Special senses

- Vision
- Hearing
- Smell
- Taste

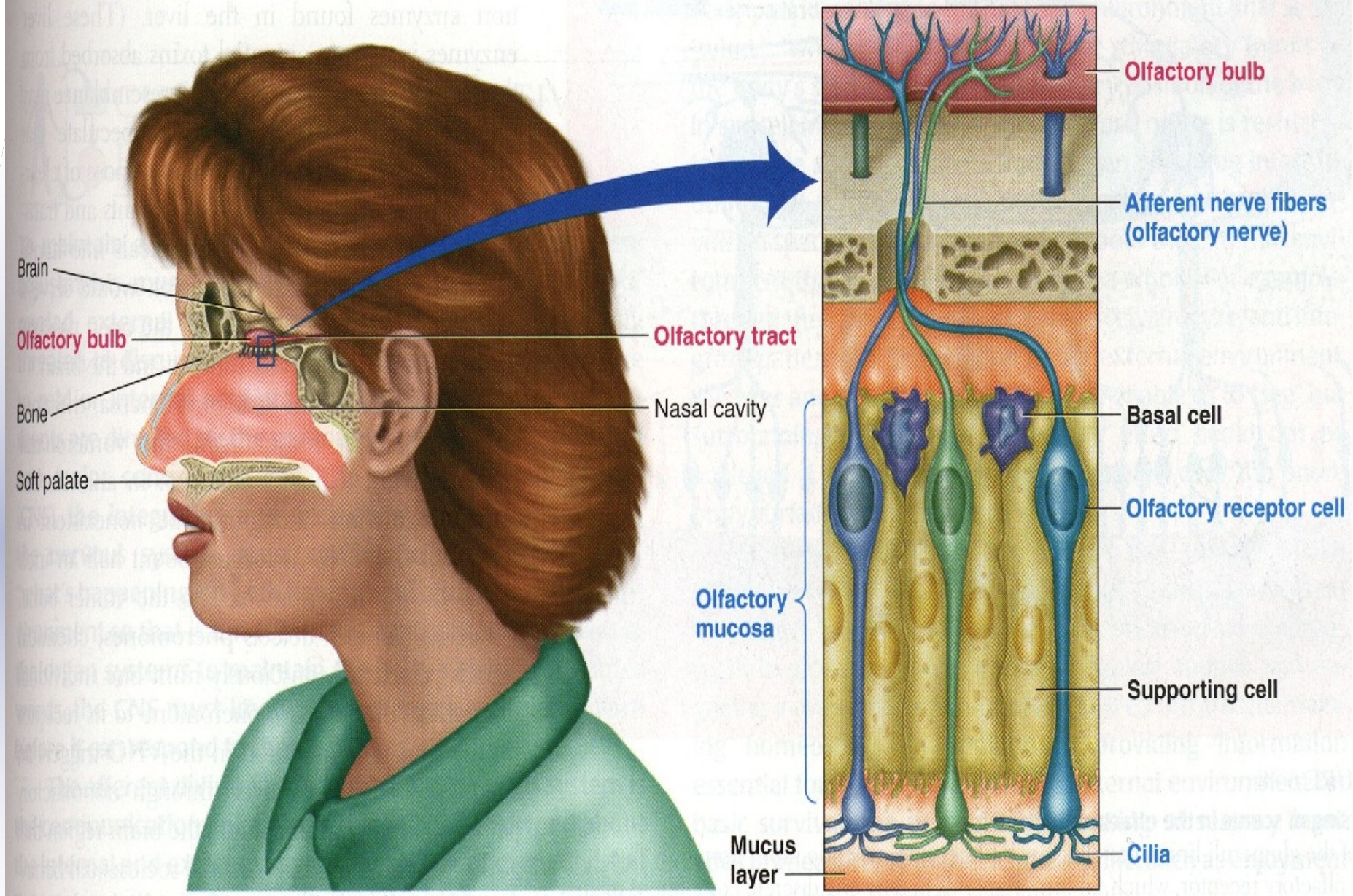
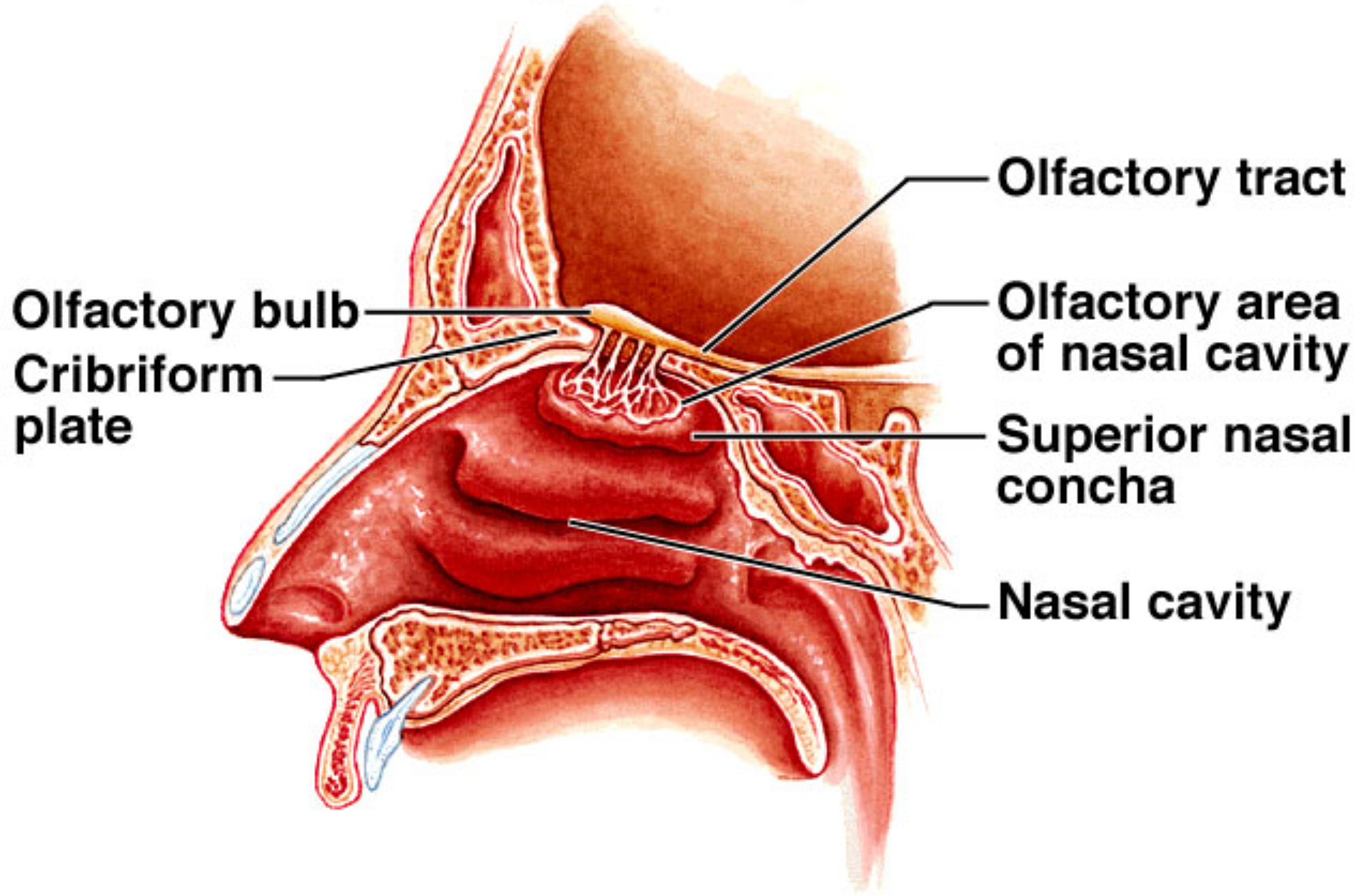


