Making Sense of Scents

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What is Smell?

Smell is one of the 5 major senses we have within our body that we use everyday. Smell is perceived by the olfactory system which is made up of olfactory receptors that identify the different scents around us. Humans and other organisms that have olfactory receptors also have a nose. These olfactory receptors are found in the olfactory mucosa membrane located in the nasal cavity near the septum.
Anatomy of The Nose and Limbic System

Composed of:

- Nasal cavities
  - Maxillary sinuses
  - Sphenoid sinuses
  - Ethmoid sinuses
  - Frontal sinuses
- Nasal septum
- Hairs
- Mucosal membrane
- Bone and cartilage
- Concha and meatus
- Olfactory epithelium
- Receptor cells
- Olfactory bulb
- Other structures of the limbic system
**How Does it work?**

- **In the Nasal Passage**
  - Olfactory epithelium (mucous membrane)
  - Lined with sense receptors
    - Receptors Contain the G protein, Which is stimulated by the odor molecules
    - release of a cyclic AMP catalysing enzyme, cAMP, in turn depolarizes the receptor cells.
  - Following the stimulation of a receptor, the odor molecule is rapidly destroyed to make room for a new molecule to take its place
How Does It Work Cont’d

- Olfactory sensory inputs travel from the axons through the cribriform plate holes and mitral cell synapses.
  - Mitral Cells are found in the Olfactory bulb.
- The stimulus continues to travel through the main Olfactory Tract to the Olfactory Cortex in the limbic system.
- From there it is sent to: the hypothalamus, the thalamus and the orbitofrontal cortex.
- The reception of olfactory input in the orbitofrontal cortex explains why we may perceive smell and taste at the same time.
Clara’s Nasal Endoscopy

Endoscopy Link (0:48 seconds)
What if you can’t smell?

Anosmia: The complete inability to smell

Hyposmia: Acute inability to smell

- **Causes:**
  - Cold
  - Allergy
  - Nasal Infection
  - Head Trauma

- **Treatment:**
  - No cure for Anosmia
  - Can treat underlying causes (ex. Causes above)
Vocab you may have missed

- **Anosmia**: the complete inability to smell
- **Endoscopy**: a procedure in which an instrument is introduced into the body to give a view of its internal parts.
- **Olfactory Neurons**: transduction cells within the olfactory system.
- **Mucosal**: tissue that produces mucus
- **Choncha**: bony plates projecting from the inner wall of the ethmoidal labyrinth
- **Innervation**: the supply of nervous energy or of nerve stimulation sent to a part.
- **Trigeminal Nerve**: a nerve responsible for sensation in the face and motor functions
Activities

How does your brain determine the scent?

--- Blindfold 2 volunteers to smell essential oils and determine what scent it is.

IS IT EDIBLE?:

--- Your nose and brain are suppose to help you find foods that are good to eat. But how well does this system work? Collect items that smell-- some should be things that you can eat and some items are things you should not eat. Test people to see if they can pick out things that can be eaten and those that can't.