

## Ex #40 Hand Washing

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- Bacteria have their own population explosion going. They can reproduce every 20 minutes.
- The number of bacteria on your body right now is greater than the number of people in the United States.
- Like people, bacteria may be good or bad, depending on what they do to you or for you. And like people, bacteria are here to stay. We can't get rid of them, so we must learn to live with them.
- Some bacteria spend their lives in the small folds of the skin, on hair or under fingernails. Others cause body odor. Still others, called pathogens, cause disease.
- We'll call the bacteria normally found on your skin "resident" bacteria. They exist on the skin of normal, healthy people, and are usually not harmful. They're always there and can't be removed completely.
- Other bacteria are transferred to your skin in one way or another. Let's call these "transient" bacteria. Think for a moment about how many ways your hands have picked up bacteria today.
- Your hands do all sorts of things for you. They write, pick up the telephone, handle money, fix meals, dress wounds. Your hands gather bacteria with each job they do. You can remove many of these bacteria by washing your hands and scrubbing your fingernails.
- We can't see individual bacteria without using a microscope. But if they are allowed to grow and multiply on agar, we can see them. Nutrient agar is a special food used to grow bacteria in the laboratory. It contains everything bacteria need to grow and reproduce.
- If we transfer bacteria to an agar plate and keep it warm (incubate it), the bacteria will reproduce rapidly. There will be so many that we can see them with the naked eye. These millions of bacteria, side by side, are called a colony. The pictures in this publication show this clearly.

### Hands

We transferred bacteria to agar plates by touching them with our fingers. First, we touched a plate with dirty fingers. Then we rinsed the fingers in cold water for 20 seconds. Next we washed them with soap and water for 20 seconds. The fingers were then washed an additional 20 seconds. Finally, we dipped the fingers in a sanitizing solution containing chlorine. We could have obtained similar results with a bromine or iodine solution. The fingers touched an agar plate after each cleansing. The plates were incubated at 98°F for 24 hours. The photos show what happened.



### *Unwashed Hand*

The dirty fingers contained so many bacteria that the areas they touched on the agar plate were masses of colonies.



### *Rinsed Hand*

The 20-second cold water rinse removed large particles of dirt and some bacteria. But millions of bacteria were left. As you can see, rinsing your hands with cold water is not a very good way to clean them.



### *Washed Hand*

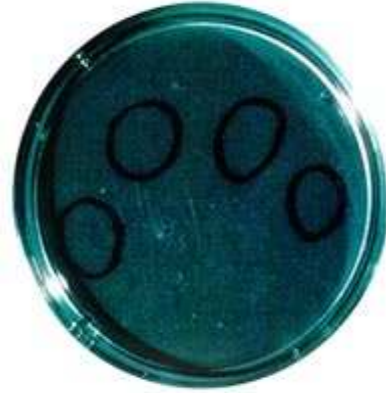
Washing the hands with soap and water for 20 seconds (top) reduced the number of bacteria. However, 20 seconds was not long enough. After the hands were washed again with soap and water for 20 seconds (bottom), the number of bacteria decreased even more. So hands should be washed at least 40 seconds with soap and water. Washing them a full minute is even better.

The photos show that soap and water will reduce the number of bacteria on your hands. Removing all bacteria is impossible with soap and water. The important thing is to reduce the number of transient bacteria on your hands. Just be sure to wash your hands thoroughly for at least 40 seconds before you handle food.



### *Sanitized Hand*

No bacteria grew on the agar plate after the fingers were dipped in a sanitizing solution. The bacteria may or may not have been killed, but the sanitizer stopped their growth. Of course, some people may not be able to use a sanitizing solution because it may irritate their skin.



### *Sanitizer on Sneeze*

This photo dramatizes the effect of sanitizing agents on bacteria. An agar plate was sneezed on, and then a drop of sanitizing solution was put in the center of the plate. Bacteria grew in the area not touched by the sanitizer.



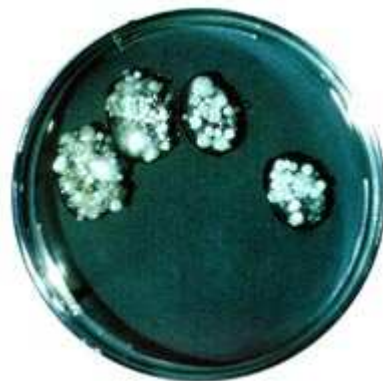
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## Gloves

Like your hands, gloves also become dirty and covered with bacteria. In the next demonstration, a person wearing a dirty glove touched an agar plate. He then rinsed the glove in cold water for 20 seconds; washed it with soap and water for 20 seconds; then washed it again with soap and water for 20 seconds; and finally dipped it into a sanitizing solution. After each cleansing, he touched an agar plate. The photographs show how the plates looked after 24 hours.

### *Unwashed Glove*

The dirty glove contained many bacteria, as shown by the large number of colonies left on the agar.



### *Rinsed Glove*

The number of colonies decreased after the glove was rinsed in water. As you can see, we can reduce the number of bacteria on gloves by just rinsing them in water.



### *Washed Glove*

The two 20-second washes with soap and water reduced the number of bacteria to a very low level.

So soap and water are better than a plain water rinse for removing bacteria from gloves.



### *Sanitized Glove*

The sanitizing solution stopped all bacteria from growing.

Removing bacteria from the glove was easier than from the hands. Gloves have no resident bacteria, only transient bacteria. Gloves have no ridges or crevices in which the bacteria can hide. It's possible to remove all bacteria from gloves, although we can't remove all of them from our hands.



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## Other Sources

### *Hair*

Well-kept hair is attractive, but let's keep it out of our food. Nobody likes to see hair in what he or she is about to eat. It's a good sign that someone didn't follow sanitation rule when the food was processed or prepared. So always wear a hair net or a hat when you work with food.

To demonstrate the importance of this, we placed some human hair on an agar plate and incubated it for 24 hours. Look at the number of bacteria that grew around the hair.

Like hands, completely removing bacteria from your hair is impossible. Although you may have just washed it, it still contains many bacteria.



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### *Apron*

We can also transfer bacteria from dirty aprons to food. We touched a dirty apron to an agar plate and incubated it for 24 hours. The photo shows that the apron contained many bacteria. These bacteria could easily have been transferred to food. This points out the need for wearing clean clothes and clean aprons every day. If your clothes or apron get dirty during the day, change them.

Cutting boards are another source of bacteria and should be washed thoroughly after each use. Do not use wooden cutting boards. Bacteria can hide in the wood fiber, making their complete removal impossible. If you use cutting boards or utensils on raw food, don't use them to hold, serve, prepare or carve cooked food before they are thoroughly cleansed and sanitized.



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### *Pests*

Flies, roaches and rats leave bacteria on everything they touch. To illustrate this, we let a cockroach walk on an agar plate. The photo, made after 24 hours, shows the number of bacteria the cockroach left on the plate.

Rats, flies, roaches and other insects leave bacteria as they crawl on food, garbage and people. So we must all work to keep these pests out of our homes, restaurants and food-processing plants. The time you spend cleaning and sanitizing your food handling equipment is wasted if you allow insects and rats to walk on them after they've been cleaned.

Even the best homes, restaurants and food processing plants have flies, roaches and other insects from time to time. But these pests should not be allowed to live in these places for long.

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