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

BioMEMS Applications Overview Learning Module

This booklet contains six (6) units:
Knowledge Probe (KP or pre-test)
BioMEMS Applications Overview Primary Knowledge (PK)
BioMEMS Applications Activity: Nanomachines
BioMEMS Applications Activity: ELISA
BioMEMS Applications Activity: DNA Hybridization
BioMEMS Applications Assessment

This learning module is an overview of some of the major biomedical developments and applications of BioMEMS. There are three activities that provide further exploration into some of these applications, how they are used and how they work.

Target audiences: High School, Community College, University

Southwest Center for Microsystems Education (SCME) NSF ATE Center

Website: www.scme-nm.org

BioMEMS Applications Overview
Knowledge Probe
Participant Guide

Assessment

This learning module is an overview of some of the major biomedical developments and applications of BioMEMS. There are three activities that provide further exploration into some of these applications, how they are used and how they work.

This knowledge probe evaluates your current knowledge on bioMEMS devices and applications prior to completing the BioMEMS Applications Overview. There are ten (10) assessment questions.

1. In the medical field, mercury thermometers have largely been replaced by thick film disposable thermistors and _____.
    a. Alcohol thermometers
    b. Noncontact infrared thermometers
    c. Contact infrared thermometers
    d. Thermocouple patches

2. What type of micro-device is used to detect specific genes, gene mutations, and gene activity?
    a. ELISA
    b. Protein microarrays
    c. DNA microarrays
    d. LOCs

3. What type of micro-device uses antibodies as biosensors for a variety of analytes in drug screening, food safety, medical diagnostics and homeland security?
    a. ELISA
    b. Protein microarrays
    c. DNA microarrays
    d. LOCs

4. Which of the following is an example of an externally connected sensor – a sensor with an in vitro and an in vivo component?
    a. Cochlear Implant
    b. Pacemaker
    c. Defibrillator
    d. LOC

5. Which of the following has NOT been a primary driver for the large increase in the BioMEMS market?
    a. Increase in the patient pool
    b. New diagnostic and therapeutic devices
    c. New treatments for cardiology and neurology
    d. Changes in FDA approval process for medical devices

6. Glucometers are what type of bioMEMS device?
    a. Biosensors
    b. Microfluidic device
    c. SAW sensor
    d. BioCHIP

7. Which of the following is an implantable bioMEMS device?
    a. ELISA
    b. Glucometer
    c. Pacemaker
    d. BioFLIP

8. Microspheres and microbeads are being developed for which of the following applications?
    a. Retinal implants
    b. Drug delivery
    c. Biomolecular sensors
    d. MicroCHIPS

9. The Human Genome Project led to the development of which of the following devices?
    a. ELISA
    b. Microfluidic LOCs
    c. Tissue engineering
    d. DNA microarrays

10. Which of the following in vivo drug delivery devices consist of several wirelessly actuated reservoirs containing a drug that it released when needed?
    a. ELISA
    b. Microfluidic LOCs
    c. MicroCHIPS
    d. Stents