**Cell Biology Questions FS 2017**

**PART 1 – Nervous system and Multiple Sclerosis**

What is the purpose of myelinating cells (oligodendrocytes/Schwann cells)?  
Name diseases when myelination does not occur as intended?  
What is the mechanism by which the oligodendrocytes myelinate axons (name the steps)?  
Conceptual steps leading to myelination?  
Proteins in CNS and PNS? What is their intended function?  
Define Node of Ranvier in detail. What is their function and how does it work?  
Describe CMT(1A). What are the genes involved in this disease?  
What are advantages and disadvantages when using the zebra fish model organism?  
Describe Schwann cells development. What are the major genes during each developmental step?  
Explain the prion theory?  
Describe the importance of NRG1-III in detail?  
How does Rapamycin inhibit mTOR?  
In which processes are mTORC1 and mTORC2 involved?  
Explain HNPP?  
How does PNS regeneration happen? How does CNS regeneration happen?  
Why is there no complete regeneration in the CNS?

How does Natalizumab/Tysabri work?  
Explain risk stratification!  
What do we know about the cellular pathology of MS?  
Explain the EAE model?  
Explain the oligodendrocyte death model?  
Explain the different types of MS?  
How do oligodendrocyte sense the energy needs of an axon in detail (with proteins involved)?  
What is adaptive myelination and how does it occur?

**PART 2 – Embryology**

How can you induce pluripotency in a cell?  
Describe the evolution of a zygote to an embryo with all developing structures and the genes/TF involved?  
Which ES cells are capable of giving rise to the whole embryo when implanted into an 8-cell embryo?  
How can you create RPE? Which markers are involved?  
Explain LIF. Why is it important?

**PART 3 – Growth Factors and Angiogenesis**

Which growth factors are endocrine? Which are not?  
What is needed for endocrine growth factors to bind to their receptors (detailed answer)?  
Which growth factors are involved in angiogenesis?  
Where does excessive angiogenesis lead to? And insufficient angiogenesis?  
Name inhibitory factors of angiogenesis and their mechanisms?

**PART 4 – Wound Healing**

**PART 5 – Oxygen signalling and Lipid Metabolism**

**PART 6 – Peroxisomes and Autophagy**