ELT 72106 Cellular Interactions

1. Explain briefly:
   a. Local adhesion in cells
   b. Micro electrode array (MEA)
   c. Gap-junction in cells
   d. Patch Clamp measurement

2. Mechanisms of mechanosensing in cells

3. ~~Kerro esimerkki miten voit~~ mallintaa sydänsolun ionikanavia ja aktiopotentiaalia?

4. Describe an example how to make mathematical model of a single ion channel or myocardial action potential?

5. a) A cell in 37°C temperature has the following ionic concentrations and membrane permeabilities:

	Intracellular concentration(mM)	Extracellular concentration (mM)	Relative permeability
K^+	135	5	1
Na^+	15	140	0.05
Cl^-	5	110	0.45

Calculate the resting membrane potential of the cell using the Goldman-Hodgkin-Katz equation.

Constants:

$$R=8.3145 \ \frac{J}{K\,mol} \ , F=96485 \ \frac{C}{mol} \ , k_B=1.3807*10^{-23} \ \frac{J}{K} \ , e=1.602*10^{-19}C$$

b) Describe the meaning and purpose of the Goldman-Hodgkin-Katz equation – compare it to Nernst equation?