



**SRI BALAJI VIDYAPEETH (SBV)**

(Deemed to be University)  
U/S 3 of UGC Act 1956  
Puducherry-607402

This document contains the details of the  
**Certificate Course in Introduction in Basics and Practical Aspects**  
**of ELISA and Westernblot,**  
conducted by Centre for Interdisciplinary Research Facility (CIDRF),  
Sri Balaji Vidyapeeth, Deemed to be University.

REGISTRAR  
SRI BALAJI VIDYAPEETH  
(Deemed University u/s 3 of UGC ACT, 1956)  
Accredited by NAAC with 'A' Grade  
Pillaiyarkuppam, Pondicherry-607 402

(This document is attested from pages 1-18)

NAAC 2020



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### **Criteria 1**

#### **Metrix 1.3 : Curriculum Enrichment**

##### **1.3.2**

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#### **Details of Certificate Course in Introduction on Basics and Practical Aspects of ELISA and Westernblot**

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Pillaiyarkuppam, Pondicherry-607 402.

NAAC 2020



# SRI BALAJI VIDYAPEETH

( Deemed to be University Accredited with "A" Grade by NAAC  
Central Inter-Disciplinary Research Facility (CIDRF)



Second Floor, MGMCRI College Block, SBV Campus, Pillaiyarkuppam, Puducherry - 607 402.  
e.mail : info@cidrf.res.in

## Certificate Course in Introduction on Basics and Practical Aspects of ELISA and Western Blot

(Two SBV Credit hour Course)

### SHORT TERM INTER-DISCIPLINARY COURSE

CONDUCTED BY SRI BALAJI VIDYAPEETH

DATE: NOVEMBER 8-10, 2019

VENUE: CIDRF, SBV, Puducherry

#### Course on ELISA and Western blot

The course will introduce the participants on ELISA techniques and western blot in theory and practice to develop the competence needed to perform the technique in their own laboratory for research and diagnosis.

#### The course includes:

**ELISA:** Introduction to ELISA techniques, Colorimetric & fluorometric methods, Assay formats & components of ELISA systems, Biconjugation, Optimization & Validation methods and Statistical interpretations & Trouble shooting.

**Western Blot:** Introduction to Protein analysis : Principles and Chemistries, Protein extraction, Quantification and estimation, SDS-PAGE ; Protein Immunostaining, Detection, Documentation and data analysis of immunoblot.

#### Aspirants eligibility

Faculty/PhD Scholars/PG students of Medical/Biomedical departments who wish to apply ELISA and Western blot techniques for research & diagnostics.

#### Resource persons

**Dr. Agiesh kumar B,**  
Deputy Director, CIDRF,  
Sri Balaji Vidyapeeth, Pondicherry

**Dr. Veni Subramanyam,**  
Scientist, CIDRF  
Sri Balaji Vidyapeeth, Pondicherry

**Dr. T.S.Anitha,**  
Scientist, CIDRF,  
Sri Balaji Vidyapeeth, Pondicherry

**Mr. M. Vignesh, Ms. K. Anandhi,**  
**Ms. R. Rahini, Ms. Varsha Maheswari**  
CIDRF

**Dr. Parashuraman S,**  
Head Bioimaging facility,  
Institute of Protein Biochemistry, Italy

**Dr. Maheswaran Mani,**  
Asst. Professor,  
Dept. of Microbiology,  
School of Life Sciences, Puducherry.

**Dr. Rajesh Parsanathan,**  
Malcolm Feist Post doctoral fellow,  
Dept. of Pediatrics and Center for  
Cardiovascular Diseases and Sciences,  
Louisiana State University  
Health Sciences Center, USA.

**Knowledge partners :** Veda Scientifics Chennai, India

#### Registration Details :

SBV Students and Faculty - Rs. 4000/- Outside Participants - Rs. 5000/-

Registration fee ( Payment should be made by  
" Sri Balaji Vidyapeeth" Payable at Puducherry)

For more details contact: [vsubramcidrf@gmail.com](mailto:vsubramcidrf@gmail.com), [ajiesh.b@gmail.com](mailto:ajiesh.b@gmail.com)

Course Co-ordinators : 8220208031, 9943186494

This document is attested  
from pages 1-14

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*Certificate course in Introduction on Basics and  
Practical Aspects of ELISA and Western Blot*

**Course Content**



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## Course Need

This course offers hands-on training on ELISA & Western blot that will help the students to understand the theoretical and practical aspects of the technique. Completing the course will help trainees get placed in various industries, therapeutic drug monitoring services in hospitals, analytical laboratories and in executing day-to day ELISA/Western blot based laboratory operations.

