

SPIN 3 (VU1 #000042) "From molecules to function" (7 lectures, 90 min each)

1 Development of the CNS (Klimaschewski)

the neurone doctrine, brain evolution and adaptation, homology and analogy, neural induction and pattern formation, neurogenesis and migration, neural stem cells, axonal growth cones and pathfinding, target selection

2 Basic concepts of neuronal connectivity (Ferraguti)

molecular and structural features of chemical transmission, asymmetric and symmetric synapses, electrical synapses, quantum, life cycle of synaptic vesicles ('kiss and run'), synapse elimination, bungarotoxin; projection neurons, interneurons, role of glia, synchronisation, unconventional transmitters (the NO story), information processing in dendrites, global output determined by the axon initial segment

3 Basic concepts on defined microcircuits (Schwarzer)

hippocampal formation and temporal lobe epilepsy, cognitive development and aging of temporal lobe function, memory mechanisms and dementia, Aplysia and Aglantha (jellyfish) as learning models (LTP)

4 Basic concepts on defined microcircuits (Wenning)

basal ganglia and movement disorders including PD, MSA, Huntington's disease and Tourette's syndrome, descending movement control and its disorders including motor neurone disease, cerebellar circuits including ataxias

5 Basic concepts on defined microcircuits (Saria)

reward circuits and addiction, mechanisms of motivation, prefrontal and executive functions, aversion systems, inhibitory feedback control mechanisms (eating, drinking), drug dependence, nondrug addictions, use of c-Fos immunohistochemistry in functional studies

6 Basic concepts on defined microcircuits (Singewald)

amygdala and fear/anxiety disorders, pathomechanisms of depression and mania, MAO/COMT/AChE inhibitors, post traumatic stress and panic disorders, neural circuits of 'forgetting'

7 Visual systems (Dechant)

development of visual pathways, critical periods in different species, comparison of microcircuits in retina and olfactory bulb (lateral interactions, feedback), Kuffler's study of center-surround ganglion cells, retinal and cortical maps, defects in color vision, motion detection, object and spatial recognition