

# Because You Asked About Smell and Taste Disorders

If you experience a smell or taste problem, it is important to remember that you are not alone: thousands of other individuals have faced the same situation. More than 200,000 persons visit a physician for a smell or taste problem each year. Many more smell and taste disturbances go unreported.

## How do smell and taste work?

Smell and taste belong to our chemical sensing system, or the chemosenses. The complicated processes of smelling and tasting begin when tiny molecules released by the substances around us stimulate special cells in the nose, mouth, or throat. These special sensory cells transmit messages through nerves to the brain where specific smells or tastes are identified.

Olfactory or smell nerve cells are stimulated by the odors around us—the fragrance from a gardenia or the smell of bread baking. These nerve cells are found in a small patch of tissue high inside the nose, and they connect directly to the brain.

Gustatory or taste cells react to food and beverages. These surface cells in the mouth send taste information to their nerve fibers. The taste cells are clustered in the taste buds of the mouth and throat. Many of the small bumps that can be seen on the tongue contain taste buds.

A third chemosensory mechanism, called the common chemical sense, contributes to our senses of smell and taste. In this system, thousands of nerve endings—especially on the moist surfaces of the eyes, nose, mouth, and throat—give rise to sensations like the sting of ammonia, the coolness of menthol, and the irritation of chili peppers.

We can commonly identify four basic taste sensations: sweet, sour, bitter, and salty. In the mouth these tastes, along with texture, temperature, and the sensations from the common chemical sense, combine with odors to produce a perception of flavor. It is flavor that lets us know whether we are eating a pear or an apple. Flavors are recognized mainly through the sense of smell. If you hold your nose while eating chocolate, for example, you will have trouble identifying the chocolate flavor—even though you can distinguish the food's sweetness or bitterness. That's because the familiar flavor of chocolate is sensed largely by odor. So is the well-known flavor of coffee.

## What are the smell and taste disorders?

The most common chemosensory complaints are a loss of the sense of smell and the sense of taste. Testing may demonstrate a reduced ability to detect odors (hyposmia) or to taste sweet, sour, bitter, or salty substances (hypogeusia). Some people can detect no odors (anosmia) or no tastes (ageusia).

In other disorders of the chemical senses, the system may misread and distort an odor, a taste, or a flavor. Or a person may detect a foul odor or taste from a substance that is normally pleasant smelling or tasting.

Overall, smell disorders are more common than taste disorders. They rarely occur together.

### **What causes smell and taste disorders?**

Some people are born with chemosensory disorders, but most develop them after an injury or illness. Upper respiratory infections are blamed for some chemosensory losses, and injury to the head can also cause smell or taste problems.

Chemosensory disorders may result from polyps in the nasal cavities, sinus infections, hormonal disturbances, or dental problems. Loss of smell and taste also can be caused by exposure to certain chemicals such as insecticides and by some medicines.

Many patients who receive radiation therapy for cancers of the head and neck develop chemosensory disturbances.

### **How are smell and taste disorders diagnosed?**

The extent of a chemosensory disorder can be determined by measuring the lowest concentration of a chemical that a person can detect or recognize. A patient also may be asked to compare the smells or tastes of different chemicals or to note how the intensities of smells or tastes grow when a chemical's concentration is increased. Scientists have developed an easily administered "scratch and sniff" test to evaluate the sense of smell. A person scratches pieces of paper treated to release different odors, sniffs them, and tries to identify each odor from a list of possibilities.

In taste testing, the patient responds to different chemical concentrations: this may involve a simple "sip, spit, and rinse" test, or chemicals may be applied directly to specific areas of the tongue.

### **Are smell and taste disorders serious?**

A person with faulty chemosenses is deprived of an early warning system that most of us take for granted. Smell and taste alert us to fires, poisonous fumes, leaking gas, and spoiled food and beverages. Smell and taste losses can also lead to depression.

Abnormalities in smell and taste functions frequently accompany and even signal the existence of several diseases or unhealthy conditions, including obesity, diabetes, hypertension, malnutrition, and some degenerative diseases of the nervous system such as Parkinson's disease, Alzheimer's disease, and Korsakoff's psychosis.

