

Exercise 2.1 – Microbial Ubiquity

LEARNING OUTCOMES

1. Discuss microbial ubiquity and factors that influence growth.
 2. Name two types of all-purpose growth media.
 3. State the specific temperature in Celsius for room and body incubation.
 4. Properly label and prepare a Petri plate for incubation.
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Microorganisms are ubiquitous, meaning that they are found almost everywhere. They are present in the air, in the environment, on and in our bodies, and may contaminate surfaces of inanimate objects or *fomites*. In fact, life on Earth would be impossible without microbes! They decompose and recycle nutrients, carry out photosynthesis and produce oxygen, and fix atmospheric nitrogen in usable form for synthesizing essential biomolecules such as proteins and nucleic acids. Microbes that exist as part of the human microbiome play a significant role in maintaining our health and protecting us from disease. Recent research has supported the hypothesis that the role of organisms in our microbiome also may have profound influence on our metabolism and behavior.

In this exercise, various surfaces are investigated for the presence of microbes. Although the procedure is simple, several important factors must be considered to ensure proper results. All materials used for the procedure must be *sterile*, or free from any microorganisms, to ensure that the only organisms recovered are those on the surface being sampled. The media used to cultivate microorganisms must also contain sufficient nutrients to support growth. Two common types of media used in the microbiology laboratory are nutrient agar (NA) and trypticase soy agar (TSA). Both provide a semi-solid surface on which many bacteria and fungi can grow.

Since the growth requirements of one organism may differ from another, the time and temperature of incubation are also factors. Organisms that are present in the environment typically grow optimally at room temperature (25°C) incubation, while those associated with your microbiome prefer body temperature (37°C). Most of these bacteria produce *colonies*, or visible masses of growth, on the agar surface within 18-24 hours. Other microorganisms, such as fungi, may require several days or even weeks to appear.

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OBJECTIVE

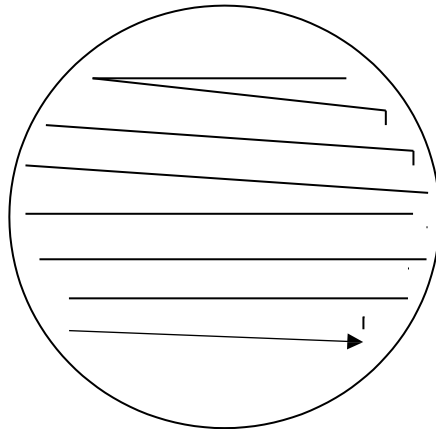
Sample a living or nonliving surface to observe different microorganisms that may be present.

MATERIALS

- ☒ MEDIA: Nutrient or trypticase soy agar plate
- ☒ SOLUTIONS: Sterile water
- ☒ EQUIPMENT: Sterile swab, marking pen, test tube rack

PROCEDURE – STUDENTS WORK INDIVIDUALLY

1. Label the bottom of a sterile agar plate with your initials, date, and what is being sampled.
2. Dip a swab in sterile water to moisten, then rub on a fomite or a specific area of your body.
3. Roll the swab over the agar surface using a tight Z pattern as shown below.
4. Dispose of the used swab in the disinfectant beaker – do not return to wrapper (why not?)
5. Invert plates and place them in a common rack for incubation.
6. Incubate for 18-24 hours at 25°C for fomite sample or 37°C for body site sample.
7. Observe results and complete the lab report.



*Swab in a tight Z-pattern on the agar surface,
being careful not to break the agar.*