SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES

OSSUDU AGARAM VILLAGE; KUDAPAKKAM POST,PONDICHERRY - 605003

Date 1.7.2020

From
Dr. Sujatha Tripathi,
HOD in-charge
Pathology
SriLakshmiNarayanaInstituteofMedicalSciences,Puducherry
Bharath Institute of Higher Education and Research,
Chennai.

To
The Dean,
SriLakshmiNarayanaInstituteofMedicalSciences,Puducherry
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Permission to conduct value-added course: Blood banking technologies

Dear Sir,

With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: Blood banking technologies on August-october 2020. We solicit your kind permission for the same.

Kind Regard

Dr. Sujatha Tripathi

FOR THE USE OF DEANS OFFICE

Names of Committee members for evaluating the course:

The Dean: Dr.Rajasekaran

The HOD in charge: Dr. Sujatha Tripathi

The Expert: Dr. Sujatha Tripathi

The committee has discussed about the course and is approved .

Dean	Subject Expert	HOD
(Sign &Seal)	(Sign &Seal)	(Sign &Seal)

DEAN
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
OSSUDU AGARAM VILLAGE,
KUDAPAKKAM POST,
PUDUCHERRY - 605 502

DEPARTMENT OF PATHOLOGY
Sri Lakshmi Narayana Institute Of Medical Sciences
PONDICHERRY - 605 502

PROFESSOR & HEAD (I/c) DEPT. OF PATHOLOGY
SRI LAKSHMI NARAYAN INSTITUTE OF
MEDICAL SCIENCES,
PUDUCHERRY - 605 502.

SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES

OSSUDU AGARAM VILLAGE; KUDAPAKKAM POST,PONDICHERRY - 605003

11.7.2020

Circular

Sub: Organising Value-added Course: Blood banking technologies

With reference to the above mentioned subject, it is to bring to your notice that **SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES Bharath Institute of Higher Education and Research**, is organising**"_Blood banking technologies" from August 2020**. The course content and is enclosed below."

The application must reach the institution along with all the necessary documents as mentioned. The hard copy of the application should be sent to the institution by registered/ speed post only so as to reach on or before 31.7.2020 . Applications received after the mentioned date shall not be entertained under any circumstances.

Dean

Encl: Copy of Course content

DEAN
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
OSUDU, AGARAM VILLAGE,
KUDAPAKKAM POST,
PUDUCHERRY - 605 502

Course Proposal

Course Title: Blood banking technologies

Course Objective:

1. To understand the basics of immunohematology and blood group systems for better learning about blood banking
2. Should know in detail about pretransfusion testing
3. Should be able to perform blood grouping correctly under supervision

Course Outcome: Better understanding and knowledge about blood grouping and pretransfusion testings

Course Audience: IInd year MBBS

Course Coordinator: Dr. Sujatha Tripati

Course Faculties with Qualification and Designation:

1. Dr. Sujatha Tripati , HOD-in-charge

2. Dr. Sivaganesh@ Porko.G, Assistant professor

Course Curriculum/Topics with schedule

SlNo	Date	Topic	Time	Faculty	Hours
1.	1.08.2020	Introduction, Basics of immunohematology	1.30-4 pm	**Dr. Sujatha Tripati**	2.5 hrs
2.	8.08.2020	Blood group system	1.30-4 pm	**Dr. Sivaganesh@ Porko.G**	2.5 hrs
3.	15.08.2020	Blood group antigen and antibodies	1.30-4 pm	**Dr. Sujatha Tripati**	2.5 hrs
4.	22.08.2020	Antigen- Antibody reactions, Factors influencing reaction	1.30-4 pm	**Dr. Sivaganesh@ Porko.G**	2.5 hrs
5.	29.08.2020	Pretransfusion testing	1.30-4 pm	**Dr. Sujatha Tripati**	2.5 hrs
6.	5.09.2020	Techniques of blood grouping	1.30-4 pm	**Dr. Sivaganesh@ Porko.G**	2.5 hrs
7.	12.09.2020	Cross-matching	1.30-4 pm	**Dr. Sujatha**	2.5 hrs

