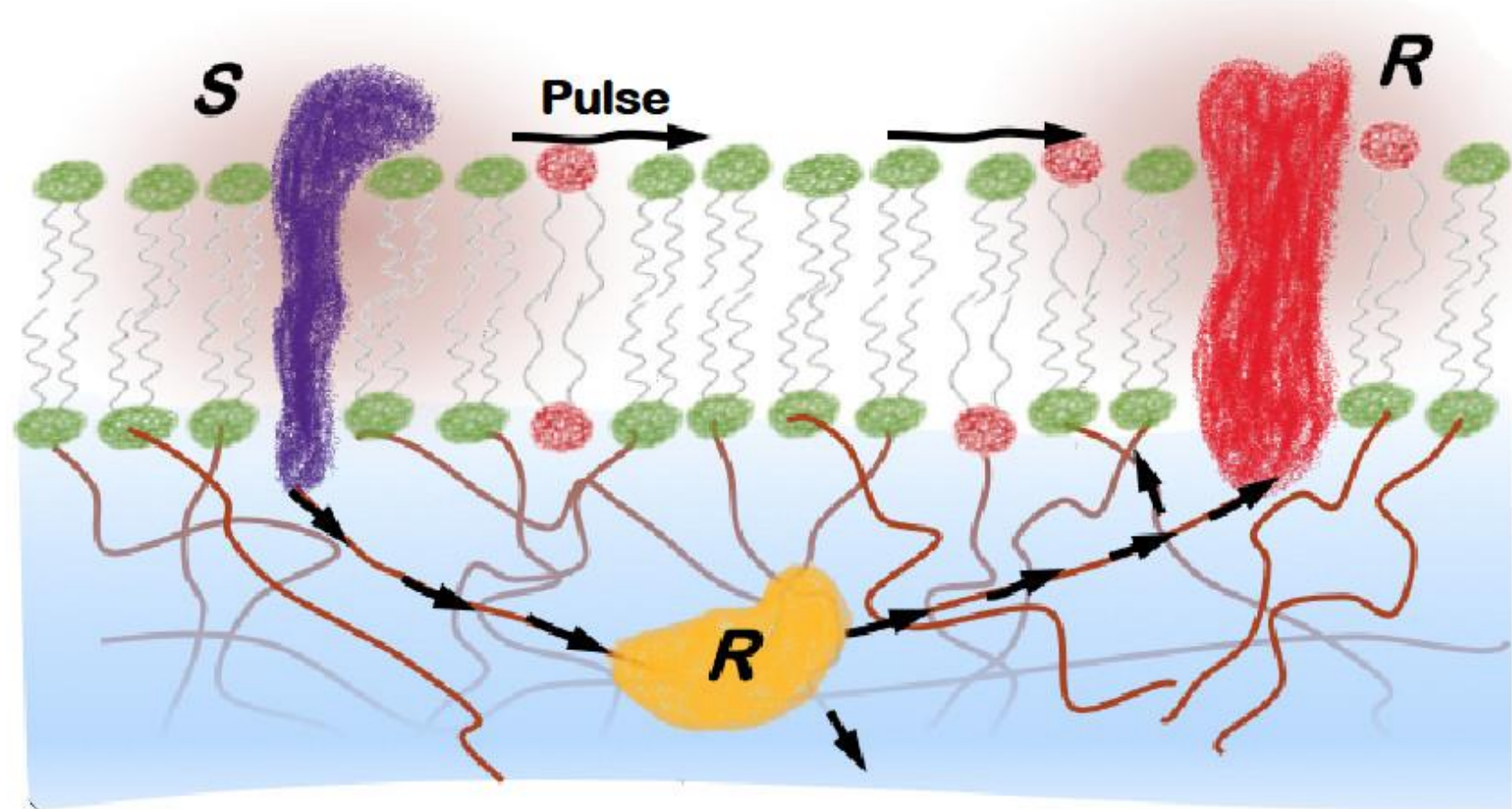


Medical and Biological Physics Group

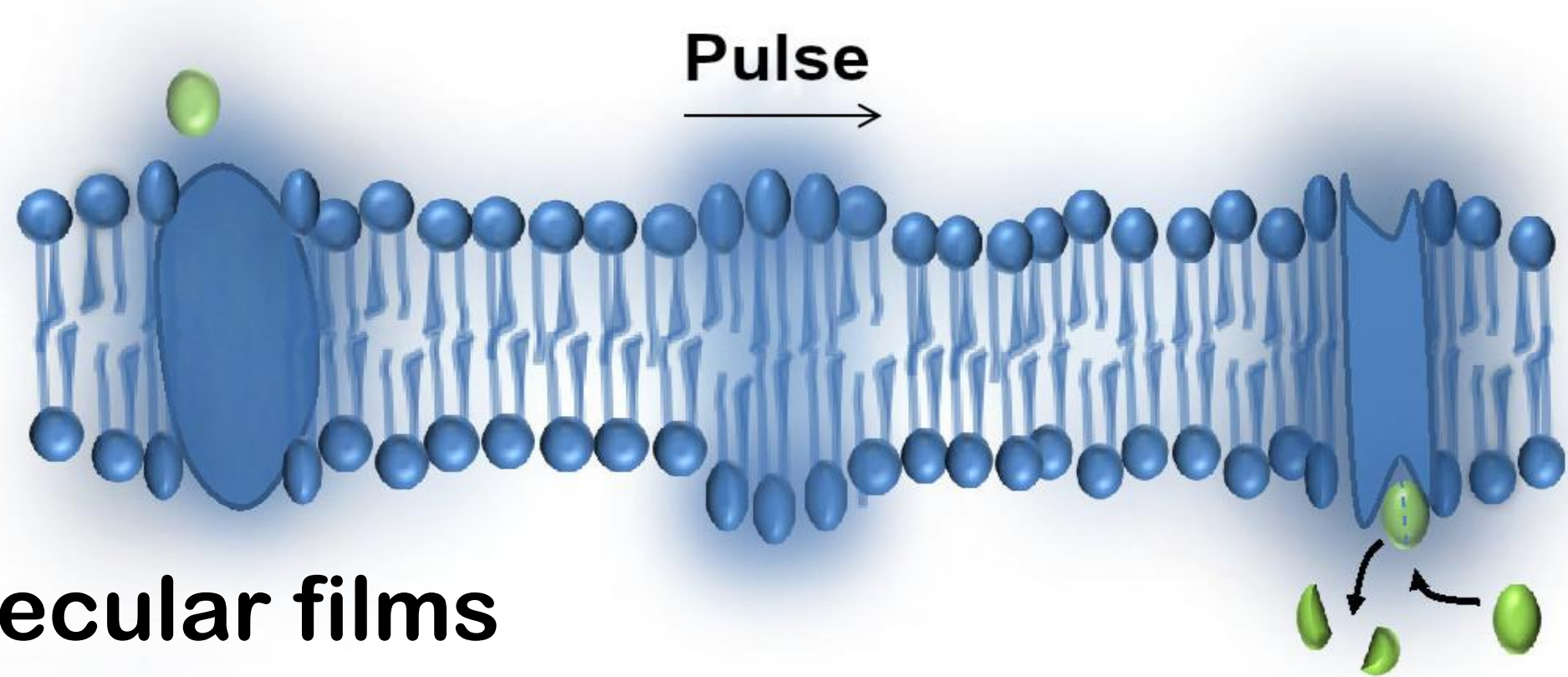
Physics of Life & Health

Ansatz: Physical principles determine biological function



Momentum conservation → communciation

Monolayer



Pulses in monomolecular films

How do pulses propagate and excite enzymes?

Paramecium (Pantoffeltierchen)

The „swimming neuron“ and how it melts

“Drunken” Paramecia?

How do anesthetics work?



Algae: Pulses in living Systems

Axon model: Are nerve pulses similar to sound pulses?

What influences such pulses?