This hands-on course on ELISA & ELISA is designed to train students in theoretical and practical aspects of the technique. Upon the completion of this course, students should be able to independently design and run ELISA, Western blot based experiments and the results obtained.

## Expected Course Outcomes (State in measurable terms)

- The course will enable the trainee to understand the theoretical and practical aspects of ELISA & Western blot and will both basics and practical aspects.
- The module will cover different types of ELISA techniques so that the trainee learns all aspects of the technique and is able to apply them aptly in research and diagnosis.
- The module will cover setting up of immunoblotting and documentation techniques.

## The scheduling structure: Consider the following three options and give your plan

ELISA:

Basics of ELISA: 4 hours ( DAY 1)

How to choose and design an assay (Theory): 4 hours (DAY 2)

Practical (demonstration): 8 Hours (DAY 3)

Practical (Demonstration): 8 Hours (DAY 4)

Practical (Hands-on): 8 Hours (DAY 5)

Practical (Hands-on): 8 Hours (DAY 6)





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Western blotting:

Introduction to Protein analysis by western blot: Principles and Chemistries (Day 1)

Protein Quantification basics and technique (Day 2)

Reagent Preparation (Day 3)

SDS-PAGE (Day 4)

Transblot and Protein Immunostaining (Day 5)

Detection, Documentation and data analysis (Day 6)

**List the teaching learning activities and methods used for instruction, monitoring and mentoring**

(Lecture, Tutorial, Small Group Teaching, Seminars, Journal clubs and more)

· Lecture and seminars

Practical-Demonstration

Practical-Hands-on

**10 Course scheduling and Credits**

Module	Direct contact sessions	Space for any other remark
Basics and Practical aspects of ELISA		
Day 1	4 Hours	This is an entirely theory and practical based course and doesn't need completion of any project.
Day 2	4 Hours	
Day 3	8 Hours	
Day 4	8 Hours	
Day 5	8 Hours	



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Day 6	8 Hours	
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Module	Direct contact sessions	Space for any other remark
Basics and Practical aspects of Western blotting		
Day 1	4 Hours	This is an entirely theory and practical based course and doesn't need completion of any project.
Day 2	4 Hours	
Day 3	8 Hours	
Day 4	8 Hours	
Day 5	8 Hours	
Day 6	8 Hours	
Total 6 Days	Total Hours: 40+40 Total Credits: 1.5+1.5=3 Total theory: 8+8=16 Total practical: 32+32=64  *One Credit= 16 hrs (theory) *One Credit= 32 hours (Practical)	





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 DEEMED TO BE UNIVERSITY  
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 RANKED 25 ALL INDIA BY NIRF 2019



**CENTRAL INTER-DISCIPLINARY RESEARCH FACILITY**

A Constituent Unit of Sri Balaji Vidyapeeth (SBV)

Deemed to be University,  
 Puducherry

**CERTIFICATE COURSE IN INTRODUCTION ON BASICS AND PRACTICAL ASPECTS OF ELISA AND WESTERN BLOT**

*This is to certify that*  
**Dr. Anitha T.S.**

*Mr./ Mrs./Ms. /Dr. ....*

*was a Resource Person for the Course in Introduction on Basics and Practical*

*Aspects of Elisa and Western Blot with <sup>TWO</sup>..... credits,*

*conducted by Central Inter-Disciplinary Research Facility (CIDRF),*

*Sri Balaji Vidyapeeth, Deemed-to-be University, Puducherry,*

*from 8<sup>th</sup> November to 10<sup>th</sup> November, 2019.*

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 SRI BALAJI VIDYAPEETH  
 PUDUCHERRY  
 (Established by u/s 3 of the Act of 1966)  
 Accredited by NAAC with 'A' Grade  
 (Autonomous, Puducherry)

*[Signature]*  
**Dr. Agiesh Kumar B.**  
 Course Co-ordinator

*[Signature]*  
**Dr. Veni Subramanyam**  
 Course Co-ordinator

*[Signature]*  
**Dr. Balanekru Subramanian**  
 Director, CIDRF, SBV





**SBV short-term course on Introduction to basics and practicalAspects of ELISA and Western Blot**



**ELISA**

**Post-Test**

1. What does a weak colour signal in competitive ELISA represent?
  - a) more antigen in the sample
  - b) less antigen in the sample
  - c) less antigen retained on the well
  - d) both a and c
  