				Tripati	
8.	19.09.2020	Transfusion Transmitted Infections	1.30-4 pm	**Dr. Sivaganesh@ Porko.G**	2.5 hrs
		Practical Class			
9.	26.09.2020	Blood grouping	1.30-4 pm	**Dr. Sujatha Tripati**	2.5 hrs
10.	03.10.2020	Cross matching	1.30-4 pm	**Dr. Sivaganesh@ Porko.G**	2.5 hrs
11.	10.10.2020	TTI	1.30-4 pm	**Dr. Sujatha Tripati**	2.5 hrs
12	17.10.2020	Assessment and g feedback	1.30-4 pm	**Dr. Sivaganesh@ Porko.G**	2.5 hrs
		Total			30 hrs

REFERENCE BOOKS:

1. Medical laboratory technology, Methods and interpretations, by Ramnik Sood, Fifth edition
2. Atlas and textbook of hematology by Dr.Tejindar singh

VALUE ADDED COURSE

1. Name of the programme & Code

Blood banking technologies and PA01

2. Duration & Period

30 hrs & AUGUST - OCTOBER2020

3. Information Brochure and Course Content of Value Added Courses

Enclosed as Annexure- I

4. List of students enrolled

Enclosed as Annexure- II

5. Assessment procedures:

Short notes- *Enclosed as Annexure- III*

6. Certificate model

Enclosed as Annexure- IV

7. No. of times offered during the same year:

1

8. Summary report of each program year-wise

Value Added Course- AUGUST - OCTOBER2020					
Sl. No	**Course Code**	**Course Name**	**Resource Persons**	**Target Students**	**Strength & Year**
1	PA01	**Blood banking technologies**	Dr. Sujatha	2nd MBBS	AUGUST - OCTOBER2020

9. Course Feed Back

Enclosed as Annexure- V

RESOURCE PERSON

DEPARTMENT OF PATHOLOGY
Sri Lakshmi Narayana Institute Of Medical Sciences
PONDICHERRY

COORDINATOR

BLOOD BANK TECHNOLOGIES

PARTICIPANT HAND BOOK

BIHER

SLIMS

COURSE DETAILS

Particulars	Description
Course Title	Blood bank technologies
Course Code	PA01
Objective	1. Basics of immunohematology 2. Antigen and Antibodies 3. Blood group systems 4. Blood group antigen and antibodies 5. Antigen- antibody reaction 6. Factors influencing antigen-antibody reaction 1 7. Factors influencing antigen-antibody reaction 2 8. Pretransfusion testing 9. Blood grouping 10. Cross matching 11. Antibody screening 12. Recent trends
Key Competencies	On successful completion of the course the students will have knowledge and skill in regarding immunohematology and blood bank techniques
Target Student	2nd MBBS Students
Duration	30hrs AUGUST – OCTOBER 2020
Theory Session	20hrs
Practical Session	10hrs
Assessment Procedure	Written assesment

Immunohaematology

- demonstration of red cell antigen (Ag)-red cell antibody (Ab) reactions is the key

• Landsteiner - blood antigens (ABO) present on RBCs would react with their respective Abs present in plasma

• Many different types of Ag-Ab reactions, blood bankers are often concerned with reactions between Ags on red blood cells and Abs in serum/ plasma.

Combination of Ag-Ab can result in observable reactions, most commonly – Agglutination, Hemolysis , Precipitation etc.....

ANTIGENS

Antigens are substances that can induce a specific immunologic response or can interact with specific antibody or immune cells "in vivo" or "in vitro".

(Immunogens)

• Epitope: structural chemical group in a specific 3-D arrangement, known as antigenic determinants, which is lacking or foreign to the immunized animal

• An Important factor affecting the immunogenicity of an antigen is its molecular size (>4,000 daltons)

• Smaller molecules (for example, drugs such as penicillin) can be immunogenic if coupled to a protein "carrier" of larger molecular weight. (Hapten)

BLOOD GROUP ANTIGENS

Present (predominantly) on RBCs & may be Carbohydrates / proteins / lipids

• 324 blood group Ags are recognized

• 33 blood group systems are known E.g. ABO, Rh, Kell, Duffy, Kidd, MNSs.....

