



Dr Phil Holland

Topic 1:

**Action potentials and
synaptic transmission**

Part 1 of 5

Module:

Biological Foundations of Mental Health

Week 3:

Synaptic transmission and neurotransmitter systems

Topic list



This week, we will be looking at the following topics:

- **Topic 1: Action potentials and synaptic transmission**
- Topic 2: Neurotransmitters, receptors and pathways
- Topic 3: Neurotransmission defects and mental health:
Focus on schizophrenia

Click **Next** to continue

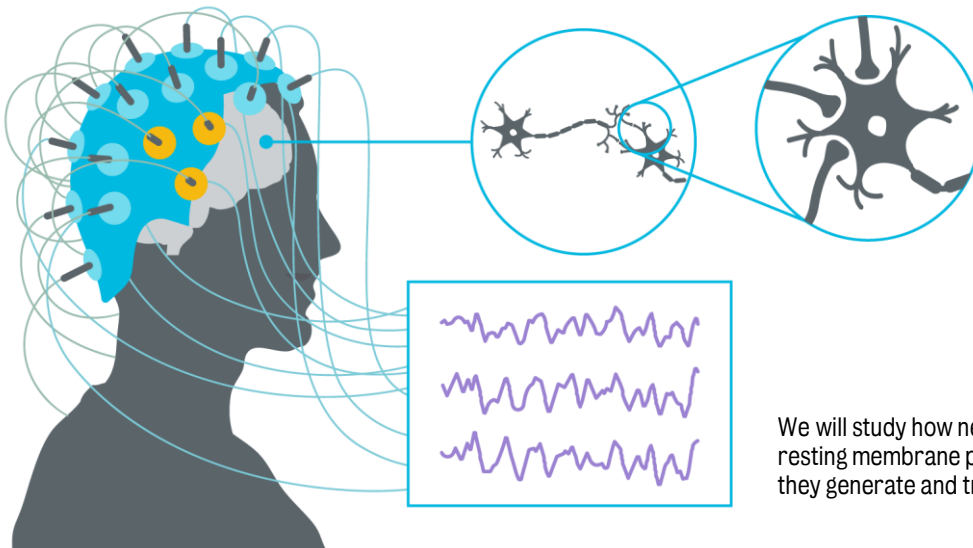
Part 1

Week 3 Synaptic transmission and neurotransmitter systems

Topic 1: Action potentials and synaptic transmission

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Introduction



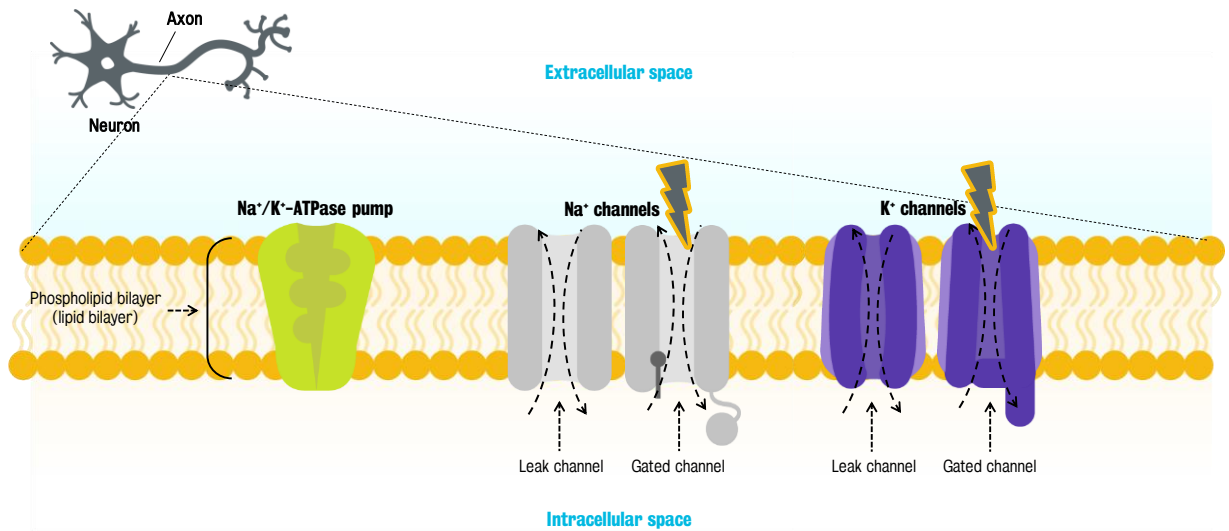
We will study how neurons set up their resting membrane potential and how they generate and transmit potentials.

