

# Microbiology Study Guide

## Microbial growth

### ***PHYSICAL REQUIREMENTS FOR GROWTH***

- Growth of population: increase in the number of cells
- Requirements are both *physical and chemical*

#### PHYSICAL REQUIREMENTS:

- \*psychrophiles: cold loving microbes
- \*mesophiles: moderate temperature
- \*thermophiles: heat loving
- Minimum growth temperature: the lowest temperature that a species will grow
  - Optimum: temperature it grows best
  - Maximum: highest temperature tolerated for growth
- Most bacteria grow at a pH value between 6.5-7.5
- Most microbes undergo plasmolysis (shrinking) in hypertonic solutions; halophiles (microorganisms that require salt to survive) can tolerate higher salt concentrations

#### CHEMICAL REQUIREMENTS:

- Carbon—all organisms require a carbon source
- \*chemoheterotrophs: use an organic molecule (pure carbon)
- \*autotrophs: use carbon dioxide
- Nitrogen—needed for protein and nucleic acid synthesis. Obtained from decomposition of proteins, from  $\text{NH}_4$  or  $\text{NO}_3$ .
- Oxygen—obligate aerobes (require oxygen); facultative anaerobes (will use oxygen if it is present but do not require it); anaerobes (do not use oxygen) – for growth
- Other: sulfur, phosphorus, trace elements, organic growth factors

#### BIOFILMS

- Microbes adhere to surfaces and accumulate as biofilms on solid surfaces in contact with water
- Most bacteria live in biofilms
- Microbes in biofilms are more resistant to antibiotics than free-swimming microbes

# Microbiology Chapter 2 Study Questions

**A Loxley**



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26, 2014 — Examine the detail and specificity of the procedure for the (cleaning) process being validated, and the amount of documentation required. We ... PDA Technical Report No. 29, Revised 2012 (TR 29) ... 49, Points to Consider for Biotechnology Cleaning Validation. It presents updated information that is aligned with lifecycle approaches to validation and ... Guidance on aspects of cleaning validation in active ... The PDA Technical Report No. 29 - Points to Consider for Cleaning Validation<sup>4</sup> is also recommended as a valuable guidance document from industry. The following ... Annex 2 Visually clean is an important criterion in cleaning validation. It should be one of the acceptance criteria used on a routine basis. Personnel responsible for ... Points to Consider for Biotechnology Cleaning Validation 49, Points to Consider for Biotechnology Cleaning Validation aligns cleaning validation practices with the life cycle approaches to validation, as enabled by ... What is Cleaning Validation in the Pharmaceutical Industry? Cleaning validation is a process used in the pharmaceutical, biotech, and medical device industries to provide documented evidence that equipment and facilities ... draft working document for comments Sep 21, 2020 — Aspects of cleaning validation and cleaning verification should be considered in quality metrics, with. 471 performance indicators identified ... Cleaning Validation Guidelines - A Complete List 2022 [May 2020] Points to consider on the different approaches -including HBEL - to establish carryover limits in cleaning validation for identification of ... Technical Report No. 49 Points to Consider for ... by TF Contributors — Cleaning validation plays an important role in reducing the possibility of product contamination from biopharmaceutical manufacturing equipment. It demonstrates ... Cleaning Validation: Protocol & Guidelines Cleaning validation is a procedure of establishing evidence that cleaning processes for manufacturing equipment prevents product contamination. Cleaning ...