• 40 blood group Ags unassigned

• Molecular biology of assigned Ags are known

• Detected by serologic techniques. (genotypes by molecular techniques)

• A & B Ags:

➢ Carbohydrates

➢ Present on cells, tissues, organs except CNS tissue & stem cells

➢ Detected on RBCs of embryos as early as 5-6 weeks of gestation

➢ Adult levels of ABO expression by age 2-4 years

BIOLOGICAL ROLE OF BLOOD GROUP ANTIGENS

• At present unknown & ABH Ags are widely distributed throughout the body

• Rh & Kell (K) - play a part in cell membrane integrity

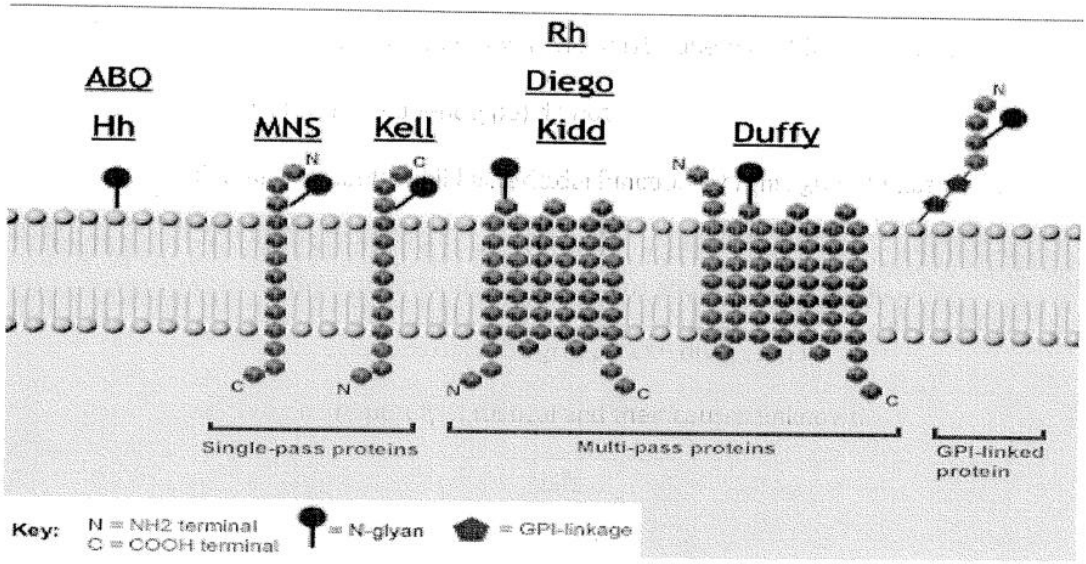
➢ Loss of Rh antigens (Rh null) on their RBCs - hemolytic anemia ("Rh-null syndrome)

➢ A, B, and H antigens (Bombay phenotype) do not

➢ Rare inherited defect of neutrophil bactericidal function (chronic granulomatous disease) -Kell blood group system

• Relationship between the Duffy blood group antigens and resistance to malaria.

• There are many other associations of blood groups with disease, particularly malignancy; many of them are purely statistical and their causes unknown.



