Table Explanation

This table helps us understand key similarities and differences in hippocampal gene expression and how this gene expression compares to other brain regions, across species, and how specific genes can inform us about functional differences. The gene expression concentration map reveals that the hippocampus has a unique gene expression profile that distinguishes it from other brain regions, but also shows gene expression similarities across all divisions of the hippocampus (Figure 4, Lein et al., 2007).Within the hippocampus, human brain transcriptome analysis demonstrates that each subdivision has different expression patterns that are sufficiently distinct to cluster together like-samples while distinguishing subdivisions from one another (Figure 5, Hawrylycz et al. 2012). Although distinctive expression patterns were found for major subdivisions of the hippocampus, CA3 and CA4 subfields were not discriminable (Figure 5, Hawrylycz et al. 2012). These differences in genome-wide gene expression patterns between hippocampal subdivisions was further substantiated through differential single gene expression confined to each specific division (Figure 7, Lein et al. 2007). Some examples of this restricted gene expression include *wfs1* which is solely expressed in CA1, *map3k15* which is expressed in CA2, and *Pvrl3* which is strictly expressed in CA3 (Figure 7, Lein et al. 2007). Furthermore, there are specific genes with gradient gene expression in divisions of the hippocampus such as *Col15a1*, which is expressed in a gradient in CA3 with higher expression proximal to DG (Figure 7, Lein et al. 2007). In addition to revealing distinctions between different brain regions and subdivisions of the hippocampus, differential gene expression patterns can also be seen within different anatomical planes and different parts of the neuron. *Nmb* and *Slit2* are two genes that show gene expression restriction in the ventral-dorsal anatomical plane, with *Nmb* being exclusively expressed in the dorsal DG and *Slit2* expression being restricted to the ventral DG (Figure 7, Lein et al. 2007). Other genes reveal similar patterns of gene expression restriction between specific structures of the hippocampal neurons, where *Nptx1* expression is found only in the soma of CA3 pyramidal cells and Mtap2 is strictly expressed in proximal and distal dendrites (Figure 9, Lein et al. 2007). While the majority of this data reveals differences in gene expression within individual animals, *CALB1* gene expression reveals differences in single gene expression patterns across different species (humans, rhesus monkey, and mouse) (Figure 5, Hawrylycz et al. 2012). Finally, 5 out of the 10 genes examined that were differentially expressed in hippocampal subdivisions are involved in cell adhesion, which suggests functional differences in this domain (Figure 7, Lein et al. 2007).