ANATOMICAL OVERVIEW OF THE ORGAN OF OLFACTION

1. Frontal sinus
2. Anterior ethmoidal artery
3. Sphenoid sinus
4. Posterior ethmoidal artery
5. Anterior nasal artery
6. Sphenopalatine artery
7. Lateral posterior nasal arteries
8. Superior nasal concha
9. Major and minor palatine arteries
10. Hard palate
11. Incisive (incisor) artery
12. Anterior ethmoidal nerve
13. Maxillary nerve
14. Pterygopalatine ganglion
15. Lateral posterior nasal nerves
16. External nasal branch of anterior ethmoidal nerve
17. Internal nasal branch of anterior ethmoidal nerve
18. Locus Kiesselbachii
19. Medial posterior nasal arteries
20. Posterior ethmoidal nerve
21. Posterior nasal nerve (septal branch)
22. Nasopalatine nerve (of Scarpa)
Olfactory sensation belongs to the chemical senses, in particular for the detection of volatile molecules that are traveling freely in the atmosphere. Conversely, the other main chemical sensory function, taste, is based on the detection of compounds that are dissolved in liquid. This difference, however, is not as sharp as it appears because in both cases the molecules are ultimately dissolved in a mucous film overlying the receptor cells. If anything, taste and smell are far more separated by the way their signals reach the brain: olfactory information is the only modality in vertebrate animals that can access the telencephalon directly. All the other sensory inputs, taste included, reach the telencephalic centers via a diencephalic (thalamic) relay. This situation underscores the paramount importance of odor signals in the animal kingdom and, albeit to a lesser degree, also in humans.

The primary sensory apparatus of smell detection is situated in the olfactory mucosa of the nasal cavity. In man, this highly specialized region occupies a relatively small proportion of the nasal epithelium in the vicinity of the roof of the nasal cavity. Yellowish in color (as opposed to the reddish tint of respiratory mucosa), the olfactory region extends to the superior turbinate, sphenoethmoidal recess, the opposite part of the septum and the arching roof connecting the lateral and medial regions, underlying the cribriform plate. The vascular supply and innervation of the region in relation to the nasal cavity are shown in Fig. 3.1. Overall, the olfactory region represents an area of about 500 mm² in a corner of the nasal cavity, less exposed to the flow of air during quiet breathing. Active exploration of odors, however, is accompanied by pulses of deep inhalation called sniffing.

**Fig. 3.2**
Block scheme of olfactory epithelium. Adapted and modified after Bannister et al., 1999, *Gray’s Anatomy.*

1. Cilia of olfactory receptor neuron (ORN)
2. Microvilli of supporting cell
3. Dendritic process of ORN
4. Cell body of supporting cell
5. Excretory duct of Bowman’s gland
6. Perikarya of ORN
7. Basal cell
8. Bundles of olfactory axons
9. Glial sheath of olfactory axons
10. Acini of Bowman’s glands