2. Which of the following is immobilized on the microtiter well in sandwich ELISA?
  - a) detection antibody
  - b) sample
  - c) capture antibody
  - d) secondary antibody conjugated to an enzyme
  
3. Which of the following is not an example of labelled antibody test?
  - a) Western blot
  - b) ELISA
  - c) Fluorescent Antibody Test
  - d) The immunodiffusion test
  
4. Which of the following does not describe the advantages of ELISA test?
  - a) They can quantify the amount the antigen or antibodies in the sample
  - b) They can demonstrate the presence of multiple antigens
  - c) They can detect either antigen or antibodies
  - d) They can be easily automated
  
5. Which of the following ELISA method used to detect antigen?
  - a) Direct ELISA
  - b) Competitive ELISA
  - c) Sandwich ELISA
  - d) Indirect ELISA
  
6. Which of the following ELISA method used to detect antibody?
  - a) Direct ELISA
  - b) Sandwich ELISA
  - c) Competitive ELISA
  - d) Indirect ELISA
  
7. Which of the following enzyme are commonly used in ELISA?
  - a) Alkaline Phosphatase

- b) Horseradish Peroxidase
  - c) Neither a nor b
  - d) Both a and b
8. Why it is necessary to wash the samples repeatedly?
- a) It is important to keep the well clean
  - b) It is important to wash away the unbound antibodies
  - c) Washing the well is just solid lab practice
  - d) It is important to wash away all bound and unbound antibodies from the wells
9. The four basic step of ELISA: 1. Bind sample to well 2. Add primary Ab and wash 3. Add secondary Ab/enzyme and wash 4. Add Substrate
- a) True
  - b) False
10. Why did you assay your samples in duplicates?
- a) To act as a control of the assay
  - b) Reproducibility of results
  - c) To test for pipetting error
  - d) All the above

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*[Handwritten Signature]*  
Central Inter-Disciplinary Research Facility  
Kannam Medical College & Research Institute Campus  
Pillaiyarkuppam, Pondicherry - 607 402



**Short-term course on Introduction to basics and practical  
Aspects of ELISA and Western Blot**



1. Western blotting includes
  - a) PAGE
  - b) AGE
  - c) SAGE
  - d) Both (a) and (b)
2. Patient serum contain
  - a) unknown antigen
  - b) unknown antibody
  - c) known antigen
  - d) known antibody
3. SDS binds to
  - a) antibody
  - b) amino acid
  - c) antigen
  - d) buffer
4. Which membrane is used in Western blot for detection of protein?
  - a) PVDF
  - b) Nitrocellulose
  - c) PES
  - d) Both (a) & (b)
5. Before denaturation of proteins, which of the following factors cannot affect the pattern of gel in western blotting
  - a) Shape of the protein
  - b) Molecular size of the protein
  - c) The kind of secondary antibodies used during the experiment
  - d) Charges of the protein
6. Which type of stains are used in Protein detection?
  - a) Ponceau Stain
  - b) Coomaasie brilliant blue
  - c) both (a) and (b)
  - d) neither (a) nor (b)
7. Process of folding does not depend on
  - a) Concentration of salts
  - b) Ph
  - c) Solute
  - d) Solvent
8. Study of interaction of antigen and antibody in blood is
  - a) hematology
  - b) serology
  - c) myology
  - d) antilogy
9. Blocking buffer is not made up of
  - a) Milk
  - b) Casein
  - c) Bovine serum albumin
  - d) Skimmed milk
10. Westernblot is used in diagnosis of
  - a) HIV
  - b) FIV
  - c) Lyme
  - d) All





Short-term course on Introduction to basics and practical  
Aspects of ELISA and Western Blot



**Pre-Test (Answer key)**

1. Which of the following molecule(s) can be detected by ELISA?  
a) proteins  
b) hormones  
c) antibodies  
d) all of the above

**Ans: d)**

2. What is a major advantage of ELISA in comparison to other biological quantification techniques?  
a) detection of a molecule at a low concentration  
b) inexpensive  
c) low specificity  
d) easily available

**Ans: a)**

3. Which of the following is used to confirm the presence of HIV infection in individuals who are antibody-positive by ELISA?  
a) Western blot  
b) Complement Fixation  
c) Ouchterlony Test  
d) Hemagglutination

