



SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES

OSSUDU AGARAM VILLAGE; KUDAPAKKAM POST, PONDICHERRY - 605003

Date 3.1.2022

From
Dr. PAMMY SINHA ,
HOD
Pathology
SriLakshmiNarayanaInstituteofMedicalSciences,Puducherry
Bharath Institute of Higher Education and Research,
Chennai.

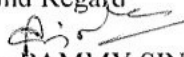
To
The Dean,
SriLakshmiNarayanaInstituteofMedicalSciences,Puducherry
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Permission to conduct value-added course: Tissue processing in histopathology

Dear Madam,

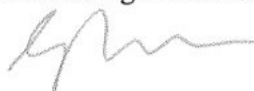
With reference to the subject mentioned above, the department proposes to conduct a value-added course titled: Tissue processing in histopathology on FEB-APRIL 2022. We solicit your kind permission for the same.

Kind Regard


Dr. PAMMY SINHA

FOR THE USE OF DEANS OFFICE


Names of Committee members for evaluating the course:

The Dean: Dr. G. Jayalakshmi 

The HOD: Dr. PAMMY SINHA


The Expert: Dr. PAMMY SINHA

The committee has discussed about the course and is approved. Dean

DEAN 
(Sign & Seal)

Subject Expert

(Sign & Seal)

HOD 
(Sign & Seal)

Dr. G. JAYALAKSHMI, BSC., MBBS., DTCO., M.D.,
DEAN
Sri Lakshmi Narayana Institute of Medical Sciences
Ossudu, Ageram Kudapakkam, Post,
Villanur, Chennai - 605 002.

PROFESSOR & HEAD, DEPT. OF PATHOLOGY
SRI LAKSHMI NARAYAN INSTITUTE OF
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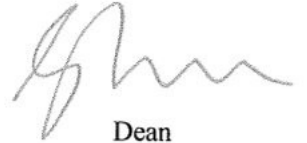
SRI LAKSHMI NARAYANA INSTITUTE OF MEDICAL SCIENCES
OSSUDU AGARAM VILLAGE; KUDAPAKKAM POST, PONDICHERRY - 605003

Circular

Sub: Organising Value-added Course: Tissue processing in histopathology

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 "Tissue processing in histopathology" from **February 2022**. The course content 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 30.1.2022. Applications received after the mentioned date shall not be entertained under any circumstances.



Dean

Encl: Copy of Course content

Dr. G. JAYALAKSHMI, BSC., MBBS., DTCD., M.D.,
DEAN
Sri Lakshmi Narayana Institute of Medical Sciences
Osudu, Ageram Kudapakkam, Post,
Villanur Commune Puducherry-605 502.

Course Proposal

Course Title: Tissue processing in histopathology

Course Objective:

1. To define the tissue processing and shall be able to discuss the principle and procedure of processing
2. Should know about the parts and principle of tissue processor
3. Should be able to perform the tissue processing and should also know about the trouble shooting

Course Outcome: Should know about the tissue processing in detail

Course Audience: IInd year MBBS

Course Coordinator: Dr.Pammy sinha

Course Faculties with Qualification and Designation:

1. Dr.Pammy sinha, Professor & HOD

2. Dr. Partho protim Barman, Professor

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

Course Curriculum/Topics with schedule

SINo	Date	Topic	Time	Faculty	Hours
1.	4.02.2022	Definition of Tissue processing and, Principle and Parts of Tissue processor	1.30-4 pm	Dr.Pammy sinha	2.5 hrs
2.	11.02.2022	How To Use Tissue processor	1.30-4 pm	Dr. Partho protim Barman	2.5 hrs
3.	18.02.2022	Methodological Information	1.30-4 pm	Dr.Sivaganesh@Porko.G	2.5 hrs
4.	25.02.2022	Overview of the steps in tissue processing for paraffin sections	1.30-4 pm	Dr.Pammy sinha	2.5 hrs
5.	4.03.2022	Obtaining a fresh specimen	1.30-4 pm	Dr. Partho protim Barman	2.5 hrs
6.	11.03.2022	Fixation	1.30-4 pm	Dr.Sivaganesh@Porko.G	2.5 hrs

7.	18.03.2022	. Dehydration Clearing, Wax infiltration and Embedding or blocking out	1.30- 4 pm	Dr.Pammy sinha	2.5 hrs
8.	25.03.2022	The effect of tissue processing on specimens	1.30- 4 pm	Dr. Partho protim Barman	2.5 hrs
		Practical Class			
9.	1.04.2022	Hands on training of tissue processor	1.30- 4 pm	Dr.Sivaganesh@Porko.G	2.5 hrs
10.	8.04.2022	Tissue Processing	1.30- 4 pm	Dr.Pammy sinha	2.5 hrs
11.	15.04.2022	Embedding	1.30- 4 pm	Dr. Partho protim Barman	2.5 hrs
12	22.04.2022	Assessment and giving feedback	1.30- 4 pm	Dr.Sivaganesh@Porko.G	2.5 hrs
		Total			30 hrs

REFERENCE BOOKS:

1 Theory and Practice of Histological Techniques

Book by John D Bancroft

2 Culling histotechniques

COURSE DETAILS

Particulars	Description
Course Title	Tissue processing in histopathology
Course Code	PA04
Objective	<ol style="list-style-type: none"> 1. Definition of Tissue processing 2., Principle and Parts of Tissue processor 3. How To Use Tissue processor 4. Methodological Information 5. Overview of the steps in tissue processing for paraffin sections 6. Obtaining a fresh specimen 7 Fixation 8. Dehydration 9. Clearing 10 Wax infiltration 11. Embedding or blocking out 12. The effect of tissue processing on specimens 13. Steps to Better Processing and Embedding
Further learning opportunities	Automated tissue processing
Key Competencies	On successful completion of the course the students will have skill in Tissue processing
Target Student	1Ind MBBS Students
Duration	30hrs Feb-April 2022
Theory Session	20hrs
Practical Session	10hrs
Assessment Procedure	Short notes

Overview of the steps in tissue processing for paraffin sections

Microscopic analysis of cells and tissues requires the preparation of very thin, high quality sections (slices) mounted on glass slides and appropriately stained to demonstrate normal and abnormal structures.