BLOOD GROUP ANTIBODIES

BIHER

SLIMS

Produce against immunization to blood-group Ag & present in plasma or serum

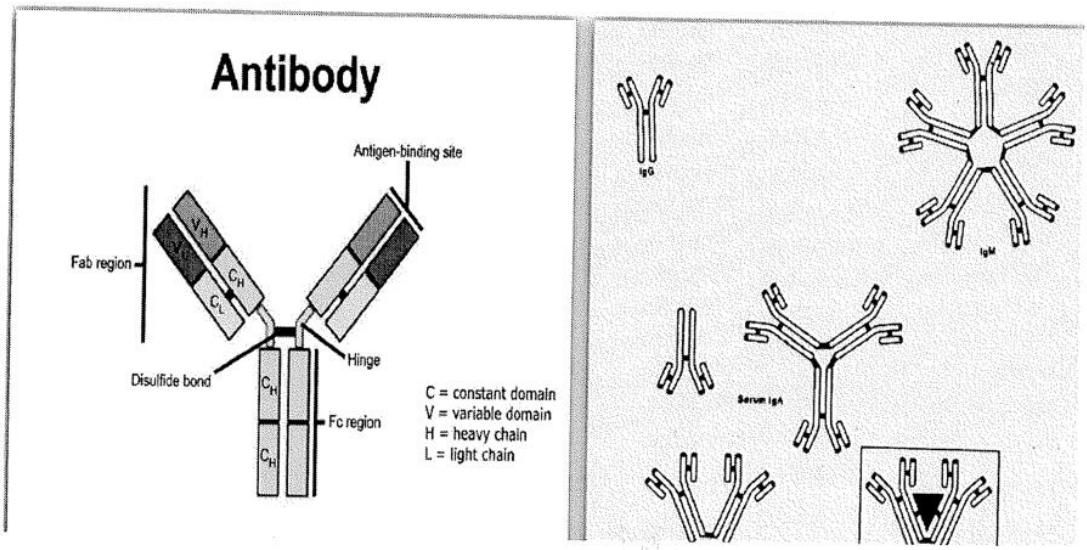
- Within a few months after birth, an infant makes anti-A and/or anti-B, if lacking those Ags on its RBCs - naturally occurring since they have no apparent antigenic stimulus.
- Naturally occurring antibodies to Ags other than ABO are also often encountered,particularly in the I, Lewis, P, and MN systems. (IgM)
- Immune antibodies to blood group Ags develop as a result of pregnancy, transfusion, or immunization (IgG). Following immunization, IgM Abs are often seen first, followed by IgG Abs, which often predominate
- Abs other than anti-A or anti-B are usually called "irregular", "atypical", or "unexpected" antibodies. The preferred term is unexpected

IgG (Warm antibodies)

- Binds at warm temp (37ºC)
- Fc portion carries macrophage receptor
- Only 2 Fab sites
- High concentration required to activate complement
- Extravascular hemolysis
- Ex -
  - *Rh antibodies*
  - *Kell*
  - *Duffy*
  - *Kidd*
  - *S,s*

IgM (Cold Antibodies)

- Binds at room or cold temp (4-24ºC)
- 10 Fab sites per molecule
- Efficient at activating complement
- Intravascular hemolysis
- Ex -
  - *Anti-Le^a*
  - *Anti-Le^b*
  - *Anti-I*
  - *Anti-P1*
  - *Anti-M*
  - *Anti-A, -B, -H*
  - *Anti-N*



Characteristics of antigen and antibody reactions

First and second stages of antigen–antibody reactions:

- **First stage – (Sensitization)**

- Ags & Abs randomly bumping into each other in the test environment, & when this occurs at the antigen site, the actual attachment of Ab to Ag takes place. (happens very quickly and not visible)

- ***Second stage – (Agglutination)***

- Demonstrable effect of attachment of Ab to Ag.

- This stage takes a longer time to develop & may need to be enhanced in the laboratory in order for it to become observable. (*Centrifugation*)

Centrifugation

- In this way agglutination may be enhanced, whereas cells that have not reacted with antibody remain unagglutinated.

Antigen-Antibody affinity;

The strength of the actual bond between a single Ab combining site and a single epitope (relates to its goodness of fit with the corresponding Ag)

The combined strength of multivalent Ab binding to many epitopes on the same carrier (such as a red blood cell)

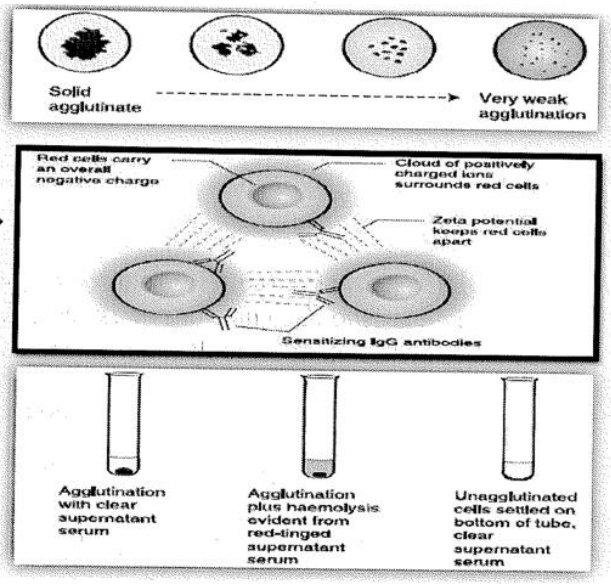
In blood banking, this condition could apply to IgM or IgG antibodies, as both have more than one binding site per molecule

