Proposal for a syllabus “Neurotrauma- mechanisms and therapeutic approaches”

1. General background: brain and spinal cord injury- severity of trauma, causation, biomechanics of head trauma, general pathology (axonal injury, vascular injury and ischemia, brain swelling, long term effects in humans.

2. General background: Primary and secondary brain and spinal cord injury (cytotoxic oedema to inflammatory response and scar formation)- general picture, cell function after injury- major apoptotic pathways, inflammation, activation of astrocytes. (2 hours)

3. Glial scar formation- the good and the bad. Role of GFAP in CNS injuries. (4 hours)

4. Myelin debris and its effect on axonal regeneration. (2 hours)

5. Inflammation in neurotrauma. (2 hours)

6. Different animal models in studding neurotrauma- primate (human, monkeys), rodents (mice, rats), non-mammalian vertebrates (zebrafish). Advantages and disadvantages of each one. (4 hours).

7. Guidance molecules and their role in regeneration (ephrins, semaphorins). (2 hours)

8. Growth factors and their role in regeneration (BDNF, Fgf, ect). (2 hours)

9. Other therapeutic strategy mechanisms (lipids, hormones, autophagy, ect), (2-4 hours)

10. Stem cell therapies for spinal cord injury. (2 hours)

11. Student presentations (4-6 hours). 10-15 minutes each presentation. Presentation of scientific paper that examines a specific therapeutic approach in regeneration after brain or spinal cord trauma followed bud hors discussion. May be done in groups or individually- depend on the number of students.

Total 28 hours equals 14 meetings