

Olfactory transduction: odorant transduction occurs through GPCRs

- There's approximately one receptor type per olfactory neuron, in which humans can have ~ 1000 different types of odorant receptors
 - o Each odorant receptor neuron, located in the mucosal endothelial layer of the nose just under the cribriform plate, project to **glomeruli** (discrete bundles of axons and dendrites located near the surface inside the olfactory bulb)
 - Each sensory neuron synapses on only one glomerulus, but on glomerulus can have projections from ~40 different sensory neurons
 - o Odorant receptors *aren't* very specific – one receptor can respond to many different types of odors
 - Thus, a specific odor is encoded based on the activity of *several types* of receptors, called **component processing**
 - If you increase the concentration of a specific odorant, it will bind to more receptors and you will perceive that odor more strongly
- Olfactory system pathways:
 - o After an odorant molecule activates a GPCR on the sensory neurons, glutamate is released onto glomeruli in the olfactory bulbs
 - This message is relayed via the **olfactory tract**, in which axons project from glomeruli to the **amygdala** in the **piriform cortex**. After this, axons can project to three different areas:
 - Axons projecting from the amygdala synapse in the **medial dorsal nuclei** in the **thalamus**, which then project on through to areas in the **orbitofrontal cortex**
 - o This pathway is responsible for the **conscious perception of odors**
 - Axons projecting from the amygdala can also synapse onto the **limbic system** or in the **hypothalamus**
 - o These pathways are responsible for **emotional responses elicited by specific scents**