Most fresh tissue is very delicate and easily distorted and damaged, and it is thus impossible to prepare thin sections from it unless it is chemically preserved or “fixed” and supported in some way whilst it is being cut. Broadly there are two strategies that can be employed to provide this support.

APPLY FOR SELF-REPORTED EDUCATIONAL CREDITS

1. We can freeze the tissue and keep it frozen while we cut our sections. These sections are called “frozen sections”.
2. Alternatively we can infiltrate our tissue specimen with a liquid agent that can subsequently be converted into a solid that has appropriate physical properties which will allow thin sections to be cut from it. Paraffin wax is such an agent. This produces so-called “paraffin sections”.

This article describes the method for processing tissue to create paraffin embedded specimens ready for sectioning.

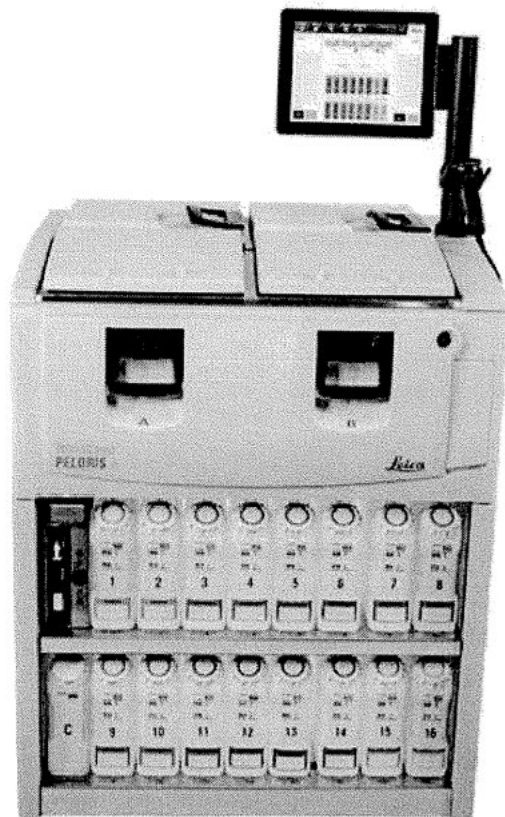
Introduction

“Tissue processing” describes the steps required to take animal or human tissue from fixation to the state where it is completely infiltrated with a suitable histological wax and can be embedded ready for section cutting on the microtome.

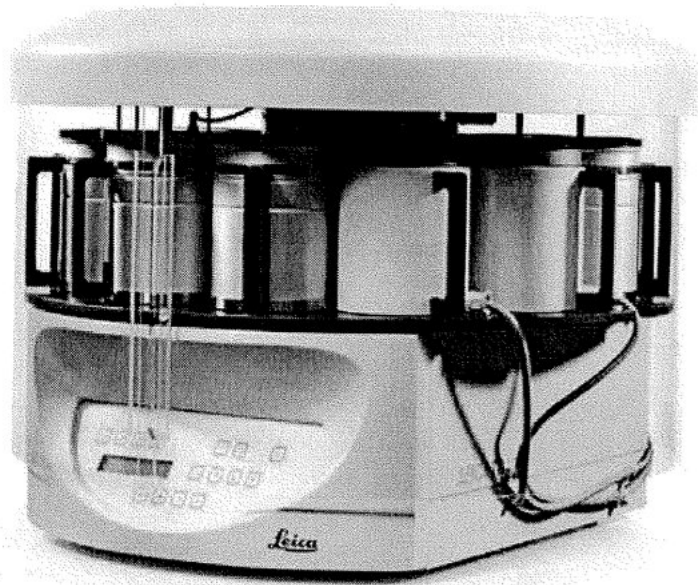
Tissue processing can be performed manually (hand processing), but where multiple specimens must be dealt with it is more convenient and much more efficient to use an automated tissue processing machine (a “tissue processor”). These devices have been available since the 1940’s¹ and have slowly evolved to be safer in use, handle larger specimen numbers, process more quickly and to produce better quality outcomes. There are two main types of processors, the tissue-transfer (or “dip and dunk”) machines where specimens are transferred from container to container to be processed, or the fluid-transfer (or “enclosed”) types where specimens are held in a single process chamber or retort and fluids are pumped in and out as required. Most modern fluid-transfer processors

employ raised temperatures, effective fluid circulation and incorporate vacuum/pressure cycles to enhance processing and reduce processing times.

Modern enclosed tissue processor



Modern enclosed tissue processor



"Dip and dunk" processors are still a good option for smaller labs.

The importance of tissue processing

Most laboratory supervisors would emphasise to their staff the importance of tissue processing. It is worthwhile to stress that use of an inappropriate processing schedule or the making of a fundamental mistake (perhaps in replenishing or sequencing of processing reagents) can result in the production of tissue specimens that cannot be sectioned and therefore will not provide any useful microscopic information. This can be disastrous if you are dealing with diagnostic human tissue where the whole of the specimen has been processed ("all in"). There is no spare tissue. There is no diagnosis. There is however a patient to whom an explanation has to be provided.

Although mechanical or electrical faults occasionally occur in tissue processors, processing mishaps where tissues are actually compromised, mainly occur because of human error. It is important to emphasise the value of proper education and training for those carrying out tissue processing and the need to apply particular care when setting up a processor for any processing run.

