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NPTEL

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Courses » Proteins and Gel-Based Proteomics

Announcements Course Ask a Question Progress



Unit 6 - Week-4: Difference gel electrophoresis (DIGE) & Mass spectrometry

Course outline

How to access the portal

Introduction to Gel-Based Proteomics

Week-1: Basics of amino acids and proteins

Week-2: Gel-based proteomics and sample preparation

Week-3: Two-dimensional gel electrophoresis (2-DE)

Week-4: Difference gel electrophoresis (DIGE) & Mass spectrometry

- L16. 2D-DIGE: Basics
- L17. 2D-DIGE: Data analysis
- L18. 2D-DIGE: Applications
- L19. Protein identification using MALDI-TOF/TOF
- L20. Proteomics experiment data analysis & challenges
- Lab session-4.1:

Week-4 Assignment-4

The due date for submitting this assignment has passed. **Due on 2016-04-21, 23:45 IST.**
As per our records you have not submitted this assignment.

1) What is the advantage of 2D-DIGE over regular 2-DE gels? 0.5 points

- More than one sample can be run at one time
- Less running artifacts
- Reduced gel-to-gel variation
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above

2) Select the correct order of steps to be followed during in-gel digestion of proteins? 0.5 points

- Destaining> Dehydration> Reduction> Alkylation> Dehydration> Digestion
- Destaining> Reduction> Alkylation> Dehydration> Digestion> Dehydration
- Dehydration> Destaining> Alkylation> Reduction> Digestion> Dehydration
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Destaining> Dehydration> Reduction> Alkylation> Dehydration> Digestion

3) You have prepared a protein sample for analysis using MALDI-TOF. Your sample has high abundance of phosphorylated proteins. Which of the following is most suitable matrix for your study? 0.5 points

- Sinapinic acid
- Picolinic acid
- 2,5-Dihydroxybenzoic acid
- Trihydroxyacetophenone

No, the answer is incorrect.

Score: 0

Accepted Answers:

Trihydroxyacetophenone

Demonstration
of Q-TOF MS
technology

- Week-4
Assignment
Answer Key
- Quiz : Week-4
Assignment-4

4) Cye dyes form covalent bond with the amino group of a particular amino acid. Which of the following is the correct option? 0.5 points

- Methionine
- Cysteine
- Lysine
- Arginine

No, the answer is incorrect.

Score: 0

Accepted Answers:

Lysine

5) Which of the following enzyme can be used for proteolytic digestion? 0.5 points

- Chymotrypsin
- Trypsin
- Pepsin
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above

6) In MALDI-TOF/TOF analysis, the analyte(s) is mixed with matrix and spotted on the MALDI plate. Match the following matrices with their suitable sample types. 0.5 points

- | | |
|---------------------------------------|------------------------------|
| 1. alpha-cyano-4-hydroxycinnamic acid | i) Proteins bigger than 5 kD |
| 2. 2,5 Dihydroxy benzoic acid | ii) Small molecules |
| 3. Sinapinic acid | iii) Small nucleotides |
| 4. Picolinic acid | iv) Peptides |
| 5. Trihydroxyacetophenone | v) Nucleotides |

- 1-iv; 2-ii; 3-i; 4-v; 5-iii
- 1-iv; 2-ii; 3-iii; 4-i; 5-v
- 1-i; 2-iii; 3-iv; 4-v; 5-ii
- 1-i; 2-ii; 3-iii; 4-iv; 5-ii

No, the answer is incorrect.

Score: 0

Accepted Answers:

1-iv; 2-ii; 3-i; 4-v; 5-iii

7) After the control and treatment protein samples are labelled with cyanine dye, which of the following reagent is used to quench the unreacted dye? 0.5 points

- Lysine
- Cysteine
- Urea
- SDS

No, the answer is incorrect.

Score: 0

Accepted Answers:

Lysine

8) Which of the following parameter is used to create an identical spot boundary across all the channels in DIGE data analysis? 0.5 points

- Detection



- Co-detection
- BVA
- EDA

No, the answer is incorrect.

