

The Nerve Impulse

Biology

The action potential, plotted and explained.

One action potential, about 1 millisecond.

1

Resting potential -70 mV

Maintained by the Na^+/K^+ pump and leak channels.

2

Threshold -55 mV

Voltage-gated sodium channels open.

3

Depolarisation to $+40$ mV

Sodium floods in.

4

Repolarisation

Sodium channels close, potassium channels open.

5

Hyperpolarisation

Overshoot below resting; the refractory period.

WHY IT MATTERS

All-or-nothing: size never varies

Intensity is coded by frequency

Refractory period ensures one-way travel

Myelination speeds conduction enormously

The refractory period is what makes impulses travel in one direction and sets the maximum firing frequency.