Overview of the steps in tissue processing for paraffin sections

1. Obtaining a fresh specimen

Fresh tissue specimens will come from various sources. It should be noted that they can very easily be damaged during removal from patient or experimental animal. It is important that they are handled carefully and appropriately fixed as soon as possible after dissection. Ideally fixation should take place at the site of removal, perhaps in the operating theatre, or, if this is not possible, immediately following transport to the laboratory.

2. Fixation

The specimen is placed in a liquid fixing agent (fixative) such as formaldehyde solution (formalin). This will slowly penetrate the tissue causing chemical and physical changes that will harden and preserve the tissue and protect it against subsequent processing steps.² There are a limited number of reagents that can be used for fixation as they must possess particular properties that make them suitable for this purpose. For example tissue components must retain some chemical reactivity so that specific staining techniques can be applied subsequently.³ Formalin, usually as a phosphate-buffered solution, is the most popular fixative for preserving tissues that will be processed to prepare paraffin sections. Ideally specimens should remain in fixative for long enough for the fixative to penetrate into every part of the tissue and then for an additional period to allow the chemical reactions of fixation to reach equilibrium (fixation time). Generally this will mean that the specimen should fix for between 6 and 24 hours. Most laboratories will use a fixative step as the first station on their processor.

Following fixation the specimens may require further dissection to select appropriate areas for examination. Specimens that are to be processed will be placed in suitable labelled cassettes (small perforated baskets) to segregate them from other specimens. The duration of the processing schedule used to process the specimens will depend on the type and dimensions of the largest and smallest specimens, the particular processor employed, the solvents chosen, the solvent temperatures and other factors. The following example is based on a six hour schedule suitable for use on a Leica Peloris™ rapid tissue processor.

3. Dehydration

Because melted paraffin wax is hydrophobic (immiscible with water), most of the water in a specimen must be removed before it can be infiltrated with wax. This process is commonly carried out by immersing specimens in a series of ethanol (alcohol) solutions of increasing concentration until pure, water-free alcohol is reached. Ethanol is miscible with water in all proportions so that the water in the specimen is progressively replaced by the alcohol. A series of increasing concentrations is used to avoid excessive distortion of the tissue.

A typical dehydration sequence for specimens not more than 4mm thick would be:

1. 70% ethanol 15 min
2. 90% ethanol 15 min
3. 100% ethanol 15 min
4. 100% ethanol 15 min
5. 100% ethanol 30 min
6. 100% ethanol 45 min

At this point all but a tiny residue of tightly bound (molecular) water should have been removed from the specimen.

4. Clearing

Unfortunately, although the tissue is now essentially water-free, we still cannot infiltrate it with wax because wax and ethanol are largely immiscible. We therefore have to use an intermediate solvent that is fully miscible with both ethanol and paraffin wax. This solvent will displace the ethanol in the tissue, then this in turn will be displaced by molten paraffin wax. This stage in the process is called “clearing” and the reagent used is called a “clearing agent”. The term “clearing” was chosen because many (but not all) clearing agents impart an optical clarity or transparency to the tissue due to their relatively high refractive index. Another important role of the clearing agent is to remove a substantial amount of fat from the tissue which otherwise presents a barrier to wax infiltration.

A popular clearing agent is xylene and multiple changes are required to completely displace ethanol.

A typical clearing sequence for specimens not more than 4mm thick would be:

1. xylene 20 min
2. xylene 20 min
3. xylene 45 min

5. Wax infiltration

The tissue can now be infiltrated with a suitable histological wax. Although many different reagents have been evaluated and used for this purpose over many years, the paraffin wax-based histological waxes are the most popular. A typical wax is liquid at 60°C and can be infiltrated into tissue at this temperature then allowed to cool to 20°C where it solidifies to a consistency that allows

sections to be consistently cut. These waxes are mixtures of purified paraffin wax and various additives that may include resins such as styrene or polyethylene. It should be appreciated that these wax formulations have very particular physical properties which allow tissues infiltrated with the wax to be sectioned at a thickness down to at least 2 μm , to form ribbons as the sections are cut on the microtome, and to retain sufficient elasticity to flatten fully during flotation on a warm water bath.

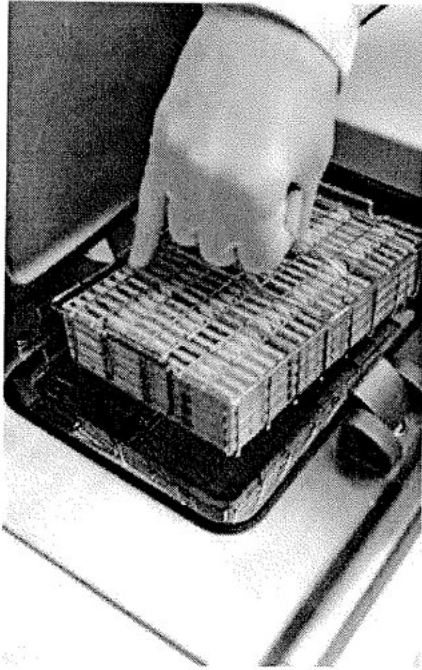
A typical infiltration sequence for specimens not more than 4mm thick would be:

1. wax 30 min
2. wax 30 min
3. wax 45 min

6. Embedding or blocking out

Now that the specimen is thoroughly infiltrated with wax it must be formed into a "block" which can be clamped into a microtome for section cutting. This step is carried out using an "embedding centre" where a mould is filled with molten wax and the specimen placed into it. The specimen is very carefully orientated in the mould because its placement will determine the "plane of section", an important consideration in both diagnostic and research histology. A cassette is placed on top of the mould, topped up with more wax and the whole thing is placed on a cold plate to solidify. When this is completed the block with its attached cassette can be removed from the mould and is ready for microtomy. It should be noted that, if tissue processing is properly carried out, the wax blocks containing the tissue specimens are very stable and represent an important source of archival material.