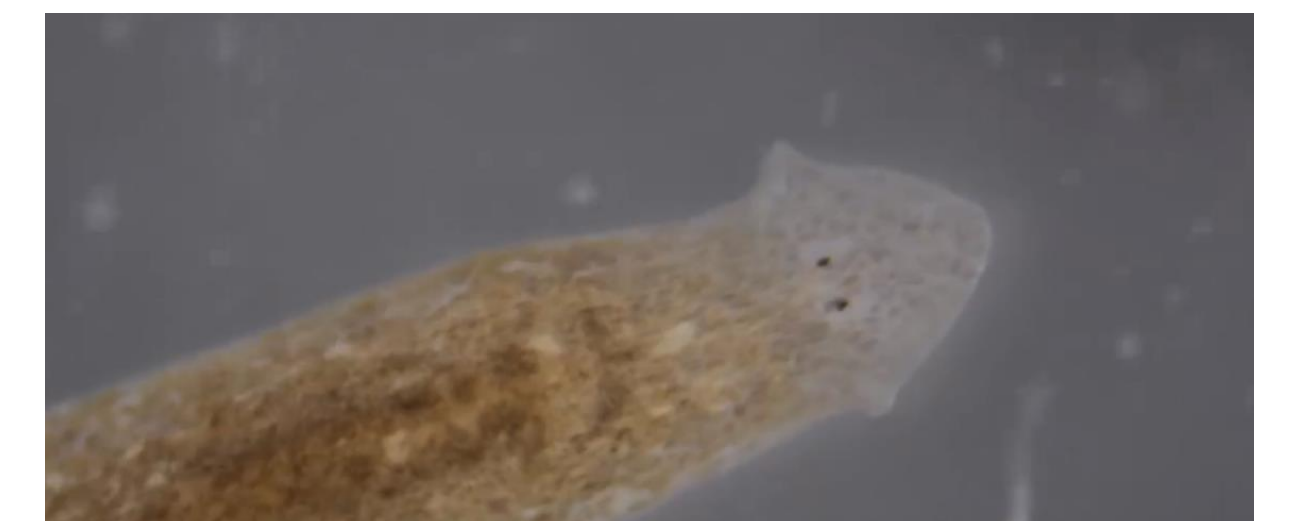
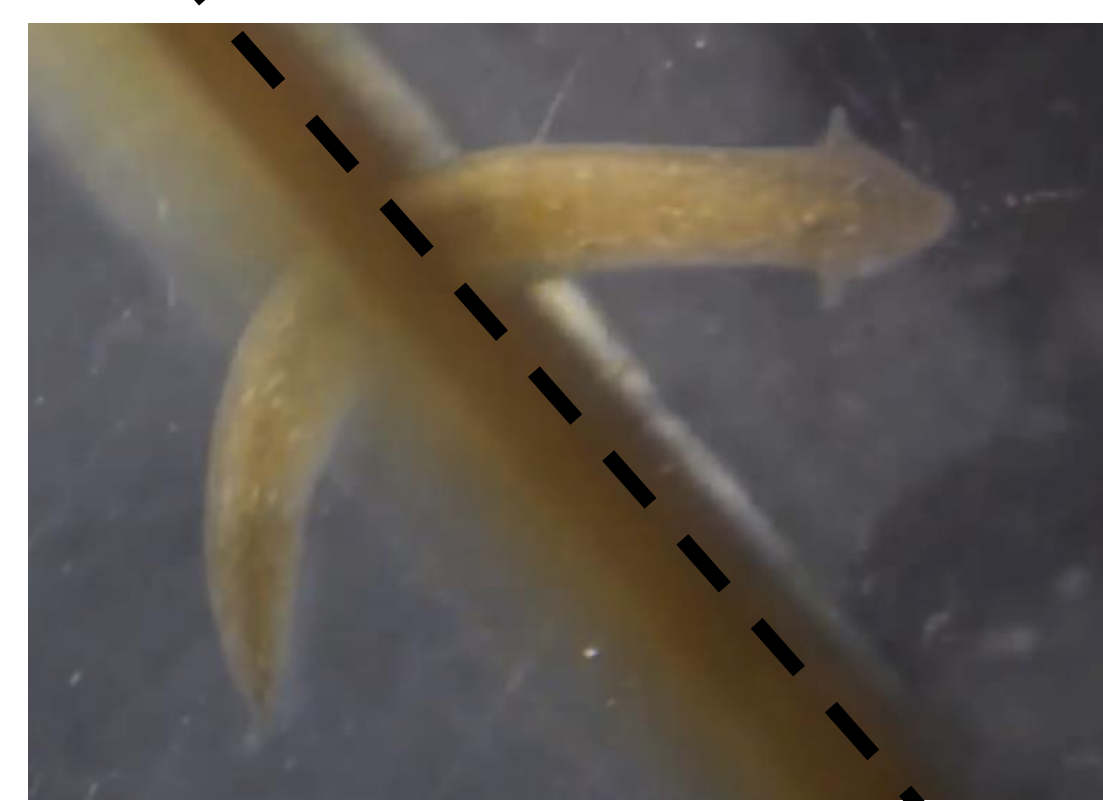
What determines the excitation threshold?



