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How This Bacteria May Be Growing More Resistant To Hand Sanitizer



The use of hand sanitizer has grown over the past decade, but are bacteria adapting? (AP Photo/Donna McWilliam, File)

Some bacteria may be getting better at handling alcohol. But that's not a good thing.

The concern is not alcohol in tiny little glasses but the alcohol in hand sanitizers. Alcohol is what helps alcohol-based hand sanitizers do their thing. No, the alcohol doesn't make the bacteria drunk and do stupid things that end up wrecking their lives. Instead, alcohol such as isopropanol can dissolve the fatty (lipid) membrane that surrounds and protects each bacterium. Alcohol can also denature proteins that serve as building blocks for the bacteria. Denaturation means that the proteins unfold from their normal structures so that they can no longer function correctly. With their protective walls dissolving and their proteins falling apart, the bacteria end up dying or ceasing to function.

However, the concern is that bacteria could learn how to handle alcohol. [A study recently published in *Science Transnational Medicine*](#) found that one type of bacteria, *Enterococcus faecium*, may be growing more alcohol tolerant over time. This species of bacteria can be found in your intestines but has the potential of causing infections in other parts of your body such as your brain and heart. For the study, a research team from Australia used 139 samples of *E. faecium* collected from two hospitals between 1997 and 2015. They exposed these samples to different concentrations of isopropanol (ranging from 23% to 70%) to determine how effectively the alcohol could kill the bacteria and whether the alcohol-treated bacteria would still be able to colonize the intestines of mice.

The study results were good for *E. faecium* and potentially bad for you if you've got other people's poop on your hands. Compared to *E. faecium* from **before** 2010, *E. faecium* from **after** the year 2010 was 10-times more tolerant to the alcohol. Moreover, the researchers found that these more alcohol-tolerant bacteria tended to have mutations in genes that help govern carbohydrate uptake and mechanism. Thus, mutations could be helping the bacteria become more resistant to alcohol.

Granted, this is one study that looked at one type of bacteria in 2 hospitals in one country. More studies are necessary to determine if such resistance is occurring elsewhere and with other types of bacteria. Moreover, people may be mousy but mice are not people. It is not clear yet whether more alcohol-tolerant *E. faecium* may be more likely to colonize humans and cause infections in humans.



If you can wash your hands with soap and water, this should be your first choice. (Photo: Shutterstock)

Nevertheless, you have to wonder what the widespread use of hand sanitizers may be doing to the bacteria around us and how effective hand sanitizers really will be in preventing infections over time. It may seem more convenient to just drop some liquid or gel in your hands compared to thoroughly washing your hands with soap and water. But is it really the same? Can smearing some hand sanitizer on your paws achieve the same effect that using running water and scrubbing your hands while reciting the alphabet can? If you've got poop in your hands and just use hand sanitizer, where does the poop actually go?

If you have the option of using good old soap and water to wash your hands, choose that over using hand sanitizer. [As the Centers for Disease Control and Prevention \(CDC\) explains](#), hand sanitizer may not be effective at killing all germs (be skeptical about any kills "99.99% of all germs" claims) or removing other substances such as chemicals, especially when

your hands are visibly dirty or greasy. If you have to use hand sanitizer, make sure that it has at least 60% alcohol.

This study is an additional reminder that bacteria can be quite progressive, not in a political sense but a biological one. Through mutations and selection pressures, they continue to evolve and have managed to overcome many antibiotics that used to work in the past. So our society needs to stay vigilant and be more careful about using hand sanitizer. Don't smear it all over your body and everything that you own. And use soap and water when you can instead. After all, using alcohol in moderation applies here as well.



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