Week 3 Synaptic transmission and neurotransmitter systems

Topic 1: Action potentials and synaptic transmission

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The membrane

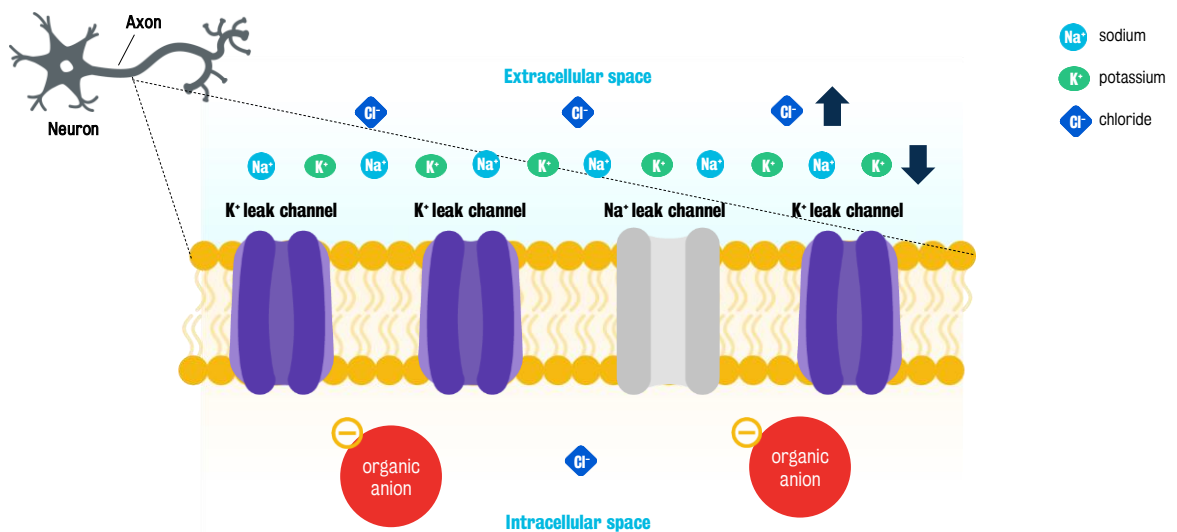


Week 3 Synaptic transmission and neurotransmitter systems

Topic 1: Action potentials and synaptic transmission

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Resting membrane potential: Leak channels

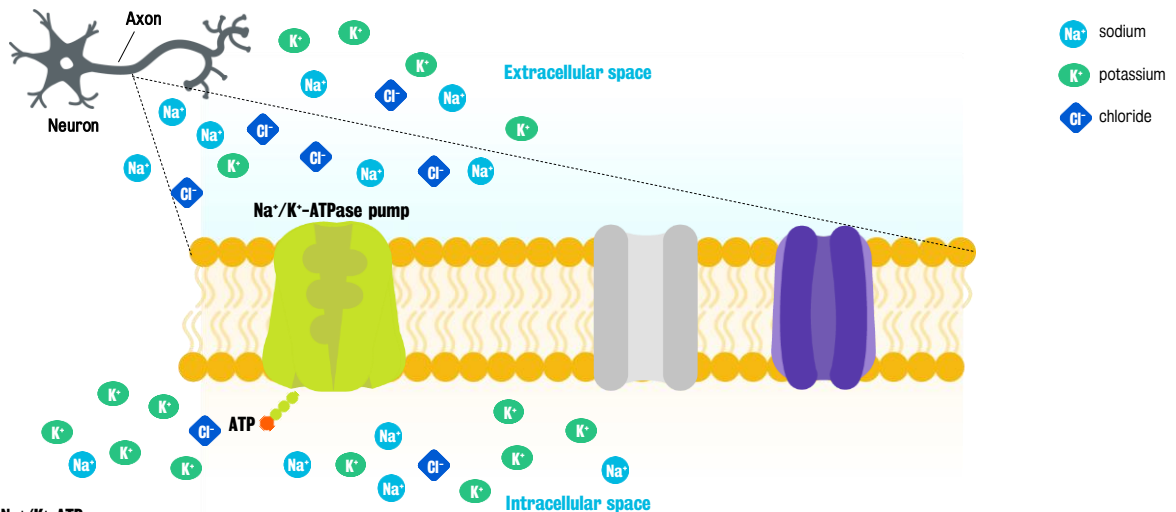


Week 3 Synaptic transmission and neurotransmitter systems

Topic 1: Action potentials and synaptic transmission

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Resting membrane potential: Na^+/K^+ -ATPase

