

Cell numbers in the reflected blade of CA3 and their relation to other hippocampal principal cell populations across nine species

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A reflected blade (RB) of CA3 is present in many species, including humans, but not in laboratory rats or mice. Distinguishing the RB from typical CA3, RB neuron may extend their dendrites into the dentate molecular layer or may not receive entorhinal inputs in some species. Direct evidence for RB function is absent, but, extrapolating from rodent CA3c, they are more likely to function with dentate neurons in pattern separation rather than with CA3 in pattern completion. We have shown before that the size of CA3 and hilar cell populations (including RB neurons) differentiate between taxonomic groups. In this study, we investigated three issues related to the RB in nine species in which RB cells and hilar polymorphic cells could be reliably distinguished: rock mouse, guinea pig, rabbit, hare, jackal, sheep, wild boar, roe deer and red deer. (1) we describe the histoarchitecture of the RB, and (2) the distribution of the Ca-binding proteins. (3) We answer how the assignment of the RB neuron population to CA3 or hilus impacts on taxonomic assessment. Our results show that (1) there are prominent RB septotemporal differences, (2) calretinin does not reliably distinguish between RB and hilar polymorphic cells, but, in some species between CA3 and the RB and (3) that the pooling RB and hilus results in a strong species differentiation, while assigning the RB to CA3 leads to clustering of all species that include humans.