involved in spatial coding and spatial memory. Genetic manipulations included ablations of glutamate receptors or electrical coupling in GABAergic interneurons in the whole forebrain, or locally in the hippocampal-entorhinal formation. Our studies underline the functional role of local GABAergic interneurons for spatial or temporal coding in the hippocampus. The genetic manipulations were always associated with distinct spatial memory deficits. These results will be summarized and discussed in the context of current models of memory formation and storage.

In addition I will present data demonstrating the presence of long-range GABAergic cells that bilaterally connect the hippocampus and entorhinal cortex[3]. Also these data will be discussed in a larger context, since there is good reason to believe that long-range GABAergic neurons are more abundant in the forebrain as previously thought. By virtue of their connectivity – the target cells are most often local interneurones – this class of cells is ideally suited to synchronize brain regions over long distance. Like local GABAergic interneurones, long-range GABA cells do not constitute a homogenous cell population. Thus, we identified long-range GABA cells expressing somatostatin that project from the hippocampus to the medial entorhinal cortex and long-range parvalbumin-positive cells that project from the medial entorhinal to the hippocampus. Of note, in both brain regions there are additional long-range GABA cells whose neurochemical identity remains to be established.

References

