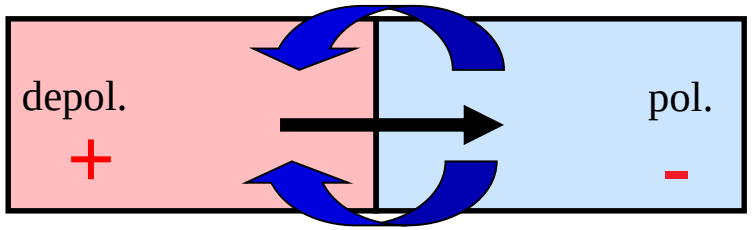
ACTION POTENTIAL



- Unit of excitation activity
- „All or nothing“ response
- Propagation without decrement („domino effect“)
- **Refracterity**



Local current



Propagation with decrement

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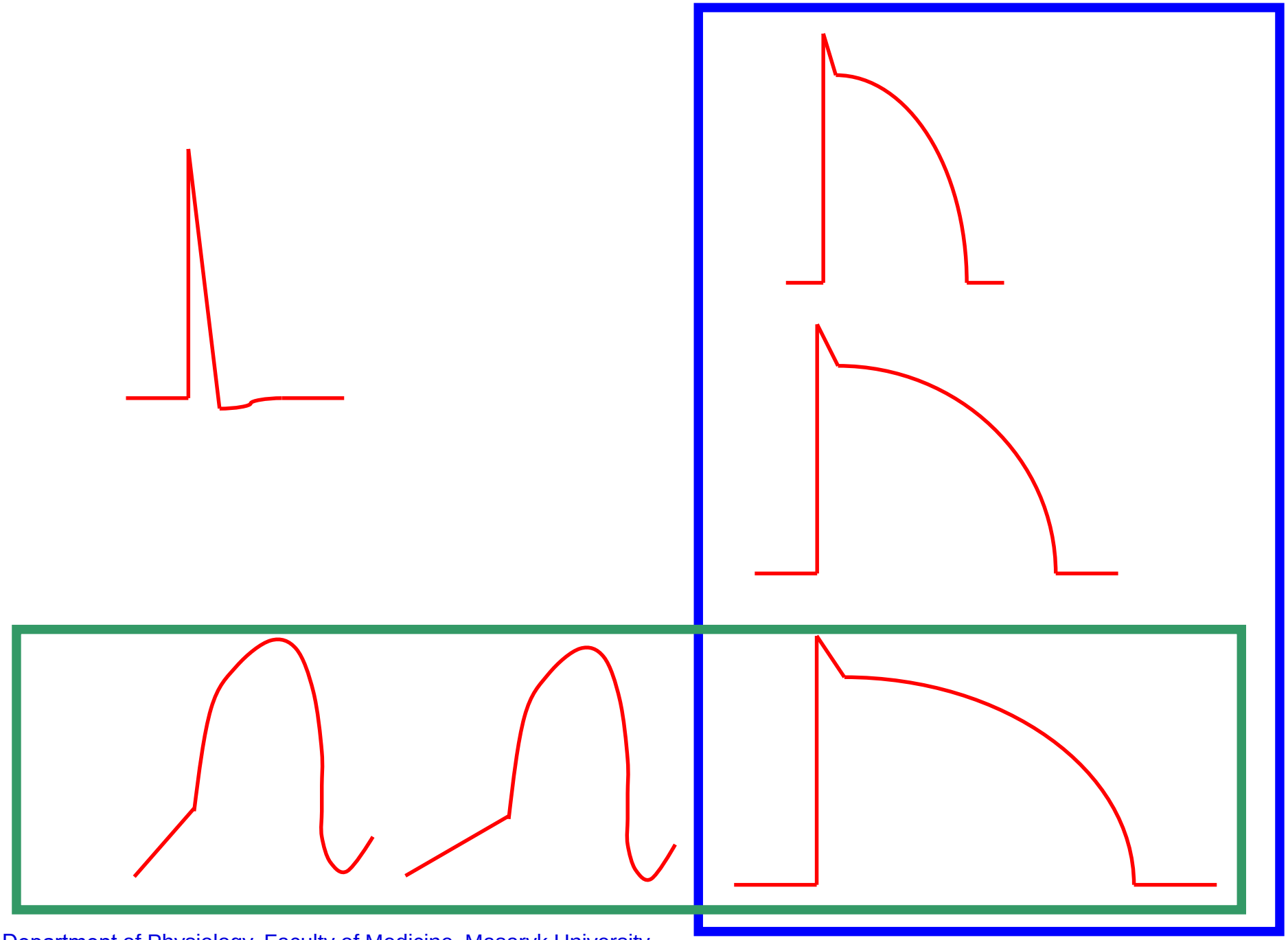

- **RESTING MEMBRANE POTENTIAL IS A CONDITION OF EXCITABILITY**
- **IT DEPENDS ON HIGH RESTING MEMBRANE CONDUCTIVITY FOR POTASSIUM**

ACTION POTENTIAL IS A PROPAGATED ELECTRICAL SIGNAL GENERATED BY FAST SODIUM CURRENT INTO THE CELL*x*

- **ACTION POTENTIAL REPRESENTS UNIT OF INFORMATION**
- **CODING OF INFORMATION IN THIS SYSTEM IS PERFORMED BY CHANGED FREQUENCY OF ACTION POTENTIALS**

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