- Prozoning: (Ab excess)

An undiluted Ab with high avidity, when mixed with a suspension of red cells containing the corresponding Ag, will fail to show any demonstrable reaction in vitro, but will do so when diluted and mixed with these same cells.

Common types of antigen- antibody reaction

- **Haemagglutination**
- **Sensitization**
- **Haemolysis**
- Neutralization
- Precipitation



Factors that influence antigen- antibody reaction;

1. Distance between reactive sites on Abs:

- IgM Ab molecules are 300 Å long & able to react observably by haemagglutination of red cells in saline.
- IgG Abs are 120 Å long & usually sensitize cells in saline.

2. Electric repulsion between red cells – zeta potential

- The repelling force between red cells that carry the same negative electrical charge is called zeta potential, which prevents the agglutination of sensitized red cells in saline.
- Zeta potential must therefore be reduced or altered in some way for the smaller IgG Abs to be able to achieve agglutination.

3. **Site of the antigenic determinants:**

- Some antigens (such as the A and B antigens) protrude from the red cell surface

farther than

others (such as the Rh antigens).

4. **Number of antigenic determinants:**

- It is easier for Abs to react with antigens, which are in abundance on each red cell, than sparsely located on the cells.
- Homozygous (more Ag sites) Vs heterozygous (Less Ag sites) - ***Dosage effect***. Ex. Kidd, Duffy , Rh & MNSs
- Ex. S positive red cells that are genetically *S/S* (with a double dose of *S*) may react more strongly with anti-S than cells which are heterozygous *S/s* (with a single dose of *S*), depending on the anti-S used in the tests.

5. **Goodness of fit:** 'lock-and-key' way

- Combination between lock & key is precise – high goodness of fit, & stronger reaction
- The degree of goodness of fit is also k/n as *Ab affinity*. *Ab affinity*

6. Effects of time: (Incubation time - IP)

- Reactants should be incubated for the optimum time for a good Ag–Ab reaction to develop.
- Too short IP - Ag & Ab may not have had sufficient time to form a good reaction.
- Prolonged IP cause Ag– Ab complexes todissociate.
- The best balance should be determined, documented and followed each time tests are performed.
- Ex. – 60 minutes for NS & 10-15 minutes for LISS

7. Effects of temperature:

- Cold Abs (IgM) react well at 2°C - 10° C
- Abs usually dissociate from the cells when the temperature israised.
- Cold Abs may be eluted from red cells by raising the temperature from 2°C to 37°C.

- Most IgG (Warm) Abs react best at 37°C.
- To dissociate Ag-Ab complexes - raise the temperature to about 56°C - Ab would be eluted
    - (removed or forced to be released) from the cells
- Red cells however, become denatured at temperatures in excess of +50°C & would have to be discarded.

8. Effects of pH

- The optimal pH range - 6·5 to 7·0, with an acceptable range of pH of 6·0to 8·0
- Outside this range, results become unreliable.

9. Effects of ionic strength

- Negatively charged red blood cells attract a 'cloud' of positive ions from the surrounding medium (NS) - normal ionic strength saline solution is isotonic with blood (0·85% to 0·9% w/v of NaCl in water)
- Low ionic strength saline solutions (LISS) are commonly used to increase the sensitivity of Ag-Ab reaction
- POTENTIATORS AND ENHANCERS

1. **low ionic strength saline solution (LISS):**

- LISS - used for red cell suspensions
- Follow manufacturer's instructions are carefully, otherwise false results may occur. It has two major impacts:
- Reduces the incubation time
- Increases the amount of Ab uptake onto red cells Ags

2. **High molecular mass substances: Ex.** Bovine serum albumin, Polyethylene glycol (PEG), Polybrene (a polymer of hexadimethrine bromide), Polyvinylpyrrolidone, Gelatin & Gum acacia

3. **Proteolytic enzymes:** reduces sialic acid residues around the red cells - reduce the zeta potential. Commonly used are:

- Pineapple stem: source of *bromelin* - Dried

latex of fig tree: source of *ficin*

- Latex of papaya fruit: source of *papain* - Extract
  of pig stomach: source of *trypsin.*

10. Concentration of Ag & Ab:

- Best results, when a large number of Ab molecules are bound to each cell.