Flatworm: Master of Regeneration

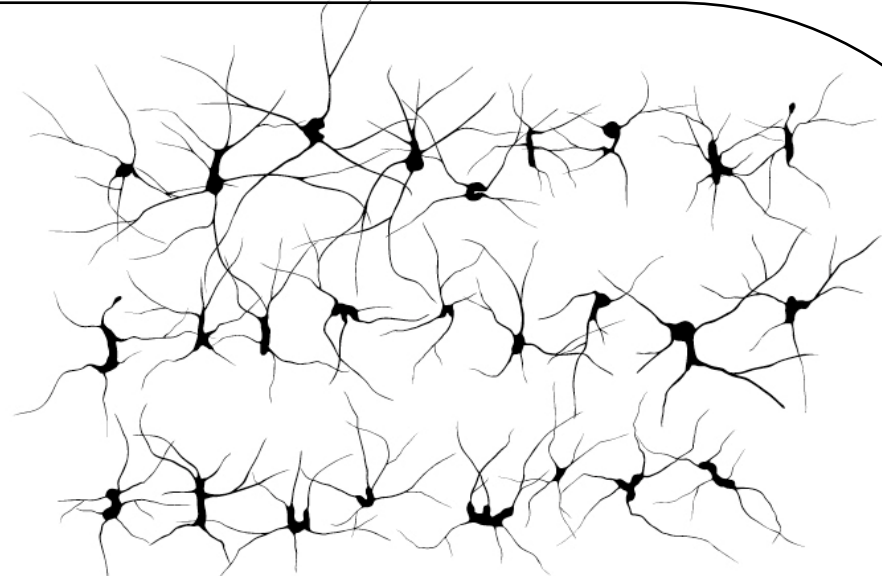
Make two out of one

After approx. 7 days a new head grows at the tail part



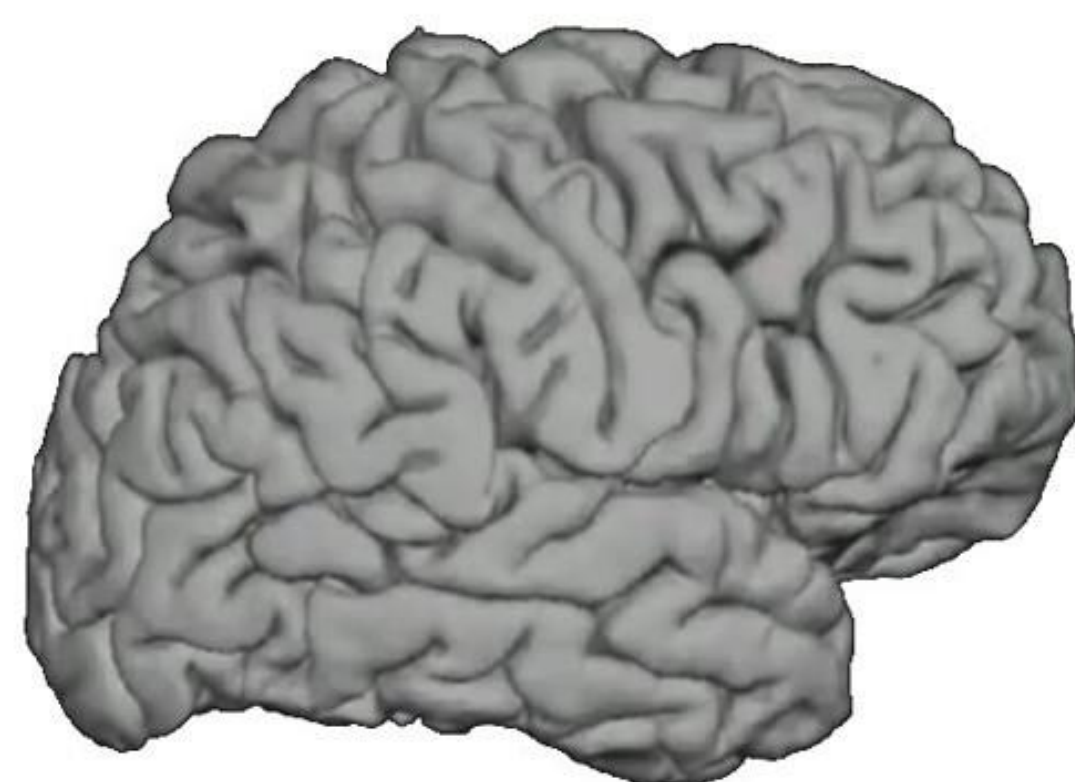