Loading specimens into a tissue processor



Embedding

“Xylene-free” processing

Although xylene is used widely as a clearing agent for tissue processing it is a toxic reagent and some laboratories prefer to use less-toxic alternatives such as isopropanol or other xylene substitutes. For this method to be successful higher wax temperatures are required so that isopropanol can be eliminated from specimens during infiltration.

The effect of tissue processing on specimens

High-quality tissue processing is critical for accurate diagnosis. The combined effects of fixation and processing is to harden the tissue and it is inevitable that shrinkage will also occur. It has been estimated that tissues shrink as much as 20% or more by the time they are infiltrated with wax⁴. Notwithstanding these effects, sections prepared from optimally processed tissues will consistently show excellent morphological detail which allows comparisons to be made between specimens and accurate histopathological diagnoses to be determined.

In theory and in practice the paraffin blocks that will be easiest to section contain relatively homogenous tissue of uniform soft consistency (such as kidney), which, when infiltrated with wax, have a consistency similar to that of solidified wax alone (not containing tissue). Tissues of a dense or fibrous nature, or a specimen where both hard and soft tissue are present in discrete

layers can pose more of a challenge because parts of them are not so well supported by the solidified wax. Differential shrinkage of the various elements in these blocks during fixation and processing contributes to the problems that might be experienced when they are being sectioned.

Steps to Better Processing and Embedding

From patient to pathologist, preparing tissue specimens for histological examination requires care, skill and sound procedures. This guide provides practical advice on best-practice techniques and simple ways to avoid common errors.

Tips for better tissue processing and embedding are highlighted in this guide. We hope each step provides a valuable reminder of good histology practice, and helps with troubleshooting when unacceptable results do occur.

Step 20 - Use an Appropriate Schedule

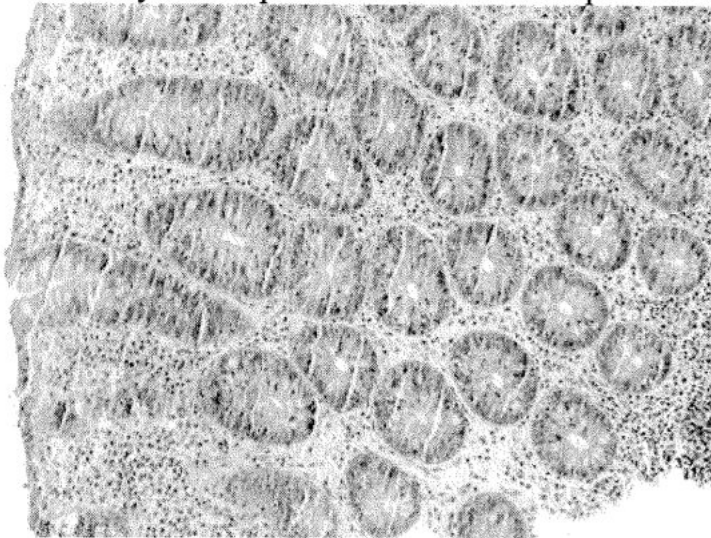
An appropriate schedule is chosen for the tissue type and size.

An inappropriate schedule is chosen. For example, a very long schedule for a small endoscopic biopsy or a very short schedule for a large, fatty breast specimen.

This micrograph of a small area of subcutaneous tissue from a large, fatty specimen shows the effects of under-processing. The fibro-fatty tissue is poorly supported and therefore fragmented while the epithelial tissue of the glands shows a lack of nuclear definition and peculiar staining due to retained solvent (H&E).



This endoscopic biopsy has been over-processed and has become very brittle. As a consequence many fine cracks are visible through out the section. Poor microtomy technique will exacerbate the problem (H&E).

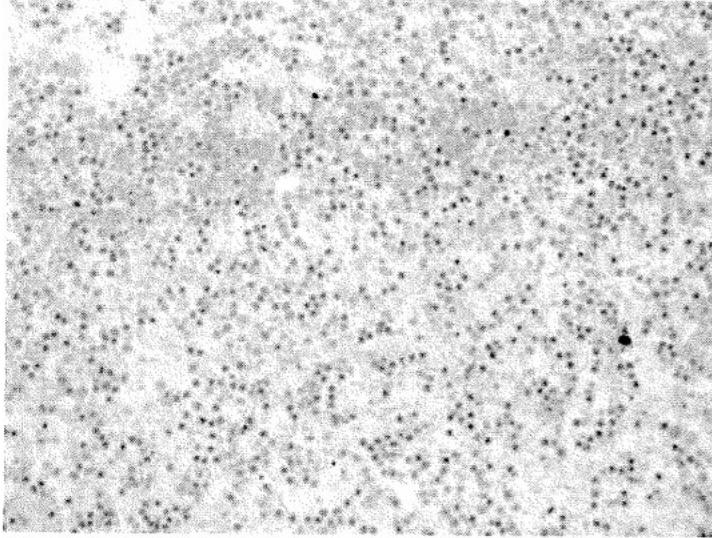


Step 21 - Provide Additional Fixation

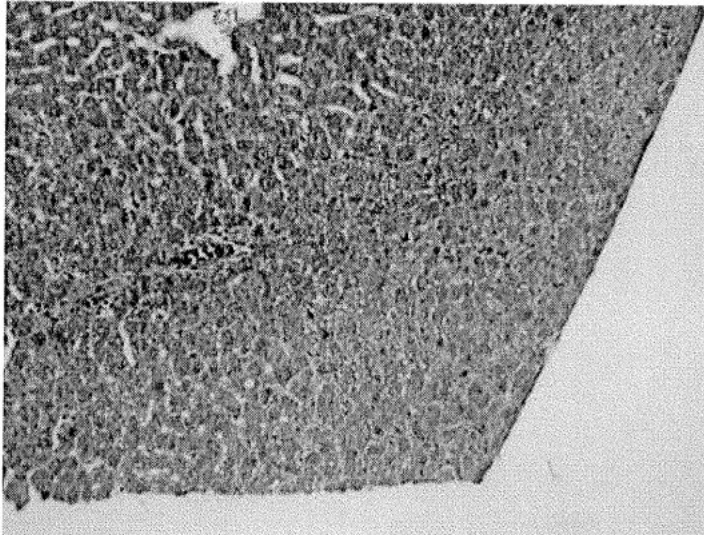
For optimal processing and good morphology tissue should be well fixed before processing. Where specimens are incompletely fixed additional formalin fixation is provided in the processing schedule.