FIGURE 6-47

Location and structure of the olfactory receptors

Olfactory Receptor Cells



Smell

- **Anatomy**
  - **Olfactory mucus: in the roof of nasal cavity near the septum**
  - **Contain olfactory receptors (bipolar neurone)**
  - **Axons collected in bundles called fila olfactoria**

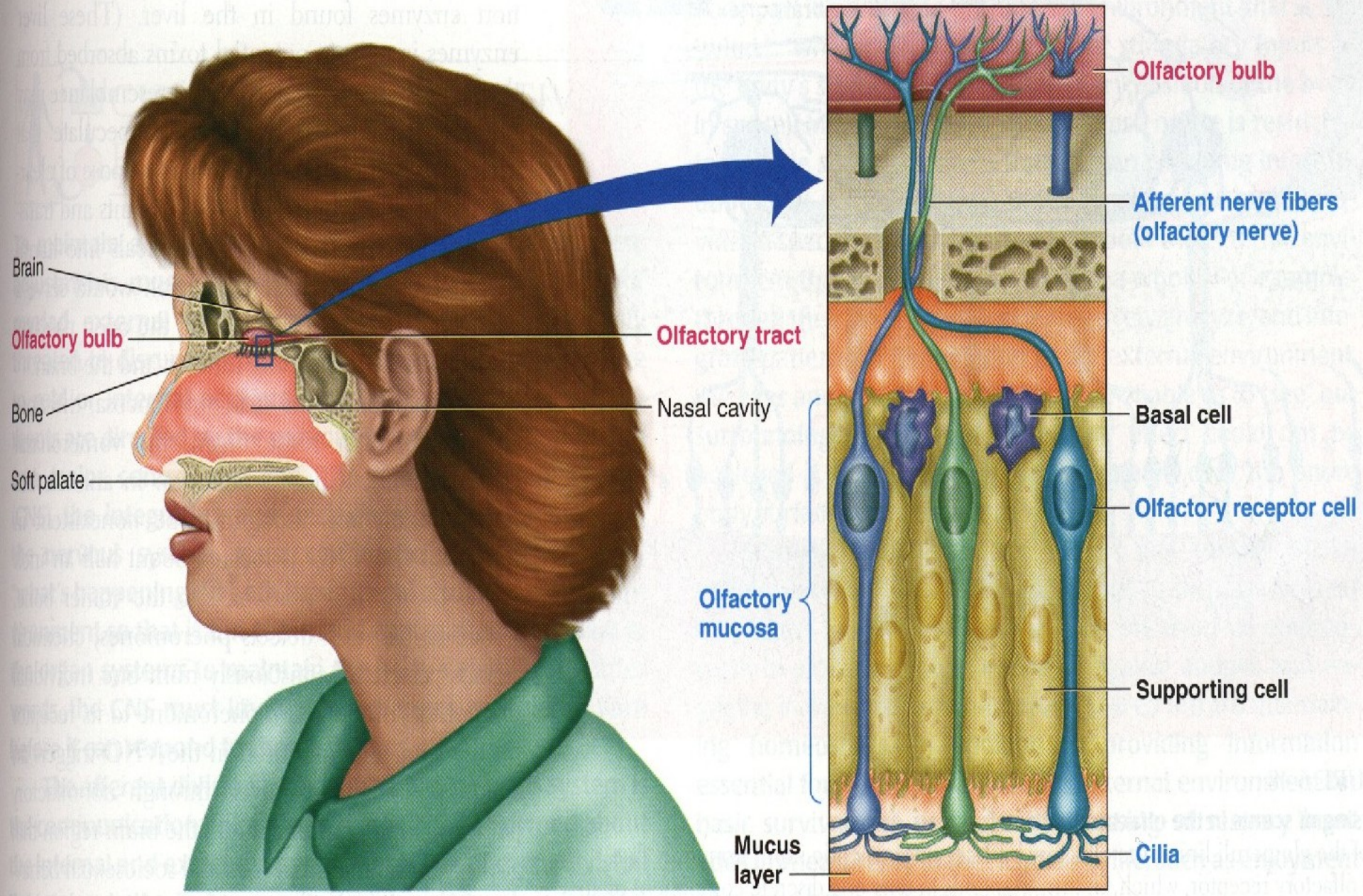
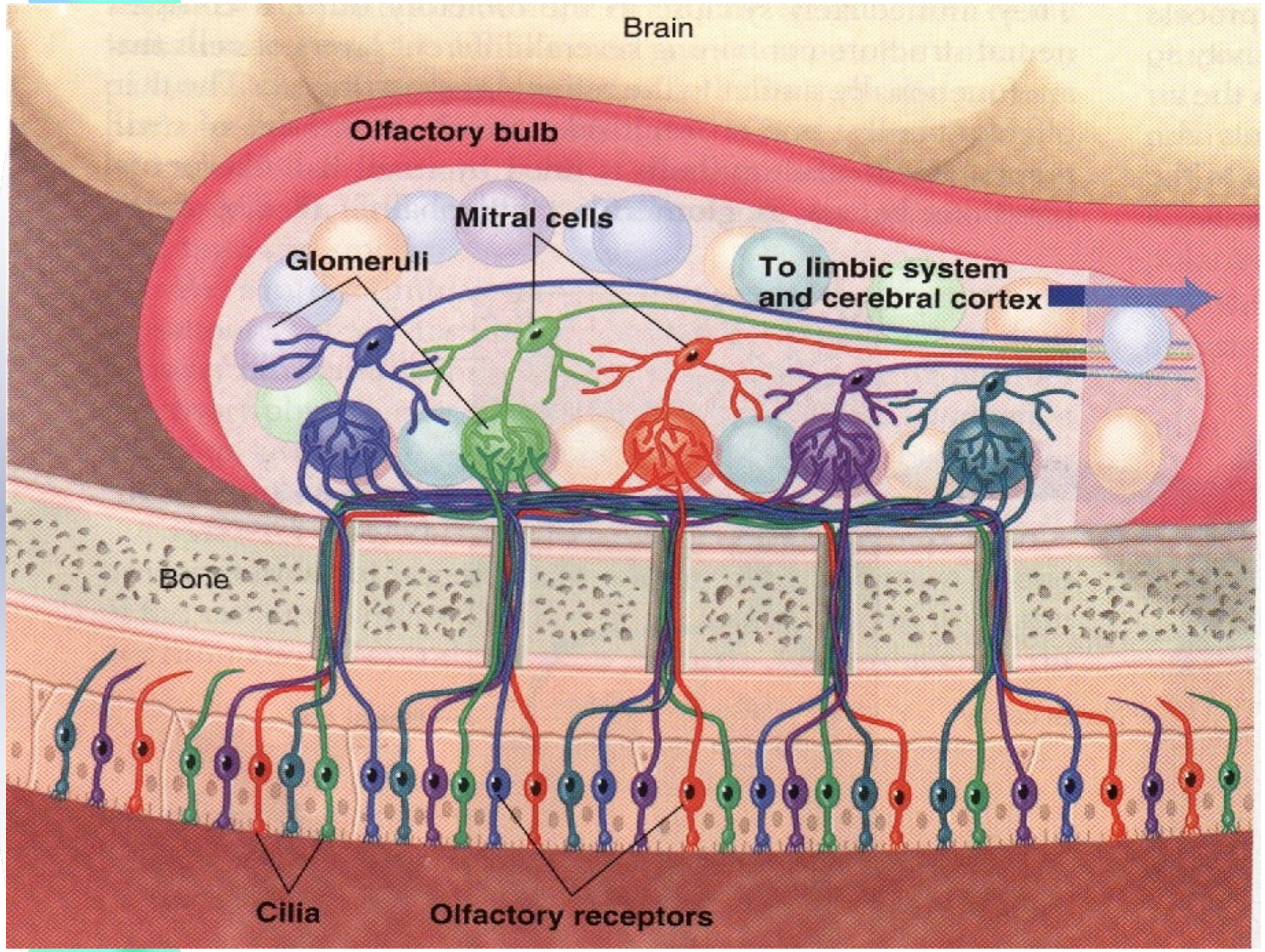
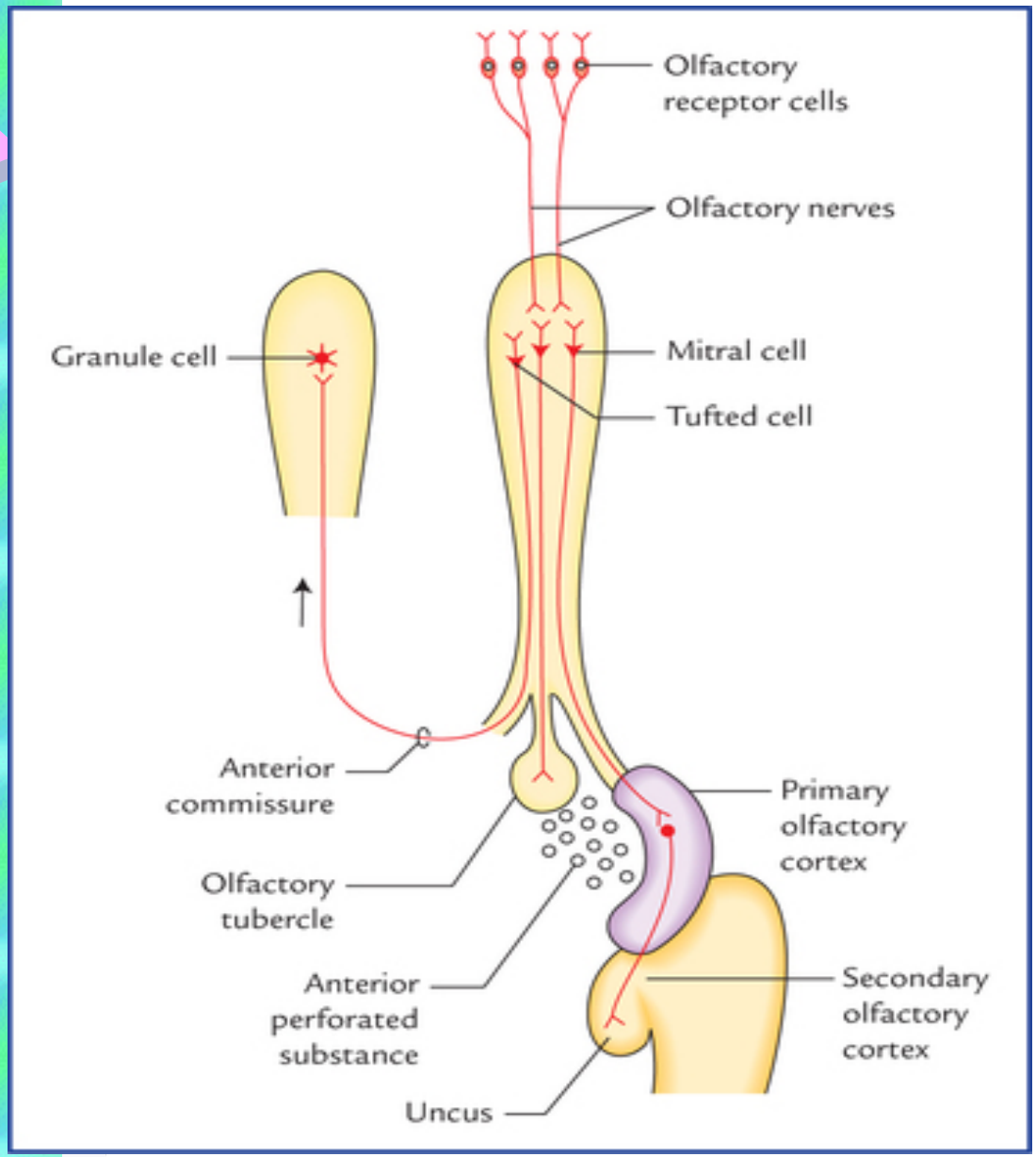