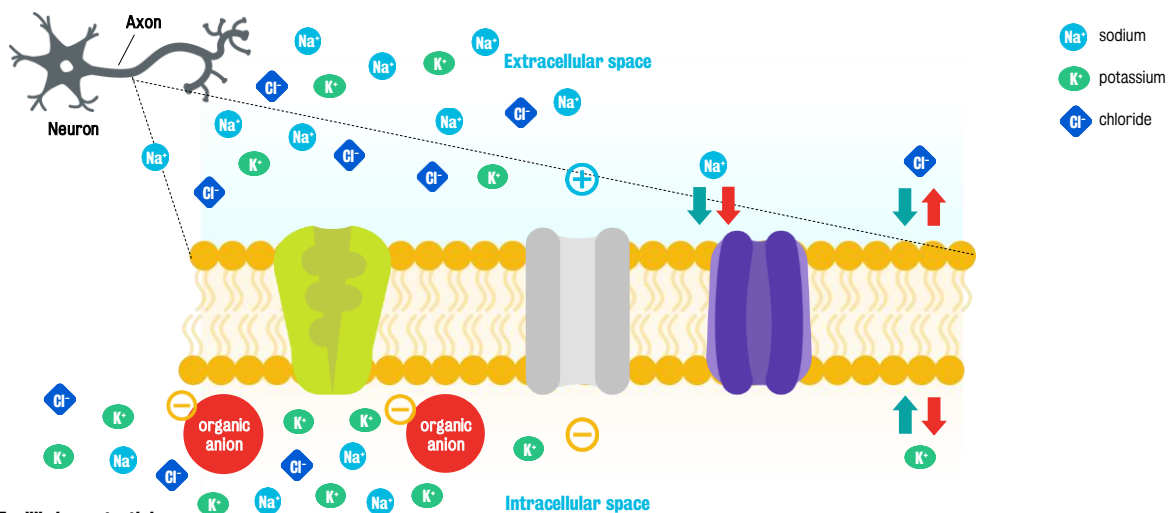


Na^+/K^+ -ATPase pump:

- increases the concentration of sodium in the extracellular space
- increases the concentration of potassium in the intracellular space

The exchange of positively charged ions help to maintain the net negativity of the intracellular space compared to the extracellular space.

Resting membrane potential: Ionic forces

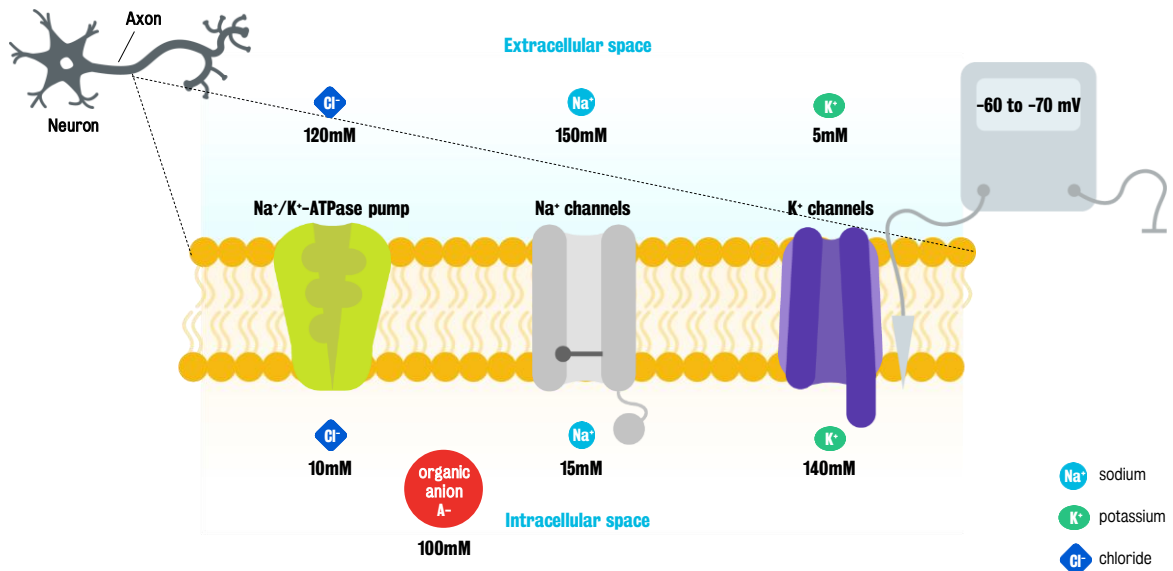


Equilibrium potential:

The point for any ion where the net flux across the membrane is zero, due to the force of the electrostatically charged component and the force of the diffusion being equal to each other.

Electrostatic force
 Force of diffusion

Extracellular & intracellular ionic concentrations



End of part 1