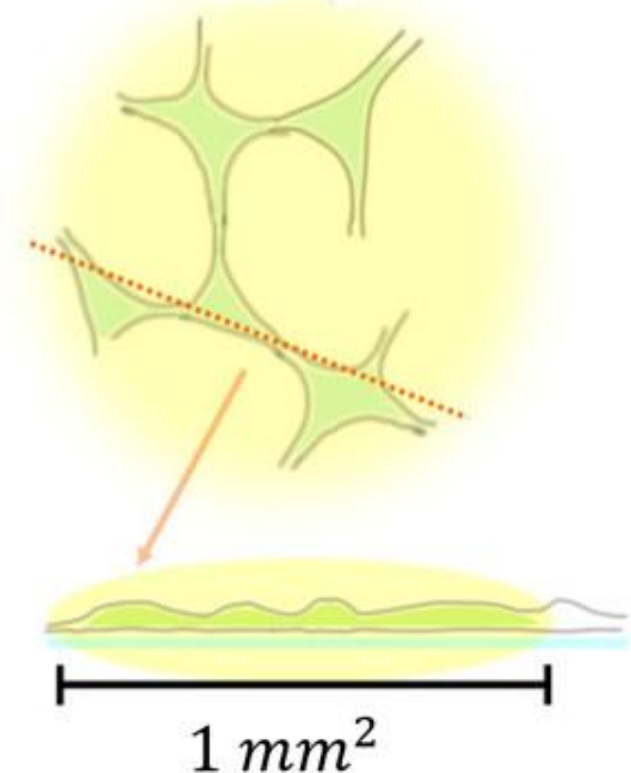
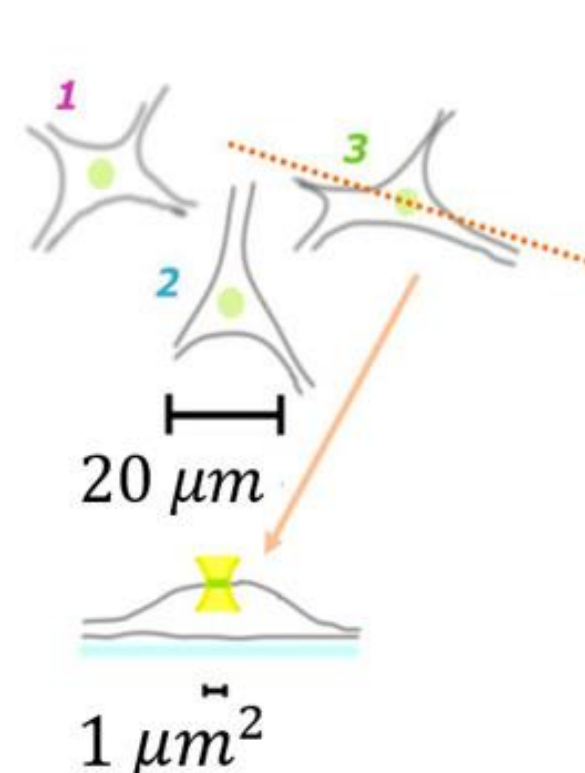
Cells and Cell Networks

How do single cells form robust functional networks that work together as an "orchestrated" organ?



