



KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELLOR
OF SCIENCE (MOLECULAE CELL BIOLOGY)

SBC 315: ADVANCED CELL BIOLOGY LABORATORY TECHNIQUES

DATE: Friday 30th March 2012

TIME: 4.30p.m – 6.30p.m

INSTRUCTIONS:

SECTION A: Instruction: Answer All questions

1. The following are general problems encountered in the expression of heterologous proteins using eukaryotic hosts except:
 - a) instability of certain gene products within the host microorganism, leading to their rapid degradation by proteases;
 - b) incorrect folding of the polypeptide that generates an inactive molecule, which may accumulate to form inclusion bodies within the cell; and
 - c) Difficulties in achieving post-translational modification of proteins, such as cleavage, glycosylation or amidation.
 - d) Toxicity of the protein to the host leading to cell death

2. What is totipotency?
 - a) establishment of missing plant organs or parts using a few cells or small portion of a plant
 - b) formation of a whole plant from a few cells or small portion of a plant
 - c) formation of undifferentiated, swollen cell mass due to the influence of elevated plant hormone levels
 - d) both a) and b) are correct

3. Which one of the following plant hormone is not considered as an auxin?
 - a) kinetin
 - b) Indoleacetic acid
 - c) naphthaleneacetic acid
 - d) all these molecules are auxins

4. What kind of explants material can you use to produce a haploid explants?
 - a) Unfertilized ova
 - b) Developing seed embryo
 - c) Pollen
 - d) All of the above

5. At what temperature should callus be incubated at?
 - a) Between 20° – 23° C
 - b) Between 22° - 25° C
 - c) Between 25° – 30° C
 - d) Between 36° – 38° C

6. Which one of the following amino acid essential for the success of animal cell cultures?
 - a) Glutamine
 - b) Aspartate
 - c) Glutamate
 - d) Asparagine

7. _____ is used to remove adherent animal cells from a culture dish for studies.
 - a) Transpeptidases
 - b) Carboxypeptidases
 - c) Hydrogen peroxide
 - d) Trypsin

8. What is a cell strain?
 - a) cells originating from initial primary culture having the ability to grow up to a certain point before the culture goes in to crisis
 - b) culture of cells with an indefinite life span, considered immortal
 - c) fully differentiated cultured cells ready for use in experiments
 - d) oncogenic cells

9. Which an organism is the 35S promoter derived from?
 - a) Tomato yellow curl leaf virus
 - b) Tobacco mosaic virus
 - c) Cauliflower mosaic virus
 - d) Cassava mosaic virus

10. Which of the following statement is true concerning the 35S promoter?
- a) Causes high levels of gene expression in dicot plants and is less effective in monocots
 - b) Causes high levels of gene expression in monocot plants and is less effective in dicots
 - c) It's made up of about 250 nucleotides
 - d) It can be expressed in bacteria
11. In immunostaining, what does the term epitope refer to?
- a) Antibody/antigen complex
 - b) Area of the antibody where the antigen binds
 - c) Area of the antigen where the antibody binds
 - d) Fluorescent stained molecules
12. What is the use of Horseradish Peroxidase (HRP) and Alkaline Phosphatase (AP) enzymes in immunostaining?
- a) labeling antibodies
 - b) cleaving antibodies
 - c) cleaving antigenic molecules
 - d) separating the antibody/antigen complex
13. In confocal microscopy, what property of light is exploited in order to view images clearly?
- a) Difference of intensity from the source to the eye
 - b) Change of wavelength after being reflected by the sample
 - c) Absorption and luminescence by the sample
 - d) Use of monochromatic light
14. Which of the following molecule(s) is used in transformation of eukaryotic cells?
- a) DNA viruses
 - b) RNA viruses
 - c) Plasmids
 - d) Both b) and c) are correct
15. In multicellular tumour spheroids, what is the maximum size that a spheroid can grow to without central necrosis?
- a) 20 mm
 - b) 20 cm
 - c) 50 cm
 - d) 500 cm

16. Thymidine kinase enzyme:

- a) Is not needed to catalyze the steps in the salvage pathway nucleic acid manufacturing process in cells
- b) Is needed to catalyze the steps in the *de novo* pathway nucleic acid manufacturing process in cells
- c) convert 5-bromodeoxyuridine into 5-bromodeoxyuridine monophosphate
- d) is inhibited by 5- bromodeoxyuridine

17. A heterokaryon is derived from:

- a) The fusion of two cells that are genetically identical
- b) The fusion of two cells that are in different developmental stages
- c) The fusion of two cells that are oncogenic
- d) The fusion of two cells that are genetically different

18. What are myoblasts?

- a) Cultured macrophages
- b) Cultured muscle cells
- c) Cultures heart cells
- d) Undifferentiated macrophages

19. Etiolation can be defined as:

- a) Yellowing and stretching of a plant due to lack of sunlight.
- b) Necrosis of plant cells in the area infected by a bacteria
- c) Yellowing and drying of a plant due to lack of water
- d) Dying of a plant due to the presence of a toxic substance

20. What kind of media is used to culture plant cells?

- a) Eagles media
- b) MS media
- c) Glucose media
- d) M199 media

SECTION B: answer all questions

1. How is the Fluorescence localization after photobleaching (FLAP) used in tracking labelled molecules? (6 marks)

2. Name and briefly explain the techniques used in histotypic cultures to generate a three dimensional matrix. (6 marks)

3. How is fusion of cultured animal cells achieved? (5 marks)

4. Briefly explain the process of callus formation and multiplication in tissue culture. (6 marks)

5 a) What is SiRNA? (2 marks)

b) How does it lead to gene silencing? (5 marks)

SECTION C: Answer any two questions

1. Explain in details the various uses of animal cell and/or organ cultures. (10 marks)

2. Name and explains the importance of the two major group of hormones used in tissue culture, giving their structural configuration where necessary. (10 marks)

3. How is the selection of hybrid animal cells on HAT media done? (10 marks)