

ADULT HIPPOCAMPUS NEUROGENESIS IN HEALTHY AND ALZHEIMER SUBJECTS

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Adult hippocampal neurogenesis is abundant in neurologically healthy subjects and drops sharply in patients with Alzheimer's disease

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ADULT HIPPOCAMPUS NEUROGENESIS (AHN)

- Addition of new neurons throughout life into the dentate gyrus (DG)
- At the core of hippocampus plasticity
- Well described in rodents
- First described in humans in 1994 (Eriksson et al.) but lack of consensus
- Limited availability of human tissue and heterogeneity of processing methodologies

POPULATION

- 13 healthy Braak 0 subjects (age 43 87y)
- 45 AD subjects (age 52 97y) distributed among Braak I -Braak VI
- Brains obtained under controlled conditions and state-ofthe-art processing
 Braak stage I
 Braak stage II



IDENTIFICATION OF IMMATURE NEURONS





DCX : doublecortin (immature neurons) NeuN : Neuronal nuclei (mature neurons)



MODEL OF DIFFERENTATION STAGE IN HUMAN ANH

- Well-characterized sequence of maturation stages in rodents
- PROX 1 = Protein/Gene produced primarily in dentate gyrus
- Co-expression DCX+ / POX 1 (91%)
- Subpopulations of DCX+ cell with variable degree of maturation in human dentate gyrus



AHN IN ALZHEIMER'S DISEASE SUBJECTS



AHN IN ALZHEIMER'S DISEASE SUBJECTS



TAKE – HOME MESSAGE

- Detection of AHN markers in humans is critically dependent on fixation conditions and pretreatment of the tissue
- Demonstration of AHN in the adult human dentate gyrus until the ninth decade of life
- First model of differentiation stage of human ANH
- Impairment of the maturation with Alzheimer's disease, even at early stages of the pathology.

