Supporting Information

Jacobs 10.1073/pnas.1201880109

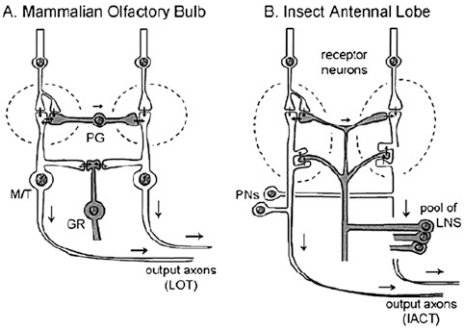

Fig. S1. Convergence in olfactory systems. (*A*) The first olfactory relay in the mammalian olfactory bulb. Receptor cells contact mitral tufted (MT) and periglomerular (PG) cells in glomerularly organized neuropil (dashed circles), creating parallel output pathways in the lateral olfactory tract (LOT). These are transected by lateral inhibitory connections from the PG and granular (GR) cells. (*B*) The first olfactory relay in the insect antennal lobe. Projection neurons (PNs), local interneurons (LNs). Reproduced from figure 5 of Ache and Young (1). Copyright (2005), with permission from Elsevier.

1. Ache BW, Young JM (2005) Olfaction: Diverse species, conserved principles. *Neuron* 48:417–430.

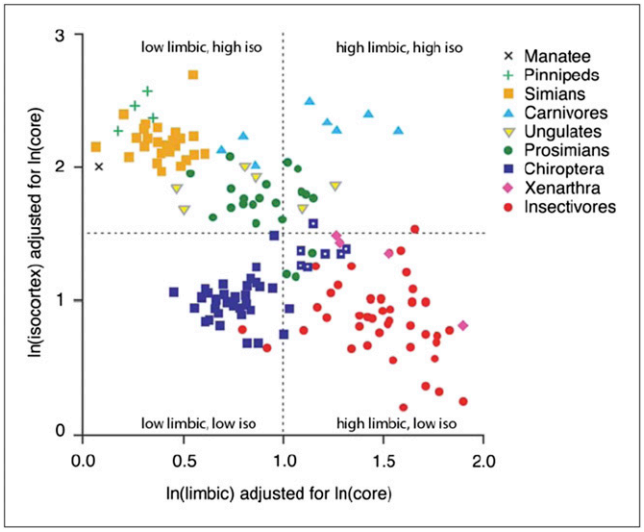

Fig. S2. The analysis of limbic system allometry by Reep et al. (1). The residual variance in the volume of limbic and isocortical components, referenced to brain core volume, in nine taxonomic groups. Blue squares with white centers represent pteropids. Reproduced from figure 5 of Reep et al. (1). Copyright S. Karger AG Basel.

1. Reep RL, Finlay BL, Darlington RB (2007) The limbic system in mammalian brain evolution. *Brain Behav Evol* 70:57–70.

NERVOUS SYSTEM	None	Nerve net	Brain
BEHAVIOR	Reactive movement	Directed movement	Extrapolation and prediction
ORIENTATION	Chemotaxis	Spatial olfaction	Multisensory bearing map
ERA	Ediacaran	Precambrian	Cambrian

Fig. S3. Summary of the proposed scenario for the evolution of spatial olfaction and the multisensory bearing map.