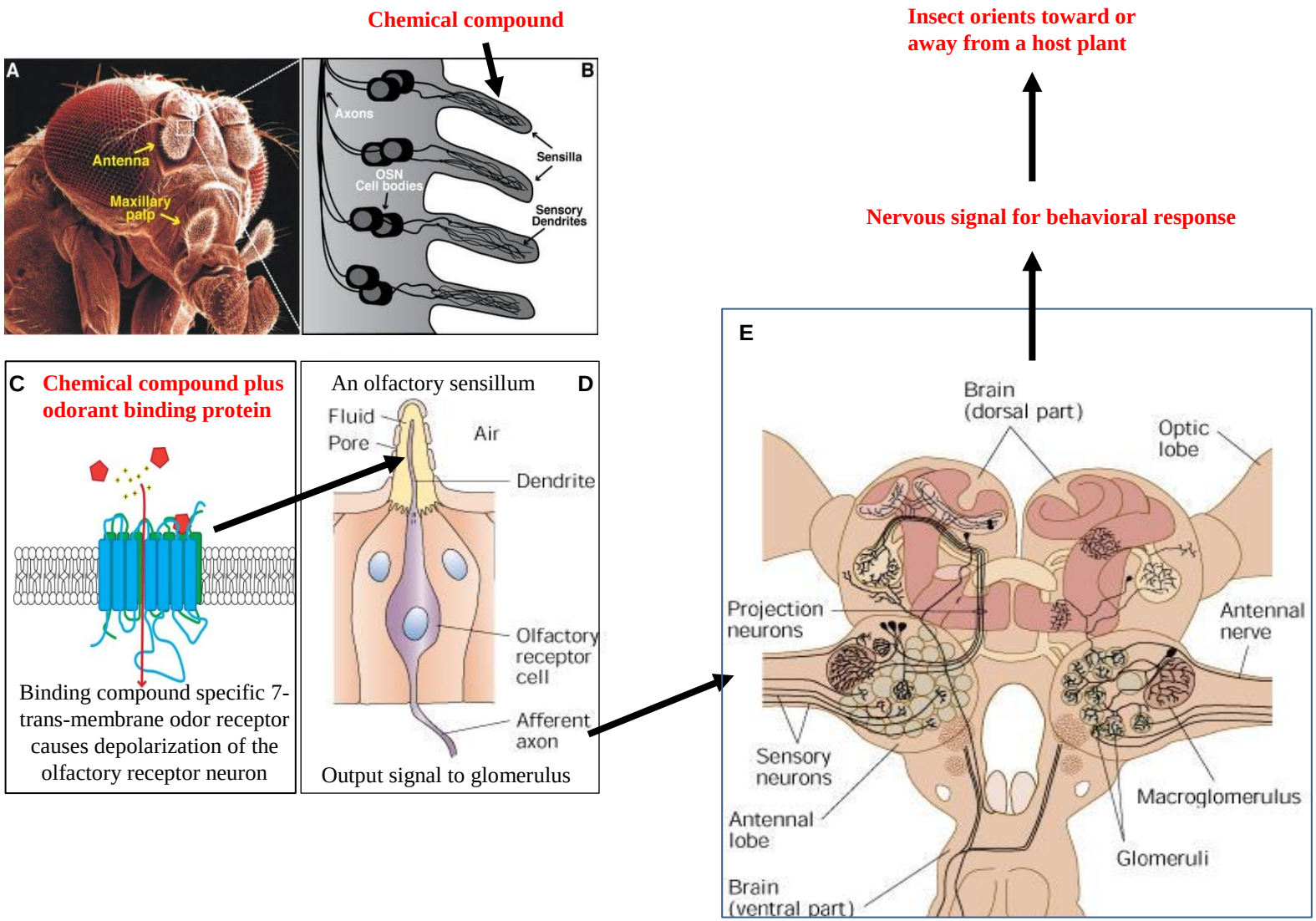
Supplementary Figure 1 – Insectory Olfactory System

Peripheral olfactory reception system

Central nervous system



Supplementary Figure 1 legend. Olfactory system of an insect. Shown are the peripheral sensory system (panels A-D) and central nervous system of an insect. The peripheral olfactory system of insects consists of chemosensory neurons (olafactory receptor cells or neurons- ORN) present in specialized sensory hairs called sensilla (see panels B & D). In many insects, olfactory sensilla are found on two pairs of olfactory organs on the head, the antennae and the maxillary palps (panel A). Odor molecules from the environment pass through pores in the cuticular walls of the sensilla (panels B & D) where they become bound to odor binding proteins (*Obp*) that transport the odor molecules to seven-transmembrane bound odorant receptor proteins (*Or*) that span the cell membranes of the dendrites of ORNs (panel C). Each *Or* binds to a unique type of class of molecule or compound, which confers specific odor response properties to the firing of the ORN. Output from the peripheral olfactory system ORNs is sent to two antennal lobes that contain a number of nerve cells organized into glomeruli (panel E). In most cases, the innervated axons of ORNs expressing the same *Or* converge to a single glomerulus in each antennal lobe. Thus, the number of glomeruli is approximately equal to the number of *Or* genes an insect possesses. Here, the ORN axons synapse with second order neurons that project to the higher brain centers in insects: the mushroom body and the lateral horn (panel E) to induce a behavioral response in the insect. The glomeruli are also the locations of local interneuron synapses, which enable the flow of information between glomeruli and likely play roles in organizing the input signal.