The olfactory nerve (Latin: Nervus olfactorius), known as the first cranial nerve, or simply CN I, carries the sensory information for the sense of smell. Derived from the embryonic nasal placode, the olfactory nerve is capable of regeneration. The olfactory nerve is sensory in nature and originates on the olfactory mucosa in the anterosuperior nasal cavity.

The olfactory mucosa is located in the upper region of the nasal cavity and is made up of the olfactory epithelium and the underlying lamina propria, connective tissue containing fibroblasts, blood vessels, Bowman's glands and bundles of fine axons from the olfactory neurons.

The mucus protects the olfactory epithelium and allows odors to dissolve so that they can be detected by olfactory receptor neurons. Electron microscopy studies show that Bowman's glands contain cells with large secretory vesicles.

The exact composition of the secretions from Bowman's glands is unclear, but there is evidence that Bowman's glands do not produce odorant binding protein.

In vertebrates, the olfactory epithelium consists of a three basic cell types: bipolar olfactory receptor neurons; sustentacular cells, a type of supporting cell; and basal cells, the stem cells that continuously give rise to new olfactory receptor neurons and sustentacular cells.

Cells in the olfactory mucosa have been shown to have a degree of plasticity, and hold potential for therapeutic applications.

Such cells have been used in clinical trials for adult stem cell therapeutic treatments, and successfully harvested for future applications.

Nasal olfactory mucosa is an accessible source of olfactory ensheathing cells for spinal cord regeneration. However, safety of the biopsy technique and the effects on sense of smell and nasal function have not been robustly assessed in the form of a prospective controlled study.

National Health Service ethical approval was granted for this study of 131 patients. The primary outcome measure was olfactory function and the secondary outcomes included postoperative complication rates as well as the SNOT 22, NOSE scale scores and surgeon reported (Lund-Kennedy score) nasal function outcomes.

65 patients underwent functional endoscopic sinus surgery (FESS) and superior turbinate biopsy, and 66 patients underwent FESS only as the control group. There was no significant difference in complication rates between the two groups. All Olfactory function outcomes were unaffected following olfactory biopsy. We demonstrated that the patients quality of life and nasal patency as well as surgeon reported outcome measurements remain unaffected following olfactory harvesting.

Andrews et al have uniquely provided level 2a evidence for the safety of endoscopic biopsy of olfactory mucosa, which does not affect nasal function or the sense of smell compared to standard FESS without biopsy [1)].

1)
Andrews PJ, Poirrier AL, Lund VJ, Choi D. Safety of human olfactory mucosal biopsy for the purpose of olfactory ensheathing cell harvest and nerve repair: a prospective controlled study in patients undergoing endoscopic sinus surgery. Rhinology. 2016 Apr 23. [Epub ahead of print] PubMed PMID: 27107010.