NeuroKine Workshop

Neuropathology

November 11 – 14, 2013

Venue:
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The aim of the course is to provide a comprehensive overview on potential and limitations of neuropathological analysis of experimental and human CNS diseases. This will be done by lectures, covering topics of neuropathological techniques, on key neuropathological features of experimental and human CNS diseases and on modern technologies of molecular neuropathology. In addition we will provide a practical course and demonstration of neuropathology at the discussion microscope. Also we intend to organize a trouble shooting session on the afternoon of Wednesday, in which the participants will have to chance to bring material from their own for discussion and help in interpretation.

Program:

Monday November 11, 2013

09:00: Welcome

09:15 – 12:00: Lectures:

Neuropathological techniques: what is available, how are they properly performed; what are the limitations and artefacts ?

Conventional stains
Histochemistry
Immunocytochemistry / Confocal Laser Microscopy
In situ Hybridization
Electron Microscopy
Quantification techniques
Future Techniques
What controls do we need?

13:00 -17:00: Practical Course

Microscopical Course in Neuroanatomy and Neuropathology: How to identify different cells in CNS and PNS, How to evaluate the specificity of staining and to identify artefacts; How to transform 2 dimensional information in sections to the 3rd dimension (space) and the 4th dimension (timing of lesion evolution).

Practical demonstration of histological techniques in the laboratory; tissue embedding, cutting, staining etc.

Tuesday November 12, 2013

09:00 – 12:00: **Lectures: Potential and Limitations of Experimental Models for CNS Disease**
Inflammatory models
Models for demyelination and remyelination
Models for neurodegeneration
Relevance of the models for human disease (MS, NMO etc.)

13:00 – 17:00: **Microscopical Course of Neuropathology (Experimental Models):**

Similarities and differences of different models of inflammatory demyelination
T-cell mediated (CD4 versus CD8 T-cell driven models)
Modification of lesions by auto-antibodies (MOG models, NMO models)
Models induced by innate immunity
Virus models of inflammatory demyelination
Models of toxic demyelination
Experimental models of neurodegeneration

Wednesday November 13, 2013

09:00 – 12:00: **Lectures: Key pathological features of human inflammatory CNS diseases**

T-cell mediated: Acute disseminated encephalomyelitis
Cytotoxic T-cell mediated: Paraneoplastic diseases, Rasmussen's encephalitis
T-cell & Antibody mediated: Neuromyelitis Optica
Antibody mediated: Diseases mediated by antibodies against transmitter receptors or ion channels
Multiple Sclerosis
Virus infections of the CNS
Common amplification factors of tissue injury in the aging brain

13:00-17:00: **Microscopical Course of Human Neuropathology**
Strategy to reach a neuropathological diagnosis;
How to identify and stage lesion in the CNS
Demonstration of examples of diseases, discussed in the morning session

Trouble Shooting session: Participants are invited to bring material from their own projects, in which there are difficulties regarding neuropathological interpretation. This will be reviewed and discussed within this session.

Thursday, November 14, 2013

09:00-12:00: **Strategies to perform molecular studies in pathological material**
The complexity of CNS lesion architecture and the need for micro-dissection
How to select proper autopsy material for RNA isolation by in situ hybridization
Techniques of RNA isolation and array platforms for paraffin material
Interpretation of gene expression results

13:00-17:00: **Microscopical Course of Human Neuropathology**
Continuation of Wednesday afternoon session

Practical laboratory demonstration of in situ hybridization: techniques and pitfalls.