



## Can Smells Harm You?

**C**an smells be bad for you? Most of us recall situations where a pungent odor—say, from a sewer, trash sitting outside, or a dirty public bathroom with a strong odor of urine—made us want to run away. “Run for your life!” you may have said to yourself. Other times, the air in a friend’s house living room was so stuffy you had difficulty breathing, or the air in your classroom smelled like dirty socks, and there were no windows to let fresh air in. *Were you going to get sick?*



### How smell works

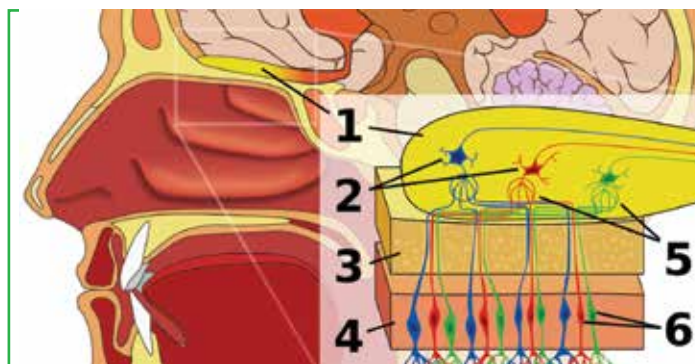
First, let’s see how we smell things. **Smell is due to molecules of a particular substance that travel into your nose.**

These odor molecules contact a tissue called the olfactory epithelium (Fig. 1), which contains olfactory receptor cells that lock onto these odor molecules. This generates electrical signals that are relayed to clusters of nerve cells called glomeruli. Then, specialized nerve cells called mitral cells send these signals to regions of the brain that will combine these signals so we can recognize the smell (or are intrigued by it).

Smell does not usually contain bacteria, which carry disease and are much larger than the gaseous molecules that make up a smell. So the odor itself cannot make you sick. **But some gaseous compounds can have other effects on your health by causing shortness of breath, headaches, eye irritation, or, if large amounts are inhaled, even death.**

### Hydrogen sulfide

One of the most foul-smelling substances is hydrogen sulfide ( $\text{H}_2\text{S}$ ), which has a characteristic rotten-egg odor. This gas is produced by the anaerobic (oxygen-free) breakdown of organic matter by bacteria; it is a common com-



**Figure 1.** When you smell a smelly substance, odor molecules travel to your nose, where they bind to olfactory receptor cells (6), which generate electrical signals that are sent to a part of your brain called the olfactory bulb (1). Also shown are mitral cells (2), bone (3); olfactory epithelium (4), and glomerulus (5). See the text for more details.

ponent of “sewer gas.” Hydrogen sulfide is quite toxic, and exposure to even small amounts can be fatal.

**The health effects of hydrogen sulfide depend on the amount inhaled and for how long.** Exposure to low concentrations (less than 50 parts per million (ppm)) can produce irritation of the nose and throat and lead to loss of appetite and headache. Higher concentrations (50–150

- ppm) can cause eye irritation, coughing, and loss of smell.
- If the amount of inhaled hydrogen sulfide is larger than 200
- ppm, damage to the eyes can occur, along with accumula-
- tion of fluid in the lungs. Beyond 700 ppm, most people lose
- consciousness, and some die.

### The bottom line...

- Your sense of smell often alerts you to potential danger.
- Bad smells can serve as a warning that something is amiss.
- If it smells bad, it is probably bad for you. More often than
- not, the nose knows.

### What’s that smell?

- Thinking of a recent or past experience with a bad smell,
- what chemicals do you think caused that bad smell? Do you
- think they were harmful? How would you find out?