### **Can smell and taste disorders be treated?**

If a certain medication is the cause of a smell or taste disorder, stopping or changing the medicine may help eliminate the problem. Some patients, notably those with respiratory infections or allergies, regain their smell or taste upon the resolution of their illness. In

many cases, nasal obstructions such as polyps can be removed surgically to restore airflow to the nose. Often the correction of a general medical problem can also correct the loss of smell and taste. Occasionally, recovery of the chemosenses occurs spontaneously.

### **What research is being done?**

The NIDCD supports basic and clinical investigations of chemosensory disorders at institutions across the Nation. Some of these studies are conducted at several chemosensory research centers, where scientists work together to unravel the secrets of smell and taste disorders.

Remarkable progress has been made in establishing the nature of changes that occur in the chemical senses with age. It is now known that age takes a much greater toll on smell than on taste. Scientists have found that the sense of smell begins to decline after age 60. Women at all ages are generally more accurate than men in identifying odors. Smoking can adversely affect the ability of both men and women to identify odors.

Although certain medications can cause chemosensory problems, others—notably anti-allergy drugs—seem to improve the senses of smell and taste. Scientists are working to find medicines similar to anti-allergy drugs that can be used to treat patients with chemosensory losses.

Smell and taste cells are the only sensory cells that are regularly replaced throughout the life span. Scientists are examining these phenomena which may provide ways to replace these and other damaged sensory and nerve cells.

NIDCD's research program goals for chemosensory sciences include:

- promotion of the regeneration of sensory and nerve cells appreciating the effects of the environment on smell and taste (such as gasoline fumes, chemicals, and extremes of relative humidity and temperature)
- prevention of the effects of aging
- prevention of the access of infectious agents and toxins to the brain through the olfactory nerve
- development of new diagnostic tests
- understanding associations between chemosensory disorders and altered food intake in aging as well as in various chronic illnesses
- improved methods of treatment and rehabilitation strategies

### **What can I do to help myself?**

Proper diagnosis by a trained professional, for example, an otolaryngologist-head and neck surgeon, is important. These physicians specialize in disorders of the head and neck, especially those related to the ear, nose and throat. Diagnosis may lead to treatment of an underlying cause of the disturbance. Many types of smell and taste disorders are curable, and for those that are not, counseling is available to help patients cope with a disorder.

Smell and taste research centers supported by the NIDCD often need research patients to help their scientists study the chemosenses more intensely.

Prospective patients should have their physicians write to the following research centers:

**Clinical Smell and Taste Research Center**

Hospital of the University of Pennsylvania  
34th and Spruce Streets  
Radvin Building  
Philadelphia, PA 19104  
Voice: (215) 662-6580  
Fax: (215) 349-5266  
E-mail: [doty@mail.med.upenn.edu](mailto:doty@mail.med.upenn.edu)  
Internet: [www.med.upenn.edu](http://www.med.upenn.edu)

**Connecticut Chemosensory Clinical Research Center**

University of Connecticut Health Center  
Taste and Smell Center  
263 Farmington Ave.  
Farmington, CT 06030-3705  
Voice: (860) 679-2459  
Fax: (860) 679-2910  
E-mail: [taste@cortex.uhc.edu](mailto:taste@cortex.uhc.edu)  
Internet: [cortex.uhc.edu/~taste](http://cortex.uhc.edu/~taste)

**SUNY Clinical Olfactory Research Center**

SUNY Health Science Center at Syracuse  
750 East Adams Street  
Syracuse, NY 13210  
Voice: (315) 464-5588  
Fax: (315) 464-7712  
E-mail: [kurtzd@vax.cshscsyr.edu](mailto:kurtzd@vax.cshscsyr.edu)

**Monell Chemical Senses Center**

3500 Market Street  
Philadelphia, PA 19104-3308  
Voice: (215) 898-6666  
Fax: (215) 898-2084  
E-mail: [info@monell.org](mailto:info@monell.org)  
Internet: [www.monell.org](http://www.monell.org)

**Rocky Mountain Taste and Smell Center**

University of Colorado Medical Center  
4200 East 9th Avenue  
Box B 205, UCHSC  
Denver, CO 80262

Voice: (303) 315-6600

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