Incompletely fixed specimens go directly into alcohol producing zonal fixation (formal in fixation for the outside of the specimen, alcohol fixation for deeper areas).

This micrograph shows the effects of zonal fixation on a section of a marrow aspirate (H&E). In the upper left portion the red cells are intact where as in the lower part they are hemolyzed.



This micrograph shows a low power view of liver stained with a trichrome stain. The staining result in the outer zone of the specimen is different to that of the inner.

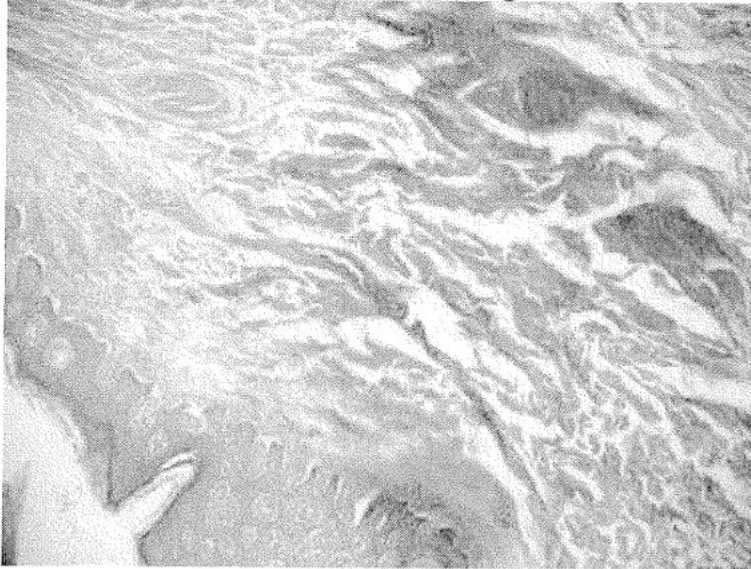


Step 22 - Maintain Reagent Quality

Processing reagents are replaced strictly according to established guidelines (ideally using an agent management system in an advanced tissue processor such as Leica Biosystem's PELORIS).

Guide lines for there placement of processing reagents are ignored, meaning that ineffective, contaminated or diluted reagents are used (e.g “out-of-threshold” warnings from the PELORIS reagent management system are ignored). This can cause poor processing quality.

In this section – from a large skin specimen – the poor preservation of the dense collagen is due to inadequate processing. In this case we believe it was due to the use of heavily contaminated reagent swell “out-of-threshold”.

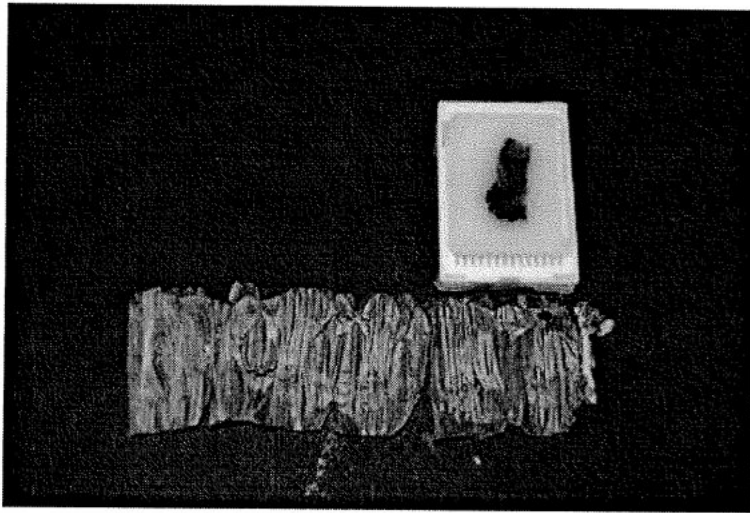


Step 23 - Use High Quality Wax

High quality wax is used for infiltration and especially for embedding (blocking out) to ensure high quality blocks that are easy to cut.

Cheap, poor quality wax from little-known sources is used for infiltration and embedding. Poor quality wax produces blocks that are difficult to cut.

A ribbon of sections was slowly cut from this block while the block was cold. The sections show considerable compression despite the low temperature used. Here the poor quality wax failed to properly support the tissue.

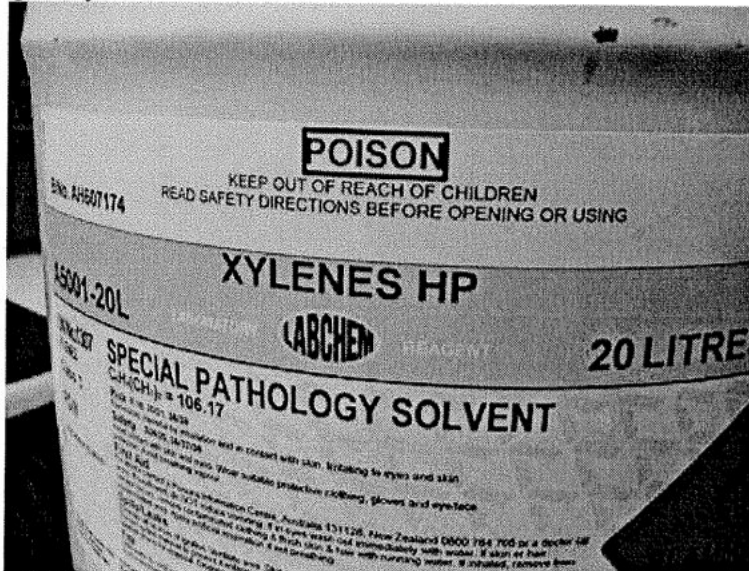


Step 24 - Avoid Hazardous Reagent

Where possible, xylene-free protocols are used (such as those available when using Leica Biosystems' PELORIS). This provides a safer laboratory environment without compromising processing quality.