11. Number of fragment Ag binding (Fab) sites:

- IgM Abs 5-10 Fab sites > IgG Abs 2 Fab sites
- In both cases, many molecules of antibody are required to result in a demonstrable reaction, but the principle remains the same.

At present, 33 blood group systems representing over 300 antigens are listed by the International Society of Blood Transfusion.[2,3] Most of them have been cloned and sequenced. The genes of these blood group systems are autosomal, except XG and XK which are X-borne, and MIC2 which is present on both X and Y chromosomes. The antigens can be integral proteins where polymorphisms lie in the variation of amino acid sequence (e.g., rhesus [Rh], Kell), glycoproteins or glycolipids (e.g., ABO). Some of the important groups are mentioned here

• Pre-transfusion Testing in IHL lab:

➢ ABO/Rh typing

➢ Other blood group antigen typing

➢ Detection of red cell alloimmunization (unexpected antibodies)

➢ Compatibility testing (crossmatching)

➢ Direct /Indirect Antiglobulin Test

➢ Weak D testing etc.....

Blood grouping and cross-matching

The most fatal of all transfusion-related reaction is ABO incompatibility causing complement-mediated intravascular hemolysis. Hence, correct blood grouping and typing, and cross-checking with the blood requisition form is of utmost importance. ABO typing is carried out by testing RBCs for the A and B antigens and the serum for the A and B antibodies before transfusion. The next step involves Rh typing with only 15% of the population being Rh-negative.

Cross-matching

Cross-matching involves mixing of donor RBCs with the recipient serum to detect fatal reactions.[19] It has three phases in which the first phase (1-5 min) involves detection of ABO incompatibility and detection of antibody against MN, P, and Lewis systems. The second phase (30-45 min in albumin and 10-20 min in low ionic salt solution) involves incubation of first phase reactants at 37°C for detection of incomplete antibodies of Rh system. The third phase consists of the addition of antiglobulin sera to the incubated second phase reactants to detect incomplete antibodies of Rh, Kidd, Kell and Duffy. Among the three phases, the first two phases are more important as they detect those involved in fatal HTR. The total time taken for all the three phases is in between 45 and 60 min.

Antibody screening

Here, commercially prepared RBCs with all the antigens, which direct production of antibodies causing hemolytic reactions, are mixed with the recipient's serum to detect the presence of those very antibodies. It is also carried out with the donor's serum.

Changing practices in blood grouping;

There are controversies regarding the best method for procurement of blood during elective and emergency situations: (a) It can be done by routinely asking for grouping and cross-matching in elective surgical patients. Many scientific articles disputed the relevance of preoperative arrangement of blood in surgeries where blood loss is not anticipated to be significant. (b) Blood may be ordered without full set of investigations. ABO-Rh typing alone results in a 99.8% chance of a compatible transfusion. Antibody screening increases this safety margin up to 99.94%, and an additional cross-match further increases the compatibility to 99.95%. In absence of cross-matching, there is a possibility of missing the antigens on donor cells, but in clinical practice, they are of less importance. Hence, "screening and typing" alone should be carried out. Other methods include "type and partial cross-match," which includes the immediate phase of cross-match; "type and uncross match," for those recipients who have never been transfused before, the chance of detection of antibody with each cross-match is 1:1000; "type O Rh-negative uncross match," it is performed in emergency situation when the time for these procedures is limited. In the latter condition, type O Rh-negative packed RBCs, that is, the universal donor can be used as they will have a negligible amount of hemolytic anti-A/anti-B antibodies against the recipient RBCs.

