

Some fresh ideas on architecture of cognitive processing and Alzheimer's disease pathogenesis:
possibilities for translation into clinical practice

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In my talk I will try to integrate and interpret recent insights obtained with different structural and functional neuroimaging modalities such as fMRI, EEG/MEG, DTI, and SPECT/PET through description of the several major neuronal networks of the cerebral cortex and their deterioration during Alzheimer's disease. Likewise, I will overview the search for the biomarkers and genetic factors contributing to Alzheimer's disease. Then, I will describe discoveries in relation to evolution and functional specialization of "concept" neurons and their role in formation of long-term declarative episodic memories, as revealed by microelectrode recordings in epileptic patients. Finally, cognitive enhancement and therapeutic possibilities using transcranial magnetic stimulation (TMS - spTMS, rTMS) and transcranial electrical stimulation (TES - tRNS, tACS, especially anodal tDCS) will be discussed.