

### Exam 31.01.2024

1. Discuss the Goldman-Hodgkin-Katz (GHK-) current equation by providing a graph for the  $i - V$  relation. Assume a single permeant, univalent cation present at tenfold increased concentration inside the cell. What can be learned from the voltage if  $i = 0$ ?
2. Why is external pressure required for forming a lipid monolayer at the air-water interface, whereas lipid bilayers can form highly compressed structures without external pressure? (please provide a sketch and a brief explanation)
3. Mobility in membranes can be determined by the equation  $\langle x^2 \rangle \propto t^\alpha$ , where  $\langle x^2 \rangle$  describes the mean square displacement. Discuss which modes of motion can be characterized by  $\alpha < 1$ ,  $\alpha = 1$ ,  $\alpha > 1$ . What can be the molecular origin of these processes?

### Exam 01.02.23

1. Cooperativity: how cells are activated
2. Explain why the partial specific volume of a protein is generally not identical to the reciprocal density of the pure protein substance?
3. Why is external pressure required for forming a lipid monolayer at the air-water interface, whereas lipid bilayers can form highly compressed structures without external pressure? (please provide a sketch and a brief explanation)
4. Transport: different types of movement: where do they come from?  $\langle x \rangle$ ,  $\alpha$ -coefficient which movement can be explained

### Exam 08.02.22

1. Discuss the Goldman-Hodgkin-Katz (GHK-) current equation by providing a graph for the  $i - V$  relation. Assume a single permeant, univalent cation present at tenfold increased concentration inside the cell. What can be learned from the voltage if  $i = 0$ ?
2. Why is external pressure required for forming a lipid monolayer at the air-water interface, whereas lipid bilayers can form highly compressed structures without external pressure? (please provide a sketch and a brief explanation)
3. Explain why the partial specific volume of a protein is generally not identical to the reciprocal density of the pure protein substance?

**Exam 03.21:**

1. Goldman-Hodgkin-Katz current equation
2. loaded particle: probability distribution
3. explain why reciprocal density  $\neq$  partial specific volume

**Exam 2018**

1. Sie haben eine Zelle, mit einem Oberflächenpotential auf der Membran. Wie und wodurch wird dieses Potential abgeschirmt. Skizze.
2. Transportprozesse, welche Art (directed, random diffusion) erwarten Sie wo, wodurch kommen sie zu Stande.
3. Membran, Arten, wie formen sie sich, innerer Druck in Membranen