**Ans: a)**

4. Which of the following is commonly used as the basis for rapid pregnancy test?  
a) An antibody sandwich ELISA  
b) An immunochromatographic assay  
c) A radial immunodiffusion assay  
d) An immunofiltration assay

**Ans: b)**

5. Which of the following specimen/samples are used for ELISA  
a) Plasma  
b) Serum  
c) Urine  
d) All the above

**Ans: d)**

6. What does the symbol  $\mu\text{L}$  stand for?  
a) Microlitre  
b) Millilitre  
c) Multilitre  
d) Nanolitre

**Ans: a)**

7. What does ELISA stands for?  
a) Enzyme Linked Immuno Sorbent Assay  
b) Enzyme Linked Immune System Assay  
c) Enzyme Linked Independent Sorbent Assay  
d) Enzyme Linked Immuno Stain Assay

**Ans: a)**

8. ELISA is known as Enzyme Immuno Assay?  
a) True  
b) False

**Ans: a)**

9. What is ELISA?  
a) Diagnostic Method  
b) Determining protein Concentration  
c) Immunological Assay Technique  
d) All the above

**Ans: d)**

10. Which of the following disease cannot be detected using ELISA  
a) HIV  
b) Sickle Cell Anaemia  
c) Pernicious Anaemia  
d) Lyme disease

**Ans: b)**

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**Pre-test – Answer key**  
**Short-term course on**  
**Introduction to basics and practical**  
**Aspects of ELISA and Western Blot**



Multiple Choice questions:

1. Western blotting is a technique used for
  - a) DNA identification
  - b) RNA identification
  - c) Identification of Unknown Proteins
  - d) All of the above.

**Ans: c)**
  
2. Western blot is also referred to as
  - a) Antigen test
  - b) Immunoblot
  - c) Fluorescent imaging
  - d) Bioimaging

**Ans: b)**
  
3. Protein are chains of
  - a) Aminoacids held together by peptide bond.
  - b) Aminoacids held together by nucleotides
  - c) Aminoacids held together by phosphate bond
  - d) All of the above.

**Ans: a)**
  
4. Protein estimation can be done by
  - a) Bradford's method
  - b) Lowry's method
  - c) Both (a) & (b)
  - d) Anthrone method

**Ans: c)**
  
5. Proteins can be detected by
  - a) Immuno blotting
  - b) SDS-PAGE
  - c) 2D- gel electrophoresis
  - d) All of the above

**Ans: d)**
  
6. Unfolding of a protein can be termed as
  - a) Renaturation
  - b) Denaturation
  - c) Oxidation
  - d) Reduction

**Ans: b)**



7. Proteins are separated based on

- a) Mass to charge ratio (Z/C)
- b) Charge to mass ratio (C/Z)
- c) Only charge
- d) Only mass

Ans: b)

8. In gel electrophoresis, the protein moves from which charge to which charge?

- a) Positive to negative
- b) Negative to positive
- c) Both (a) & (b)
- d) No charge required

Ans: b)

9. PAGE stands for

- a) Polyacrylamide gel electrophoresis
- b) Polybisacrylamide gel electrophoresis
- c) Polyvinyl gel electrophoresis
- d) Peripheral acrylamide gel electrophoresis

Ans: a)

10. Site directed mutagenesis facilitated research on

- a) Carbohydrates
- b) Proteins
- c) Lipids
- d) Fats

Ans : b)

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Enrolled student list for Certificate Course in Introduction in Basics and Practical Aspects of ELISA and Western blot

S. No.	Name	Affiliation	External/Internal	Contact No.	Mail ID	Signature
1	Ms M Geetha	St. Joseph college of Arts and Science	External	8903494917	<a href="mailto:geetha.scol14@gmail.com">geetha.scol14@gmail.com</a>	
2	Dr. R. Sivakami	Rajahmundry Dental College	External	9659812346	<a href="mailto:sivakamiasindhua@gmail.com">sivakamiasindhua@gmail.com</a>	
3	Mrs Bitavaneswari Ramesh	Centre for Music Therapy Education and Research, SBV	Internal	9840705561	<a href="mailto:bitavan28@gmail.com">bitavan28@gmail.com</a>	
4	Dr. Prathiba bala	Indira Gandhi Institute of Dental Science, SBV	Internal	9894360543	<a href="mailto:prathibabala@igids.ac.in">prathibabala@igids.ac.in</a>	
5	Mr. G. Dayanidhi	CYTER, SBV	Internal	9789210593	<a href="mailto:dayanidhi@gmail.com">dayanidhi@gmail.com</a>	
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