Individual cells

Cell layer



Cells

Networks

Organ

Robustness/Adaptation

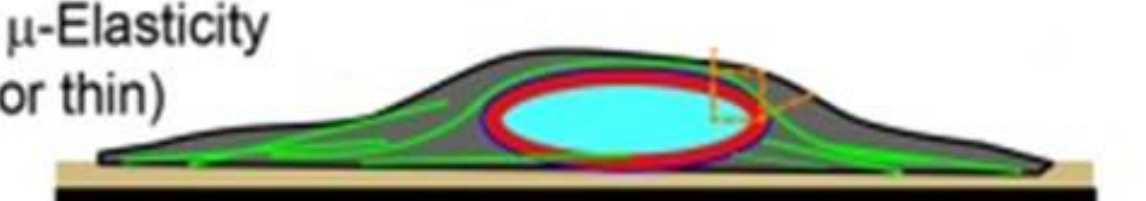
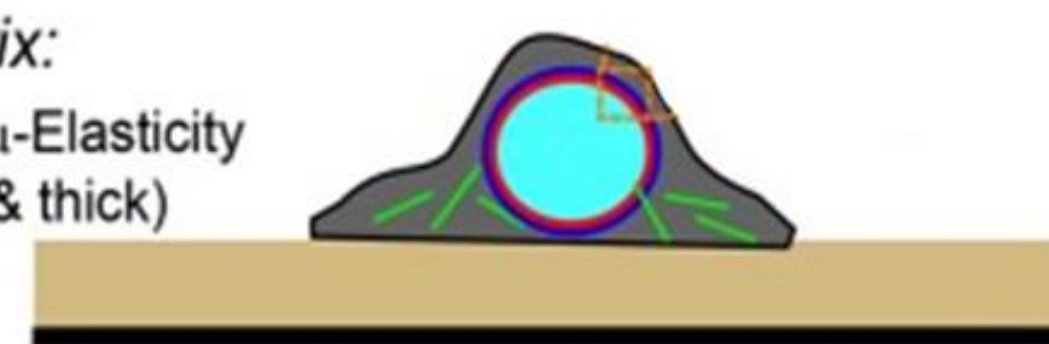
Cells are NOT fragile. They are robust or even antifrangible.

Substrate stiffness determines whether brain or bone cells develop.

Matrix:

Low μ-Elasticity (soft & thick)

High μ-Elasticity (stiff or thin)



Brain

Liver

Fat

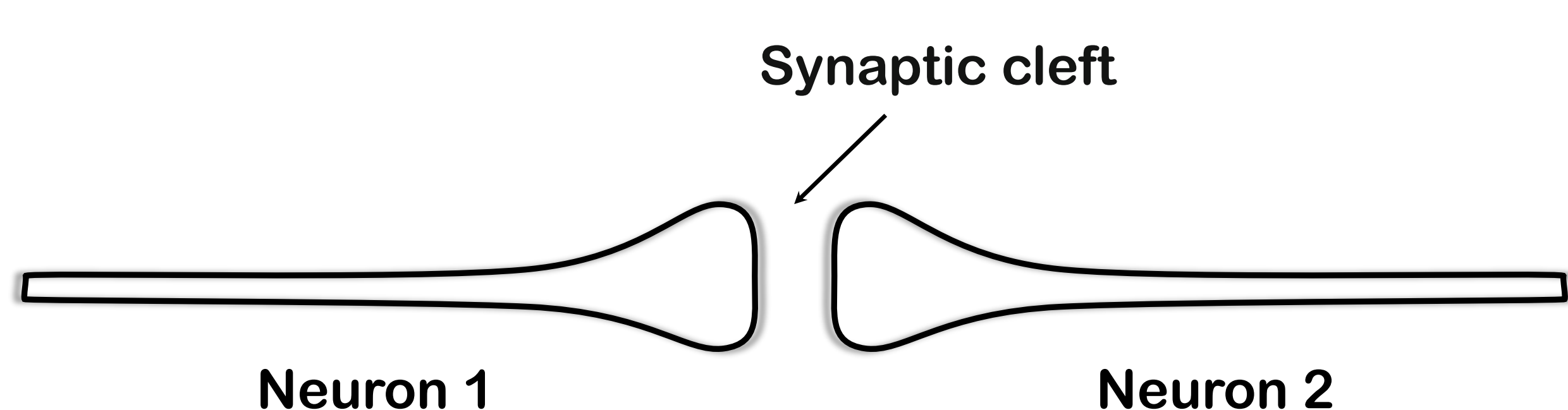
Differentiation

Cartilage

Bone

Synapses

How do chemical synapses work?



Interested in writing a thesis?
Would you like a lab tour?

Feel free to contact us!

anne.paeger@tu-dortmund.de