No consideration is given to the health effects of xylene use. The possibility of using alternatives has not been considered.

Xylene-free processing can improve laboratory safety while maintaining quality.

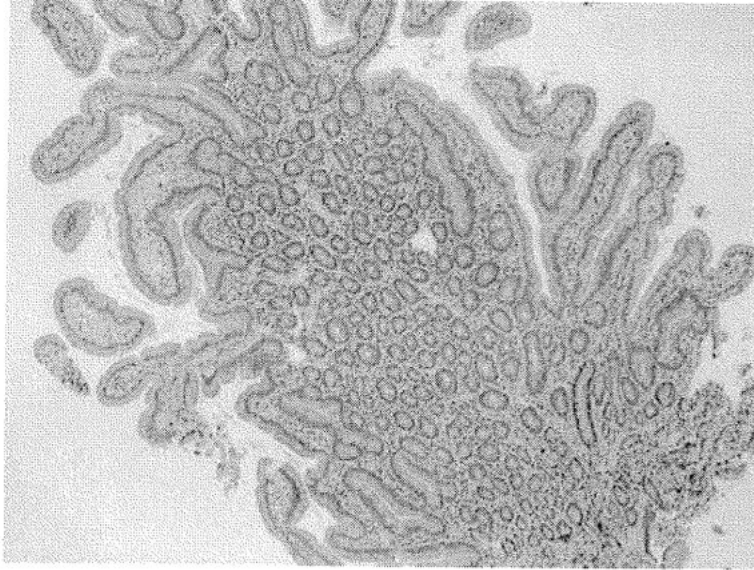


Step 25 - Orientate Specimens Carefully

Specimens are carefully orientated. Competent grossing ensures flat surfaces on most specimens. Staff performing embedding have ready access to each specimen description and are appropriately trained.

Orientation is incorrect. This can result in loss of tissue as re-embedding is required. Some poorly prepared specimens require extensive trimming on the microtome to obtain a full-face section.

This endoscopic biopsy has been orientated incorrectly and shows only the superficial level of the mucosa.

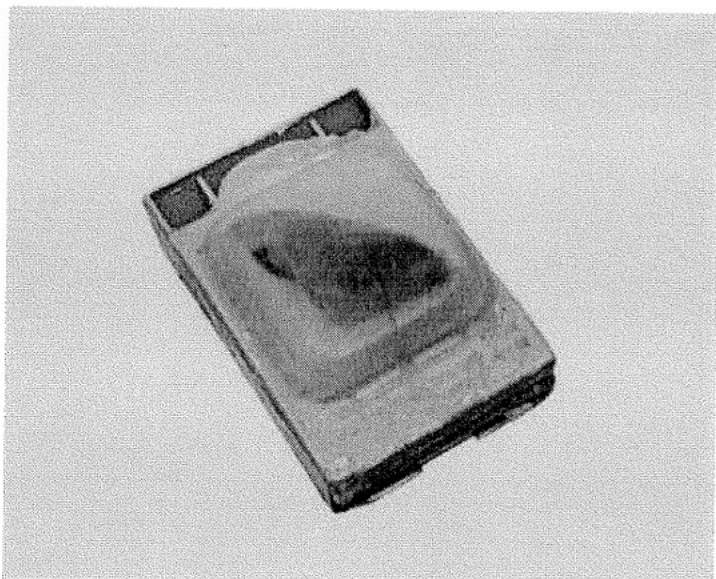


Step 26 - Choose an Appropriate Mold

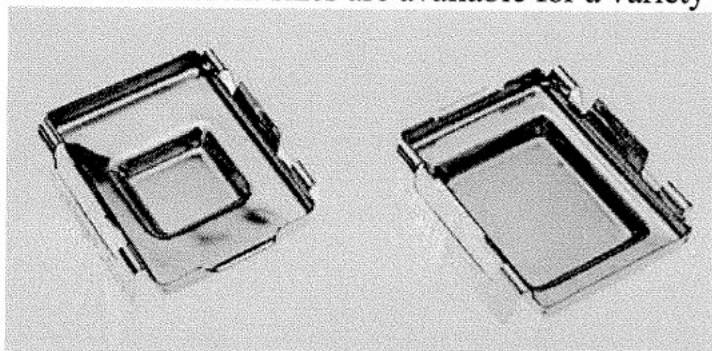
A mold of suitable size is always chosen for each specimen.

The same mold size is used for every specimen. Often the tissue touches the edge of the mold.

The mold used for this specimen was too small. The specimen is in contact with the edges of the block and may therefore be difficult to section.



Molds of different sizes are available for a variety of specimen sizes.