Assessment Procedure

Written assessment

VALUE ADDED COURSE
Blood banking technologies and PA01

List of Students Enrolled AUGUST - OCTOBER2020

2ND Year MBBS Student			
Sl. No	**Registration Number**	**NAME OF THE STUDENT**	**Signature**
1	U14MB255	JEEVAHASHINI. S	
2	U14MB256	JAYAPRIYA.J	
3	U14MB257	JAYACHANDRAN. G	
4	U14MB258	JIMS SAMGODWIN. S	
5	U14MB259	KABITH VAJAN.A	
6	U14MB260	KARPAGAM.S	
7	U14MB261	KARTHIKA PRIYA. S.K	
8	U14MB262	KAVYA. K	
9	U14MB263	KAVYASHREE.P	
10	U14MB264	KEERTHI.R	
11	U14MB265	KELHOUNEIR TSEIKHANUO	
12	U14MB266	KIRTHICK SARAN RAJA. V	
13	U14MB267	KISHORE KANNA.A	
14	U14MB268	LINGABARATHAN.A	
15	U14MB269	LITHIGA. M	
16	U14MB270	LOHISHVAR.A	
17	U14MB271	LOKESHKUMAR. B	
18	U14MB272	MADIMCHETTY SATHYA AASHEERV	
19	U14MB273	MAHANMAHARAJ.A	
20	U14MB274	MANOJ. R	

RESOURCE PERSON

DEPARTMENT OF PATHOLOGY
Sri Lakshmi Narayana Institute Of Medical Sciences
PONDICHERRY - 605 502.

COORDINATOR

PROFESSOR & HEAD, DEPT. OF PATHOLOGY
SRI LAKSHMI NARAYAN INSTITUTE OF
MEDICAL SCIENCES,
PUDUCHERRY - 605 502.

SRI LAKSHMI NARAYANA INSTITUE OF HIGHER EDUCATON AND RESEARCH

BLOOD BANKING TECHNOLOGIES

Course Code: PA01

5X3= 15

I. ANSWER ALL THE QUESTIONS

1. **Define Immunohematology. What is antigen and antibody?**
2. **Discuss Factors affecting antigen antibody reaction**
3. **Enlist pre-transfusion tests**
4. **Short notes on blood grouping**
5. **Recent trends in grouping and crossmatching**

Jeevahashini
U14MB255

12h
15

Blood Banking technologies

1) Define immunohematology. What is antigen and antibody?

Immunohematology is a branch of hematology and reactions transfusion medicine which studies antigen - antibody reactions and anologaus phenomena as they relate to the pathogenesis and clinical manifestation of blood disorder. A person employed in this field is reffered to as immuno hematologist.

antigen - A substance that enters the body and starts a process that can cause disease. The body then usually produces substance.

antibody - are Y-shaled protein that bind to the foreign invader and signal the immune system to get to work.

2) Discuss factors affecting antigen antibody reaction?

The strength of interaction between antibody & antigen at single antigenic site can be described by affinity of the antibody for antigen. He is controlled by three major factors.

Antibody epitope affinity, the valence of both the antigen and antibody and structural arrangement of interacting parts.

Keerthi R
U14MB264

BLOOD BANKING TECHNOLOGIES

12/15

① Define Immunohematology. what is antigen and antibody?

- Immunohematology is a brach of hematology and reactions transfusion medicine whiel studies antigen-antibody reactions and analogaus phenomena as they relate to the pathogenesis and clinical manifestations of blood disorder. A person employed in this field is reffered to as immuno-hematologist.

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The strength of interaction between antibody and antigen at single antigenic site can be described by the affinity of the antibody for antigen. It is controlled by three major factors.

antibody epitope affinity, the valence of both the antigen and antibody and the steric structural arrangment of the interacting parts.

Blood banking Technologies

1. Define Immunohematology. What is antigen and antibody?

10/15

→ Immunohematology is a branch of Hematology and transfusion Medicine which studies antigen antibody reactions and analogous phenomena as they relate to the pathogenesis and Clinical Manifestations of blood disorders.

→ Antigen are Molecules capable of Stimulating an immune response.

→ Each antigen has distinct surface features, or Epitopes, resulting in specific responses.

