SIDEBAR 2: PEPPERMINT CANDY

Hold your nose and use the back of your tongue to close off the back of your throat as much as you can. Then, put a peppermint candy in your mouth and try to identify the flavor(s) that you taste. Next, let go of your nose—what happened? When you held your nose, the candy probably just tasted sweet. Then when you let go, there was a blast of minty flavors. This is because menthol (the flavor molecule in mint) consists of the minty smell we are all familiar with, plus a hint of bitterness and a cool sensation. When you held your nose, your body was unable to detect the menthol aroma, and the bitterness was likely overwhelmed by the sugar in the candy. The cooling sensation comes from the menthol triggering certain nerves in the nose and mouth. By blocking your nose, you are also preventing this from happening to its full extent. You can try this exercise with any food to separate the smell of a food from its taste, which will help you appreciate how they all work together to create unique flavors.

SIDEBAR 3: BALANCING FLAVOR: SUGAR-ACID

Soft drinks are known for having a lot of sugar in them. In fact, in each 12-ounce/355 mL can—about 1½ cups of soda—there's about ¼ cup of sugar. But, have you ever considered how it's even possible for manufacturers to add such high amounts of sugar without the drink tasting too sweet? To answer this question, let's perform a quick experiment.

Fill a glass with drinking water and stir in 1 teaspoon of sugar at a time, taking a sip after each addition, until the sugar water becomes too sweet to be enjoyable. Next, stir in ¼ teaspoon of vinegar at a time, again taking a sip after each addition, until the drink tastes drinkable to you. Be sure to keep track of the amount of vinegar you added to the sugar water.

Fill a separate glass with drinking water and add the same amount of vinegar you added to the previous glass and take a sip—and try not to make a face!

This is the secret of Coca-Cola. It contains far too much sugar for most people to find tasty. However, by adding acid (and other flavors), the flavor components combine to produce a pretty delicious drink. Carbonation is another source of acidity, which is why a flat Coke tastes sweeter than a fresh one.

This is just one example of the myriad ways in which taste molecules can balance each other. Many recipes exploit this fact to add layers of flavor and bring out hidden tastes from the ingredients. The crafty cook is aware of how different flavors play off each other and is not afraid of experimenting with them to improve the overall flavor of their food. For example, the sugar and acid effect is why some cooks add a bit of sugar to their marinara sauce to balance tomatoes that are too acidic. Nathan Myhrvold even goes so far as to add a pinch of salt to red wine to make it taste better.

WHERE DO FLAVOR MOLECULES COME FROM?

Flavor molecules occur naturally in food, but they are also added by the process of cooking. You might be surprised to learn that cooked food contains many more flavor molecules than that same food uncooked. But consider: Baked cookies taste different than raw cookie dough. The taste of a cooked steak is unlike that of steak tartare. Recall that protein, carbohydrate, and fat molecules are far too large to bind to our taste and aroma receptors, so we must use tiny molecules to add taste to food. Sometimes we add these in the early stages of a recipe. For example, in a chocolate chip cookie recipe, we add sugar, salt, and vanilla. Salt is tiny enough to bind to the salt receptors on our tongues, and vanilla contains a small molecule called vanillin that binds to the odor receptors at the back of our noses. Chocolate also has flavor, but it is a more complex fermented food, with properties we will consider later on.

But the real magic of flavor creation happens when we cook the food. The process of cooking can literally break apart the protein, carbohydrate, and fat molecules and turn them into flavor molecules! Those large molecules break into small ones, which are then broken into even smaller ones and then even smaller ones. Eventually, they are small enough that they can be detected by our taste and aroma receptors. One key agent in this flavor creation is heat, which causes the molecular breakdown (we'll discuss heat in more detail in chapter 2). But similar flavor creation happens in many other cooking processes, too. Cooking food with microbes, as with various food fermentations like sauerkraut or pickles, also breaks down large molecules into tiny flavor molecules. The same is true for smoking or ageing.