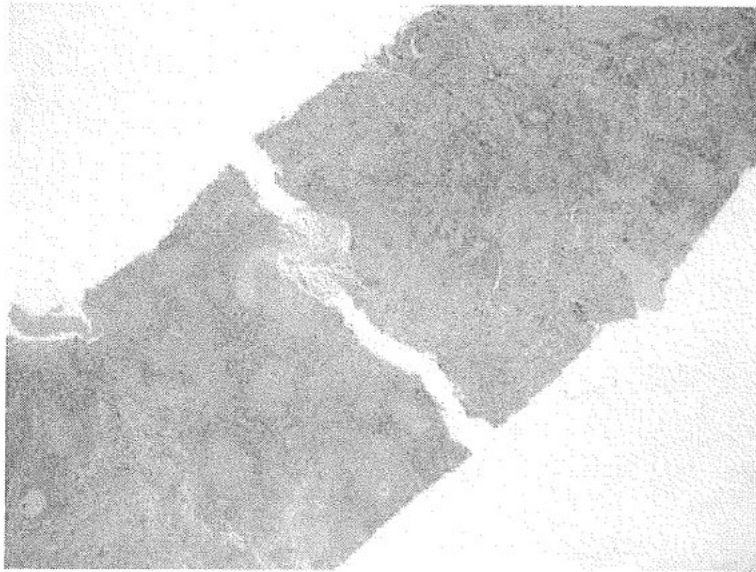


Step 27 - Handle Specimens Gently

Specimens are handled gently during embedding.

Specimens are handled forcefully during embedding to make them lie flat in the mold. Some tissue can be fractured by this process.

An H&E stained section of spleen which was fractured during embedding in an attempt to make the specimen lie flat on the base of the mold.

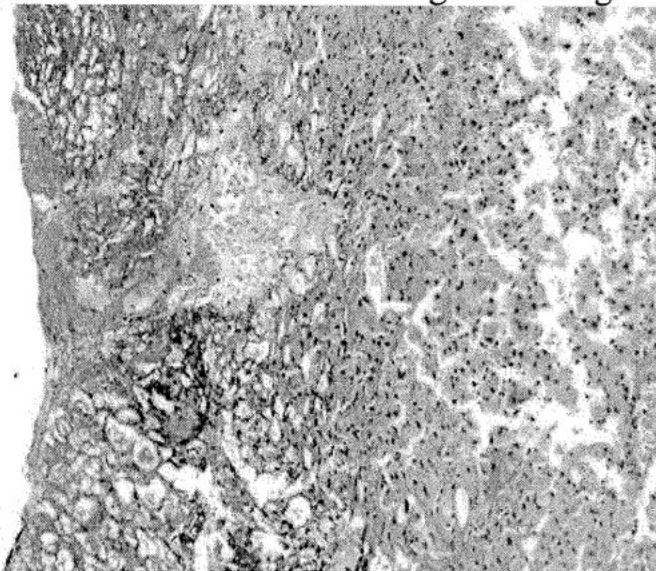


Step 28 - Avoid Excessive Heat

Before handling tissue, forceps are heated to the point where the wax just melts.

Forceps are heated well beyond the melting point of wax. This can cause local heat damage and a change in morphology in the area close to the contact point.

This micrograph shows the surface of a section of liver (H&E). Extreme local damage (making the tissue almost unrecognizable) has been caused by the application of heat to the tissue during embedding.

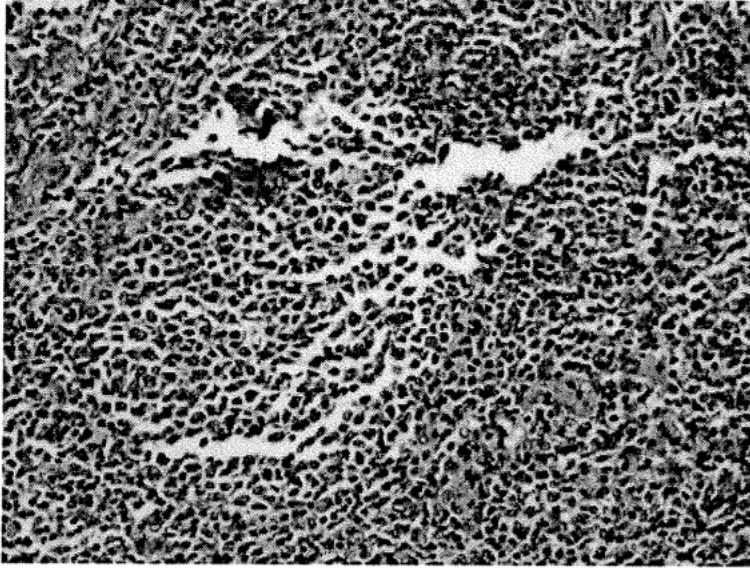


Step 29 - Check Temperatures Regularly

The temperature of the embedding center hot plate and wax reservoir is regularly checked.

The temperature of the embedding center hot plate is never checked. Even at this stage of processing specimens can be damaged by excessive local heat.

This lymph node was damaged by over-heating of the embedding center hot plate. Note the shriveled, pyknotic nuclei and extensive cracking. Cracking like this can also be caused by flotation on a water bath that is too warm, or by drying on a hot plate without sufficient draining.



Step 30 - Do Not Over-fill Molds

Molds are filled to an optimum level and do not overflow.

Molds are over-filled, requiring scraping of the back and edges of the cassette prior to microtomy. Over-filled blocks may sit unevenly in the microtome chuck causing instability that may lead to the tissue becoming damaged during microtomy.

VALUE ADDED COURSE

1. Name of the programme & Code

Tissue processing in histopathology PA04

2. Duration & Period

30 hrs Feb-April 2022

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 questions- *Enclosed as Annexure- III*

6. Certificate model

Enclosed as Annexure- IV

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

8. Year of discontinuation: 2022

9. Summary report of each program year-wise

Value Added Course- Feb-April 2022					
Sl. No	Course Code	Course Name	Resource Persons	Target Students	Strength & Year
1	PA04	Tissue processing in histopathology	Dr. Pammy Sinha	IInd MBBS	Feb-April 2022

10. Course Feed Back

Enclosed as Annexure- V


RESOURCE PERSON

PROFESSOR & HEAD, DEPT. OF PATHOLOGY
SRI LAKSHMI NARAYAN INSTITUTE OF
MEDICAL SCIENCES,
PUDUCHERRY - 605 002.