→ Antibodies (immunoglobins) are Y-shaped Proteins produced by B cells of the immune System in response to exposure to antigens.

2. Discuss factors affecting antigen antibody reaction?

→ The antigen-antibody reaction is widely used in laboratory diagnostics, including immunohaematology.

Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research

(Deemed to be University under section 3 of the UGC Act 1956)

CERTIFICATE OF MERIT

This is to certify that JEEVAHASHINI has actively participated in the Value Added Course on *Blood banking technologies* held during AUGUST - OCTOBER 2020 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Dr. Sujatha
RESOURCE PERSON

Dr. Sujatha
COORDINATOR

PROFESSOR & HEAD, DEPT. OF PATHOLOGY
SRI LAKSHMI NARAYAN INSTITUTE OF
MEDICAL SCIENCES,
PUDUCHERRY - 605 502.

Sri Lakshmi Narayana Institute of Medical Sciences

Affiliated to Bharath Institute of Higher Education & Research

(Deemed to be University under section 3 of the UGC Act 1956)

CERTIFICATE OF MERIT

This is to certify that KEERTHI.R has actively participated in the Value Added Course on *Blood banking technologies* held during AUGUST - OCTOBER 2020 Organized by Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry- 605 502, India.

Dr. Sujatha
RESOURCE PERSON

DEPARTMENT OF PATHOLOGY
Sri Lakshmi Narayana Institute of Medical Sciences
PONDICHERRY 605 502.

Dr. Sujatha
COORDINATOR

PROFESSOR & HEAD, DEPT. OF PATHOLOGY
SRI LAKSHMI NARAYAN INSTITUTE OF
MEDICAL SCIENCES,
PUDUCHERRY - 605 502.

Student Feedback Form

Course Name: **BLOOD BANKING TECHNOLOGIES**

Subject Code: **PA01**

Name of Student: Jeevabharathi Roll No.: U14MB255

We are constantly looking to improve our classes and deliver the best training to you. Your evaluations, comments and suggestions will help us to improve our performance

Sl. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear		✓			
2	Course contents met with your expectations			✓		
3	Lecturer sequence was well planned			✓		
4	Lectures were clear and easy to understand		✓			
5	Teaching aids were effective		✓			
6	Instructors encourage interaction and were helpful		✓	✓		
7	The level of the course			✓		
8	Overall rating of the course	1	2	3	4	5

**** Rating: 5 – Outstanding; 4 - Excellent; 3 – Good; 2– Satisfactory; 1 - Not-Satisfactory***

Suggestions if any:

Nil.

Signature

Date:

Student Feedback Form

Course Name: **BLOOD BANKING TECHNOLOGIES**

Subject Code: **PA01**

Name of Student: Keerthi.R Roll No.: U14MB264

We are constantly looking to improve our classes and deliver the best training to you. Your evaluations, comments and suggestions will help us to improve our performance

Sl. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear		✓			
2	Course contents met with your expectations			✓		
3	Lecturer sequence was well planned			✓		
4	Lectures were clear and easy to understand			✓		
5	Teaching aids were effective		✓			
6	Instructors encourage interaction and were helpful			✓		
7	The level of the course			✓		
8	Overall rating of the course	1	2	3	4	5

** Rating: 5 – Outstanding; 4 - Excellent; 3 – Good; 2– Satisfactory; 1 - Not-Satisfactory*

Suggestions if any:

Nil

Signature

Date:

Date: 17.10.2020

From

Dr.Sujata tripathi
HOD-in-charge
Department of pathology
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Through Proper Channel

To

The Dean,
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Completion of value-added course: Blood banking technologies

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled: : Blood banking technologies for IInd MBBS during Aug- Oct 2020 for 20 students . We solicit your kind action to send certificates for the participants, that is attached with this letter. Also, I am attaching the photographs captured during the conduct of the course.

Kind Regards,

Dr. Sujata tripathi

PROFESSOR & HEAD, DEPT. OF PATHOLOGY
SRI LAKSHMI NARAYAN INSTITUTE OF
MEDICAL SCIENCES,
PUDUCHERRY 605 502.

Encl: Certificates

Photographs