Disease transmission

Transcript

There are thousands of different bacteria living on our skin and other surfaces. A pathogen, such as the *E. Coli* shown here, is a type of bacteria that causes disease.

A transmissible disease is one that can be passed from person to person by direct contact, such as touching or through bodily fluids such as saliva.

In this experiment, the number of bacterial colonies grown from hands before and after washing will be compared.

Agar is a source of nutrients for bacteria to grow on. It is sterile to avoid contaminating the results. By pressing fingers on the agar, bacteria is transferred, and can grow to form colonies.

A bacterial colony is a visible cluster of bacteria. Each colony can grow from just a single bacterium.

Three fingers are pressed gently onto the agar of one of the Petri dishes. Any bacteria on the fingers should transfer to the surface of the agar.

A lid is placed on the Petri dish.

Two small pieces of adhesive tape are used to seal the lid on two sides. The lid should not be sealed all the way around as oxygen would not be able to get in and dangerous anaerobic bacteria could grow.

This Petri dish is labelled as ‘unwashed’.

Hands are now washed thoroughly using hand wash.

Hands are dried thoroughly and the same three fingers as before are pressed on to the agar of the second Petri dish. The same fingers being used is a control variable.

The Petri dish is sealed on two sides using adhesive tape as before, making sure the seal is not all the way around. The sample is labelled ‘washed’.

The samples are placed in a sealed container and left for at least 24 hours at room temperature, which is about 21 degrees Celsius. This allows enough growth so that separate colonies can be counted but not so much that the plate is overcrowded.

After at least 24 hours, the Petri dishes are observed.

It is safe to handle and view the Petri dishes so long as the lids are sealed.

If a Petri dish is found with a lid off, it should be immediately put it in a sealable bag and disposed of in a biohazard bin or an autoclave. Hands should then be washed thoroughly with soap.

The number of colonies are counted through the lid. The lids should not be removed as the inside of the Petri dishes are a biohazard.

Each bacterial colony that is counted, should be separate and have a defined edge.

For example, these are some common shapes of bacterial colonies.

The large patch at the top has an undefined edge and a fluffy appearance, and so is likely to be a fungus. This is not included in the count.

32 bacterial colonies have grown.

Some of them are very small and difficult to see on screen but they are separate and so are counted.

Notice this bacterial colony has a very different shape to the others. It is not a fungus because its spiralled edges have a defined outline. It looks like a rhizoid.

These two also look different to the others. They are not circular, but they do have a defined outline. They look like they are irregular.

The different appearance of the colonies indicates that they are the colonies of three different types of bacteria: circular, irregular and rhizoid.

The number of colonies grown for the washed hand sample is then counted.

It is difficult to see in this image because of the air bubbles under the adhesive tape, but there are no bacterial colonies present.

This looks like a fungus as it does not have a defined edge.

Although most of the bacteria on the hands are not harmful to healthy individuals, they can be hazardous when grown in colonies. Therefore, it is important to wash hands *thoroughly* after handling Petri dishes containing colonies. Or gloves could be worn and disposed of in a biohazard bin.

Notice that there are more bacterial colonies growing on the unwashed sample than on the washed sample. There is also a larger variety of bacteria types.

This experiment demonstrates that there are bacteria living on our hands that can be transferred by touch, and that washing hands reduces the number of bacteria on the hands.

Normally, it is expected to see a few bacterial colonies even after hand washing because naturally occurring bacteria that are healthy for us are released from the skin when it is rubbed during the hand-washing motion.

This experiment emphasises the importance of washing hands after using the toilet or before eating, to help prevent the transmission of bacteria, including pathogens that can cause disease.