COORDINATOR

PROFESSOR & HEAD, DEPT. OF PATHOLOGY
SRI LAKSHMI NARAYAN INSTITUTE OF
MEDICAL SCIENCES,
PUDUCHERRY - 605 002.

VALUE ADDED COURSE

Tissue processing in histopathology and PA04

List of Students Enrolled Feb-April 2022

2 Year MBBS Student			
Sl. No	Registration no.	Name of the Student	Signature
1	U16MB291	GOKUL SRIRAM .D	<i>Gokul</i>
2	U16MB292	GOLLA SRUTHI	<i>Golla</i>
3	U16MB293	GOMATHI .M	<i>Gomathi</i>
4	U16MB294	GRACELIN RINI .J	<i>Gmrl</i>
5	U16MB295	GUNASUNDARI .M	<i>Gms</i>
6	U16MB296	GUNTI YAGNA NARAYAN	<i>Gunti N</i>
7	U16MB297	HANEESHA PALETI	<i>Haneesha</i>
8	U16MB298	HARIHARAN .J.K	<i>Harihara</i>
9	U16MB299	HARIPRIYA .T	<i>Haripriya</i>
10	U16MB300	HARISHKA.S	<i>Harishka S</i>
11	U16MB301	HARITHA SHREE .K	<i>Haritha</i>
12	U16MB302	HARSHITHA CHOWDARY .P	<i>Harshitha Chowdary</i>
13	U16MB303	HEMAPRIYA .G	<i>Hemapriya</i>
14	U16MB304	JADHAV MAHESH MOHANRAO	<i>Jadhav</i>
15	U16MB305	JAGAI PRIYA .M	<i>Jag</i>
16	U16MB306	JAYASRI .J	<i>Jaysri</i>
17	U16MB307	JESTIN K.J	<i>Jestin</i>
18	U16MB308	JEYACHANDRAN .S	<i>Jeyachandran</i>
19	U16MB309	JINCY J MANU	<i>Jincy J Manu</i>
20	U16MB310	KARTHIK .K	<i>Karthik</i>

[Signature]
RESOURCE PERSON

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

[Signature]
COORDINATOR

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



SRI LAKSHMI NARAYANA INSTITUTE OF HIGHER EDUCATION
AND RESEARCH

Pa04

Tissue processing in histopathology

Short notes

1. Introduction to tissue processing
2. Fixation
3. Dehydration
4. Clearing
5. Embedding
6. Steps for better tissue processing

Tissue processing constitutes of steps required

TISSUE PROCESSING IN HISTOPATHOLOGY.

Karthik. K
UI6MB310

29/20

1. The aim of tissue processing is to embed the tissue in a solid medium firm enough to support the tissue and give it sufficient rigidity to enable thin sections to be cut and yet soft enough not to damage the knife on tissue.
2. Fixation is the preservation of biological tissues from decay due to autolysis or putrefaction. It terminates any ongoing biochemical reaction and may also increase the treated tissues' mechanical strength or the stability.
3. Dehydration is the removal of water from aqueous fixed tissue. This step is necessary to prepare the tissue for embedding in non-~~embedding~~^{aqueous} media like paraffin. Alcohols are most commonly used in the laboratory for tissue dehydration.

1. Tissue processing constitutes of the steps required to take animal or human tissue from fixation to the state where it is completely infiltrated with a suitable histological wax and can be embedded ready for section cutting on the microtome.

2. Fixation in Pathology refers to the process of preservation of biological tissues from decay due to autolysis or putrefaction.

It terminates any ongoing biochemical reactions and may also increase the treated tissues' mechanical strength or stability.

3. Dehydration is the process of removal of water from aqueous - fixed tissue. This is a necessary step because most fixatives are aqueous and this step enables the preparation of the tissue for embedding in non-aqueous media like paraffin.



Sri Lakshmi Narayana Institute of Medical Sciences

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CERTIFICATE OF MERIT

This is to certify that GOKUL SRIRAM.D has

actively participated in the Value Added Course on TISSUE PROSSESSING IN HISTOPATHOLOGY

held during Feb-April 2022 Organized by Sri Lakshmi Narayana Institute of Medical

Sciences, Pondicherry- 605 502, India.


Dr. Pammy Sinha

RESOURCE PERSON

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Dr. Pammy Sinha

COORDINATOR

PROFESSOR & HEAD, DEPT. OF PATHOLOGY
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PUDUCHERRY - 605 502.

Student Feedback Form

Course Name: TISSUE PROSSESSING IN HISTOPATHOLOGY

Subject Code: PA04

Name of Student: Haishan Roll No.: _____

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

SI. 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:

Student Feedback Form

Course Name: TISSUE PROSSESSING IN HISTOPATHOLOGY

Subject Code: PA04

Name of Student: Karthik.K Roll No.: U16MB310

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


SI. NO	Particulars	1	2	3	4	5
1	Objective of the course is clear					✓
2	Course contents met with your expectations					✓
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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:

NONE

Date:


Signature

Date: 22.04.2022

From

Dr.Pammy sinha
Professor and Head,
Department of pathology
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Through Proper Channel

To

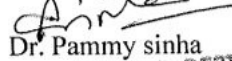
The Dean,
Sri Lakshmi Narayana Institute of Medical Sciences
Bharath Institute of Higher Education and Research,
Chennai.

Sub: Completion of value-added course: Tissue processing in histopathology

Dear Sir,

With reference to the subject mentioned above, the department has conducted the value-added course titled: : Tissue processing in histopathology in IIInd MBBS FEB APRIL 2022 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. Pammy sinha

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

Encl: Certificates

Photographs

