



Extension Activity

Microbiology: Discovering antibacterial agents

What is the best way to keep your hands clean?

With this activity, pupils can investigate the importance of good hand hygiene by preparing a culture before and after washing their hands. This activity can be done as an introduction to bacteria or as a closing activity with a take-home message.

Start the activity by asking students why they think it is important to keep their hands clean. Which products do they consider would be the best? How long should be spent on washing hands? At which water temperature? Write down the answers and make teams with different conditions, as in the example or similar.

Team 1: washing with hot water only

Team 2: washing with regular soap and hot water for 30 seconds

Team 2: washing with regular soap and room temperature water for 30 seconds

Team 3: washing with regular soap and room temperature water for 2 minutes

Team 3: washing with regular soap and hot water for 2 minutes

Team 4: washing with hand sanitizer only

Materials

- Two petri dishes with agar growth medium per student
- Permanent pen
- Hand soap
- Hand sanitizer (at least 60% ethanol)
- Stopwatch
- Water
- Paper tissue



Petri dishes with agar growth medium and bacteria from the hands before (left) and after (right) washing
Image courtesy of the authors

Procedure

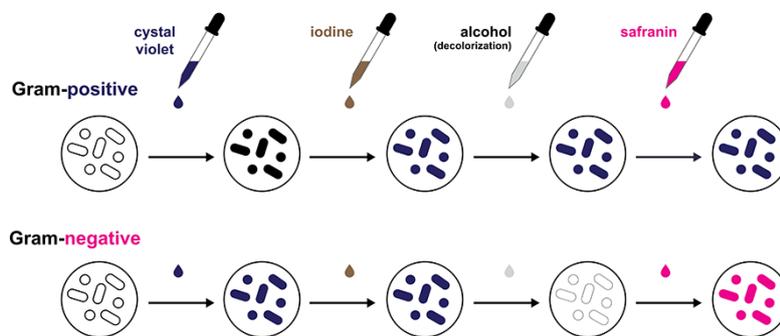
1. Using a marker pen, label two plates with your name. Label one plate with 'before' and the other with 'after'.
2. Place the 'before' plate on a previously disinfected table and open it carefully. Then, press your hand gently onto the plate, taking care to include areas of the hand that are hard to reach. The plate should be open for the shortest possible time.
3. After closing the lid, wash your hands with the method assigned to your team and dry them with a paper tissue.
4. Place the 'after' plate on a table and open it carefully. Then, press your hand gently onto the plate, taking care to include areas of the hand that are hard to reach. The plate should be open for the shortest possible time.
5. Finally, leave the petri dishes in a safe area and incubate them at a constant temperature for 24 hours or until bacterial colonies are seen.
6. After the colonies are visible, discuss the results and compare them between groups. Which was the best method? Under which conditions? How could you apply these results in your daily life?

Gram staining

If you choose to carry out or discuss [Gram staining](#) as part of Activity 1, this graphic gives a nice overview of the process.

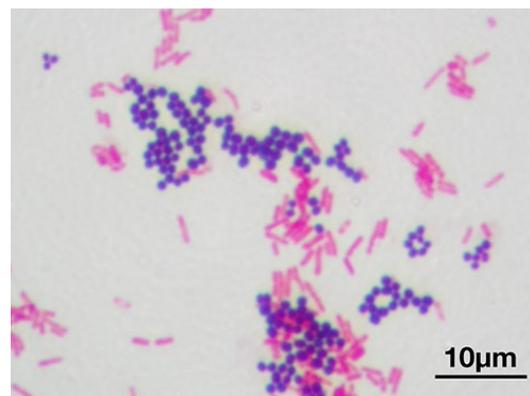
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Gram Staining of Bacteria



The Gram-staining technique of classifying bacteria, according to whether they have a single membrane and thick peptidoglycan cell wall (Gram positive, since the thick cell wall retains the purple Gram stain) or a double membrane and thin cell wall (Gram negative)

BigBearCamera/Shutterstock.com



Microscopic image of a Gram stain of mixed Gram-positive (purple) and Gram-negative (pink) bacteria
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