[The Microbiology of Raw Cookie Dough](http://modernistcuisine.com/2012/12/the-microbiology-of-raw-cookie-dough/" \o "The Microbiology of Raw Cookie Dough)

By [Scott](http://modernistcuisine.com/author/scott/) on December 11, 2012

In May 2009, an outbreak of foodborne illness sickened at least 80 people across 30 states; it put 35 people in the hospital. The source of that outbreak was raw, store-bought cookie dough.

To better understand the risk of getting sick from undercooked foods, it’s important to know a little about the mechanics of foodborne illnesses. They almost always fall into one of three categories:

* The first category is a *non-invasive infection*. This is when pathogens from the food get into your gut and continue living there, but without penetrating the lining. Tapeworms are typically non-invasive, as are certain kinds of bacteria, which may nevertheless secrete toxins that make you ill.
* The second variety of foodborne illness is an *invasive* *infection*. This occurs when pathogens migrate from the gut into the blood or other organs where they can wreak havoc and secrete toxins. Some delightful examples include the parasitic trichinella worm and many strains of bacteria including *Salmonella enterica* and *Escherichia coli*.
* The third category is *food poisoning*. People sometimes apply this term broadly to any kind of foodborne illness, but food poisoning actually refers specifically to the poisoning of the body by toxins that bacteria have released *inside* the food before you eat it. Because these toxins are already present before you start cooking, food poisoning typically sets in quickly following a contaminated meal, whereas foodborne infections take a bit of time for bacteria to reproduce inside your body. Botulism, the biggest fear of home-canners everywhere, is one well-known example of food poisoning.

*E. coli*, the invasive infection responsible for the May 2009 outbreak, lives in the intestinal tracts of humans and other warm-blooded animals. Like other bacteria, *E. coli* are tiny, being about one-thousandth of a millimeter across and only two to three times that in length. It would take 1.5 *trillion* of these germs to balance a small paperclip. But what *E. coli* lacks in size, it makes up for in notoriety. Most *E. coli* strains are harmless, but one in particular, *E. coli* O157:H7, has become infamous for its role in foodborne outbreaks, including contaminated milk, ground beef, spinach, and alfalfa.

Another common source of invasive infection is salmonella, which, although it wasn’t to blame in the 2009 cookie-dough outbreak, really is as dangerous as most people imagine. But here, too, confusion reigns over the true source of contamination. Salmonellabacteria do not live in chicken meat (muscle tissue), the source most commonly fingered as the culprit. Instead, the bacteria normally live in the intestinal tracts and feces of chickens and can contaminate the meat during slaughter and processing (except *S. enterica*, which can infect hen ovaries and contaminate intact eggs regardless of fecal contact). The poultry industry has made enormous strides in containing contamination, and chickens are far from alone in spreading the disease. In 2008, for instance, U.S. investigators traced a major outbreak of salmonella to tainted peanut butter and other peanut-containing foods.

Certain brands of raw cookie dough, which are labeled for raw consumption, such as cookie dough chunks in store-bought ice creams, are safe to eat raw. But even when safe handling practices are followed, eating homemade raw cookie dough, or store-bought cookie dough that is intended to be baked, will always carry some risk.

If you want to avoid a stomach ache—or worse—muster all your willpower… and wait for those cookies to emerge from the oven.

For more on the microbiology of food and food-related illness, check out our [tips on Food52.com](http://www.food52.com/blog/4562_7_essential_food_safety_tips).

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