Score: 0

Accepted Answers:

Co-detection

9) Zip-tips having C-18 columns are used for sample enrichment and salt removal. Sample containing digested peptides binds to the C-18 column matrix because of which of the following biological interactions? 0.5 points

- Ionic interactions
- Covalent bond
- Hydrogen bond
- Hydrophobic interactions

No, the answer is incorrect.

Score: 0

Accepted Answers:

Hydrophobic interactions

10) Your extracted protein sample has high salt contamination but you do not have zip-tips for sample cleanup. Which of the following ionization technique would be preferred to analyze your sample? 0.5 points

- ESI
- MALDI
- Electroionization
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

MALDI

11) Which of the following is an advantage of difference in-gel electrophoresis (DIGE) over gel-free approaches? 0.5 points

- More sensitive
- Detects modification of intact/undigested proteins
- Allows greater range of proteins to be analyzed
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Detects modification of intact/undigested proteins

12) Which of the following criteria is used to select the matrix for sample analysis in MALDI-TOF/TOF? 0.5 points

- Charge on the sample
- Molecular weight and nature of sample
- Iso-electric point of sample
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Molecular weight and nature of sample



13 Which of the following should be used to minimize any biasness in sample processing in DIGE experiments? 0.5 points

- Dye swapping
- Addition of cysteine
- Use of Cy5 dye
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Dye swapping



14 We are providing PMF file (http://www.bio.iitb.ac.in/~sanjeeva/itpws/wp-content/uploads/2016/04/PMF-8.txt) generated using MALDI-TOF MS system. Please analyze the file using online MASCOT server (http://www.matrixscience.com/cgi/search_form.pl?FORMVER=2&SEARCH=PMF). What is the species of the sample we ran on MALDI-TOF instrument? 0.5 points

(Hint: Refer to Lecture 20 Proteomics experiment data analysis & challenges)

- Bos taurus
- Yeast
- Human
- E. coli

No, the answer is incorrect.

Score: 0

Accepted Answers:

Bos taurus



15 We are providing PMF file (http://www.bio.iitb.ac.in/~sanjeeva/itpws/wp-content/uploads/2016/04/PMF-17.txt) generated using MALDI-TOF/TOF MS system. Please analyze the file using online MASCOT server (http://www.matrixscience.com/cgi/search_form.pl?FORMVER=2&SEARCH=PMF). What is the approximate mass range of protein with the best score hit? 0.5 points

(Hint: Refer to guidelines presented in Lecture 20 Proteomics experiment data analysis & challenges)

- 10000-12000
- 20000-22000
- 30000-32000
- 40000-42000

No, the answer is incorrect.

Score: 0

Accepted Answers:

40000-42000

16 The mass spectrometry could be used for..? 0.5 points

- protein identification.
- protein characterization
- protein quantification.
- All of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

All of the above

17) Which of the following organic solvent is used as mobile phase in liquid chromatography based experiments? 0.5 points

- Methanol
- Chloroform
- Acetonitrile
- Acetone

No, the answer is incorrect.

Score: 0

Accepted Answers:

Acetonitrile

18) Which of the following is the correct sequence of events in case of mass spectrometer? 0.5 points

- acceleration, deflection, detection, ionisation
- ionisation, acceleration, deflection, detection
- acceleration, deflection, ionisation, detection
- acceleration, ionisation, deflection, detection

No, the answer is incorrect.

Score: 0

Accepted Answers:

ionisation, acceleration, deflection, detection

19) In which of the following mass spectrometric technique the sample is introduced in solution form, which is eventually nebulized under an applied electrical potential? 0.5 points

- electron ionization (EI)
- electrospray ionization (ESI)
- matrix-assisted laser desorption ionization (MALDI)
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

electrospray ionization (ESI)

20) The path of ions after deflection depends on..? 0.5 points

- only the mass of the ion.
- only the charge on the ion.
- both the charge and mass of the ion.
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

both the charge and mass of the ion.

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