**Concept course Cell Biology FS 2011**

**Bei diesen Fragen handelt es sich nicht um die original Prüfungsfragen, sondern nur um relativ gute Erinnerungen : )**

**Suter**

Describe how it could be shown experimentally (give the technical details) that Oligodendrocyteprecursor cells can myelinate demyelinated axons in an experimental mouse model. What is the significance/importance of this in human disease? (6 points)

**Jessberger**

1. Give a factor that induces differentiation of neural stem cells into neural cells in the neural stem cell niche of the subventricular zone or the dentate gyrus. (1 point)
2. Give the name of a cell that produces such a factor. (1 point)
3. Describe 2 strategies how you can generate a patient-specific neural cell out of fibroblast of this patient. (2 points)
4. What is “pluripotency”? How can you determine which type of cells a mouse embryonic stem cell can produce? (2 points)

**Niemann**

1. Mitochondria are influenced by mitochondrial and genomic DNA. Describe differences regarding inheritance and disease progression between these two. (2 points)
2. Imagine a damaged mitochondrium in a neuron. The other mitochondria in the neuron are healthy. Describe the process how the defective mitochondrium is eliminated. Why do defects in these processes often lead to neurodegenerative diseases? (4 points)

**Werner**

1. Name 3 roles of the blood clot in wounds. (3 points)
2. Name 3 functions of macrophages in wound healing (3 points)

**Werner**

Please specify 3 modes (3 points) with corresponding examples (3 points) how proteases can affect growth factor activity/signaling. (6 points)

**Werner**

1. Name two reactive oxygen species. Are these radicals? (2 points)
2. How can intracellular reactive oxygen content be measured? What is the underlying principle? How is it detected? (2 points)
3. How can protein oxidation be measured? How is the method called? What is the underlying principle? How does the detection work? (2 points)

**Krek**

1. How many mTor complexes have been detected in humans? What is their function? Describe how mTOR is inhibited by Rapamycin mechanistically. (2 points)
2. Cancer cells show a different metabolism when compared to normal proliferating cells. Describe the differences, associated metabolites and their function. (3 points)
3. What is the function and cellular location of VDAC? (1 points)

**Kovacs**

1. Define the two branches of SREBPs in cholesterol regulation, including the concept of convergent feedback inhibition. (2 points)
2. Why do defects in cholesterol synthesis often lead to defects in embryonal development? (1 point)
3. Name 5 major metabolic pathways taking place in the peroxisome (0.5 points)
4. Describe the peroxisomal matrix protein import. (2 points)

**Krishnan**

1. List factors involved in mitochondrial biogenesis and/or fatty acid synthesis.
2. How do these factors contribute to mitochondrial biogenesis and fatty acid synthesis? Mode of action?
3. Describe how the oxygenated state of a cell influences its metabolism. What are mediators of these responses?