

English Short Summary Thesis Cathrin Canto (250 words)

Layer Specific Integrative Properties of Entorhinal Principal Neurons

The entorhinal cortex (EC) is involved in memory processes and research on this area is of interest for the society, since in a long run it may help finding medication for patients suffering from memory dysfunctions as seen in Alzheimer's disease.

Researches in a number of species indicate that within EC at least two subdivisions can be differentiated, generally referred to as the lateral and medial EC (LEC and MEC, respectively). MEC is involved in spatial memory 'where does something happen', whereas LEC is important for memory about what is happening.

The central hypothesis of this thesis is that differences in morphological, physiological and local network properties are key elements to explain these reported functional differences between LEC and MEC. Further it is known that functional differences may also depend on differential inputs and how they are integrated. Therefore we examined whether neurons in different layers of MEC react differently to two important input structures, the pre- and parasubiculum. Likely, the pre- and parasubiculum send directional information to MEC, comparable to what a compass can provide us with.

The results show that properties of neurons of one specific cell layer differentiate MEC and LEC, whereas the remaining networks are comparable. Further in MEC differences exist in how similar neurons integrate different inputs and how different neurons integrate similar inputs. These data support

the hypothesis that functional differences may partly be explained by layer- and area-specific properties of neurons and possibly might be affected by how different neurons uniquely integrate inputs.