FIGURE 6-47

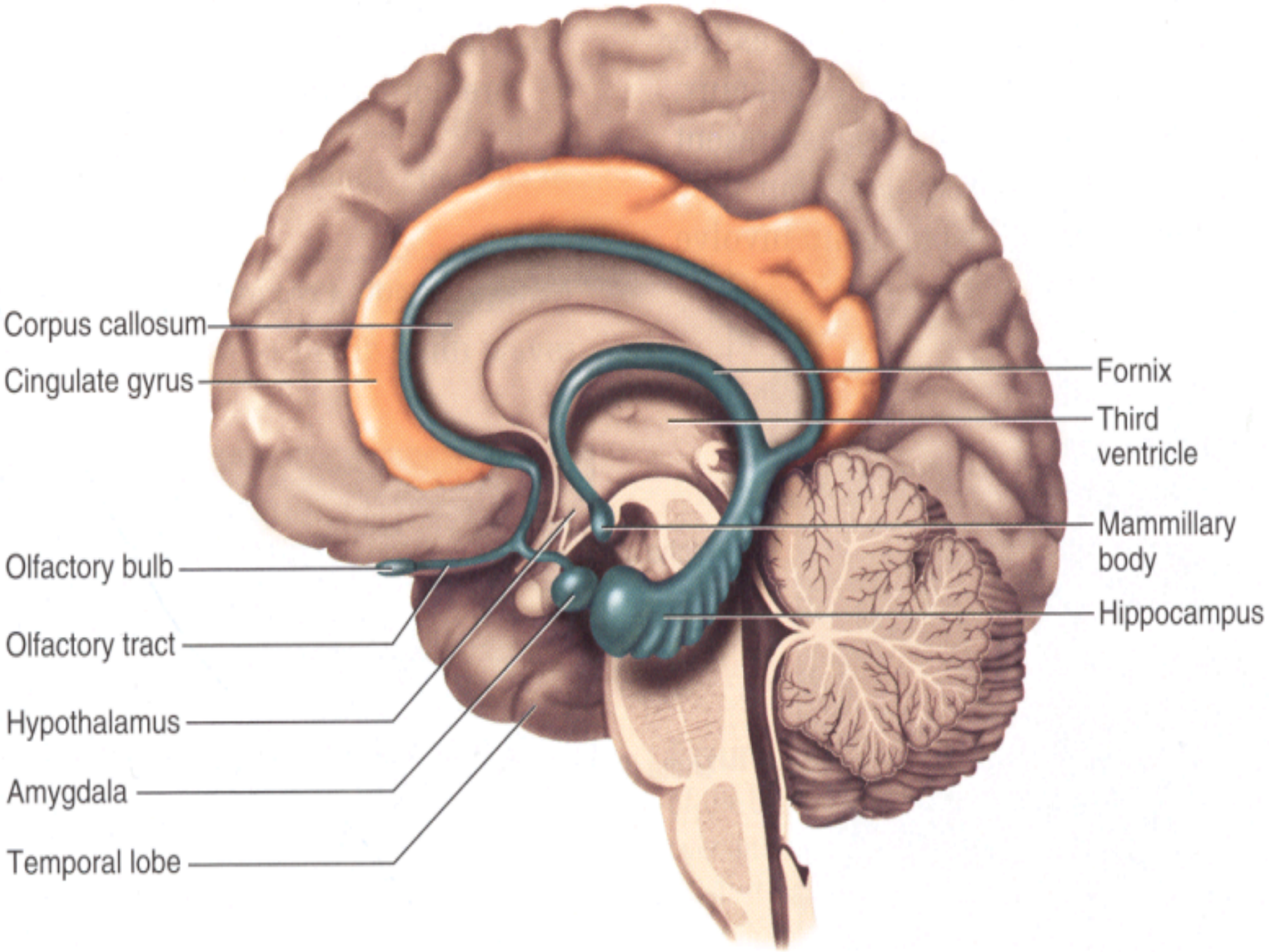
Location and structure of the olfactory receptors


Brain
Olfactory bulb
Mitral cells
Glomeruli
To limbic system
and cerebral cortex
Bone
Cilia
Olfactory receptors


Olfactory receptor cells
Olfactory nerves
Granule cell
Mitral cell
Tufted cell
Anterior commissure
Primary olfactory cortex
Olfactory tubercle
Anterior perforated substance
Secondary olfactory cortex
Uncus

Olfactory pathway

- Fila olfactoria inter olfactory bulb »»»» synapse with mitral and tufted cells :
- »»»» from mitral cells lateral and intermediate stria start »»»» end on ipsilateral cortex
- »»»» from tufted cells medial strai start then cross the midline & end on granular cells in opposite side (contralateral)
- Impulses travel along the olfactory tracts to the limbic system
  - (also involved in emotions and memory
- Impulses are interpreted in olfactory cortex
  - Deep in temporal lobe and base of frontal lobe


Corpus callosum
Cingulate gyrus
Olfactory bulb
Olfactory tract
Hypothalamus
Amygdala
Temporal lobe
Fornix
Third ventricle
Mammillary body
Hippocampus

Physiology of olfaction

- Molecules dissolve in mucus layer »»»» combine with receptors on cilia
- »»»» stimulate adenylat cyclase »»»» increase intracellular cAMP
- »»»» opening of Na channels »»»» receptors potential »»»» AP in olfactory pathway

- Human can differentiate between 2000-4000 odours
- Adaptation can occur to pleasant and nasty smells due to changes both in receptors and central connections

Pathophysiology

- **Anosmia: loss of smell sensation**
  - Due to damage to olfactory epithelium
- **Parosmia (dysosmia)**
  - Alteration in smell sensation
- **Hyperosmia (increase in smell sensation)**
  - Adrenal insufficiency
- **Hyposomia (decreased smell sensation)**
  - Vitamin A deficiency