

**Southwest Center for Microsystems Education (SCME)
University of New Mexico**

Cells: The Building Blocks of Life Learning Module Map

There are four (4) units in this learning module:

Knowledge Probe
Primary Knowledge
Cells Research Activity
Final Assessment

This learning module provides a review of “cells”, the smallest unit exhibiting the properties of life. It discusses how these cells are being used in bioMEMS as well as other micro and nano-sized devices. A research activity provides the opportunity to further explore how cells can be used in bioMEMS (bio MicroElectroMechanical Systems).

Target audiences: High School, Community College, University

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Website: www.scme-nm.org

Cells – The Building Blocks of Life

Knowledge Probe (KP) or pre-quiz

Participant Guide

Introduction

This learning module provides a review of “cells”, the smallest unit exhibiting the properties of life. It discusses how these cells are being used in bioMEMS as well as other micro and nano-sized devices. A research activity provides the opportunity to further explore how cells can be used in bioMEMS (bio MicroElectroMechanical Systems).

The purpose of this knowledge probe (pre-quiz) is to determine your current understanding of the cell as the basic unit of life, cell types and organization of cells, and the kinds of organelles found in eukaryotic cells. You should take this quiz prior to starting the learning module. The information presented in this learning module leads to an understanding of the importance of cells in bioMEMS applications.

You will not be graded on this quiz; therefore, answer to the best of your current knowledge. There are ten (10) questions.

1. If electron micrographs consistently show mitochondria grouped around a particular structure in a particular cell type, what might one infer?
 - a. Cell is dead or dying
 - b. Structure requires a considerable supply of energy
 - c. Cell contains DNA
 - d. Structure is involved in secretion
 - e. Cell is carrying out protein synthesis
2. Which of the following would be present in prokaryotic cells?
 - a. Endoplasmic reticulum
 - b. Nuclear envelope
 - c. Ribosomes
 - d. Mitochondria
 - e. Lysosomes
3. The cytoskeleton includes which of the following?
 - a. Microtubules only
 - b. Actin microfilaments only
 - c. Endoplasmic reticulum only
 - d. Microtubules and actin microfilaments
 - e. Tight junctions and microtubules

4. Why are individual cells considered life's fundamental units?
 - a. Abundant in our world
 - b. Exhibit all of the basic properties of life
 - c. Exhibit some of the basic properties of life
 - d. Are present in the fossil record
5. If all of the lysosomes within a cell suddenly ruptured, what would be the most likely outcome?
 - a. The macromolecules in the cell cytosol would begin to degrade.
 - b. The number of proteins in the cytosol would begin to increase.
 - c. The DNA within the mitochondria would begin to degrade.
 - d. The mitochondria and chloroplasts would begin to divide.
 - e. There would be no change in the normal function of the cell.
6. What type of cell always lacks a cell wall?
 - a. Bacterial cell
 - b. Plant cell
 - c. Animal cell
 - d. Fungal cell
 - e. Prokaryotic cell
7. Chromosomes are a series of entangled threads. What are chromosomes composed of?
 - a. Microtubules
 - b. DNA and protein
 - c. Fibrous proteins
 - d. Cytoskeleton
 - e. Membranes
8. A cell is composed of compounds that include proteins, nucleic acids, lipids, and carbohydrates. A cell is capable of reproduction, but when the compounds that make up a cell are isolated, none of them can reproduce. Based on this, what is cell reproduction an example of?
 - a. Growth
 - b. A molecule
 - c. Adaptation
 - d. An emergent property
 - e. Metabolism
9. Which of the following applications would NOT benefit from the ability to sort and concentrate bacterial cells on a micro-fluidic biochip?
 - a. Food safety
 - b. Environmental risk management
 - c. DNA analysis
 - d. Health diagnostics

10. Cell survival is NOT dependent on which of the following? A cell's ability to...
- a. Prevent DNA mutations
 - b. Obtain and process energy
 - c. Convert genetic information into proteins
 - d. Keep certain biochemical reactions separate from one another

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