SOP on Neuroanatomical Brain Specimen Handling

DEPARTMENT OF ANATOMY

FACULTY OF MEDICINE

UWUSL

2026

Standard Operating Procedure (SOP) on Neuroanatomy Brain Specimen Handling

(1). Title

- Standard Operating Procedure (SOP) on Neuroanatomy Brain Specimen Handling Procedure.

(2). Issued By

- Department of Anatomy, Faculty of Medicine, Uva Wellassa University of Sri Lanka.

(3). Purpose & Scope

- To provide clear and safe steps for fixing, cutting, storing, and taking care of brain specimens.
- This applies to all staff, technical officers, and medical students handling brain specimens in the Anatomy Department.

(4). Responsibilities

- Anatomy Staff: Handle delicate brain tissue carefully and guide practical sessions.
- Technical Officers: Prepare fixing solutions, check preservative levels, and manage storage tanks.
- Faculty Members: Supervise all procedures and ensure safety rules are followed.
- Support Staff: Help with moving specimens and keeping the lab clean.

(5). Materials and Equipment Required

5.1 Preservative Chemicals; 10% Neutral Buffered Formalin (NBF), Glycerol, and Carbolic acid (Phenol).



5.2 Cutting Tools: Brain slicing knife, stainless steel scalpels (No. 22), and forceps.

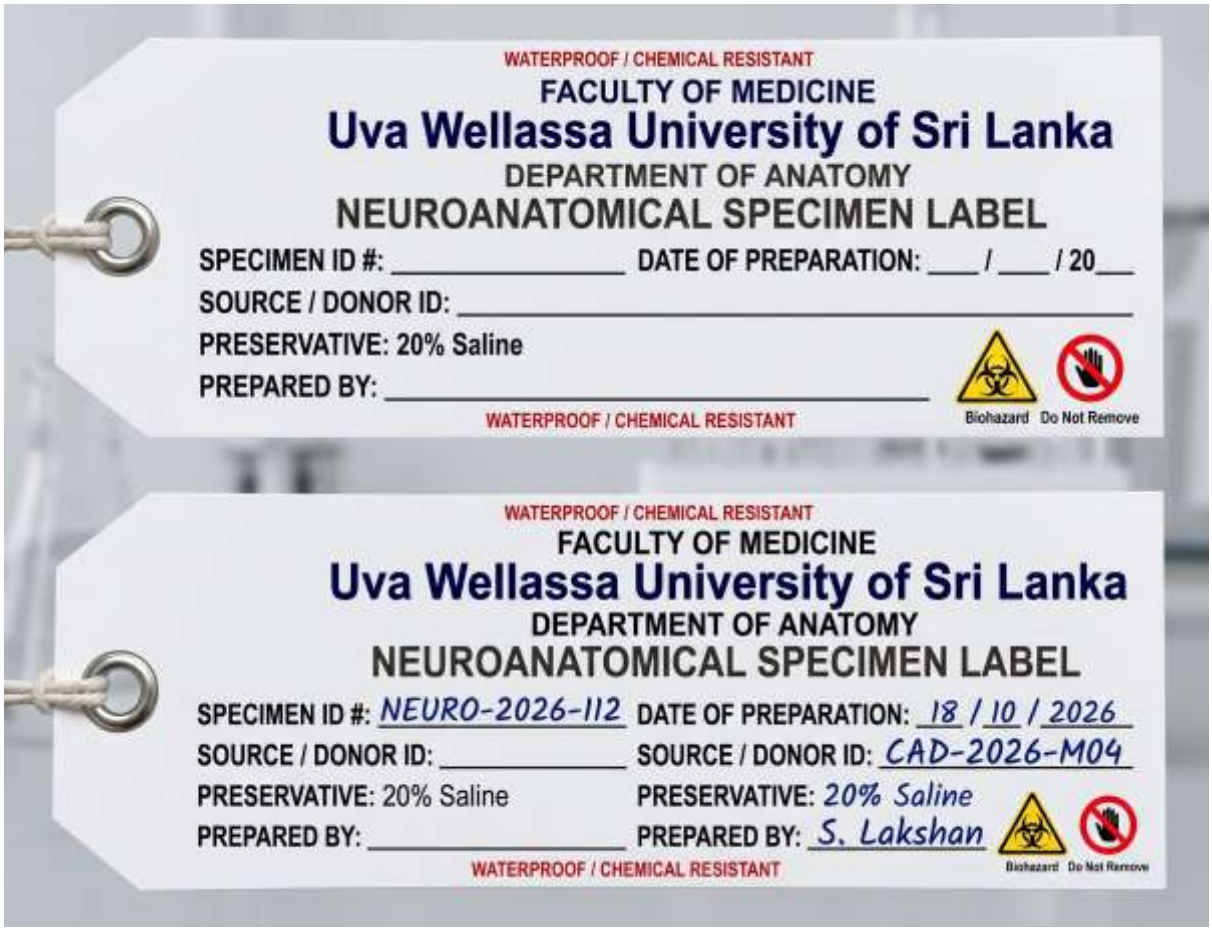


5.3 Protective Gear (PPE): Nitrile gloves, lab coats, face shields, goggles, and respirators.



5.4 Storage Items:zipper bags, and waterproof labels.




WATERPROOF / CHEMICAL RESISTANT
FACULTY OF MEDICINE
Uva Wellassa University of Sri Lanka
DEPARTMENT OF ANATOMY
NEUROANATOMICAL SPECIMEN LABEL
SPECIMEN ID #: _____ DATE OF PREPARATION: ___ / ___ / 20___
SOURCE / DONOR ID: _____
PRESERVATIVE: 20% Saline
PREPARED BY: _____
Biohazard Do Not Remove
WATERPROOF / CHEMICAL RESISTANT
WATERPROOF / CHEMICAL RESISTANT
FACULTY OF MEDICINE
Uva Wellassa University of Sri Lanka
DEPARTMENT OF ANATOMY
NEUROANATOMICAL SPECIMEN LABEL
SPECIMEN ID #: NEURO-2026-112 DATE OF PREPARATION: 18 / 10 / 2026
SOURCE / DONOR ID: _____ SOURCE / DONOR ID: CAD-2026-M04
PRESERVATIVE: 20% Saline PRESERVATIVE: 20% Saline
PREPARED BY: _____ PREPARED BY: S. Lakshan
Biohazard Do Not Remove
WATERPROOF / CHEMICAL RESISTANT


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Uva Wellassa University of Sri Lanka
DEPARTMENT OF ANATOMY
NEUROANATOMICAL SPECIMEN LABEL

(6). Safety Precautions

- Always work inside a fume hood when handling formalin to avoid breathing harmful fumes.
- Handle fresh brain tissue with care because it is very soft and delicate.
- Wear proper PPE at all times and follow safety rules for chemical and biohazard waste.



(7). Step-by-Step Procedure

7.1 Step 1: Identification & Inspection

- Check the brain specimen and make sure it has a proper ID tag with all details.
- Inspect the exterior for any damage or abnormalities.

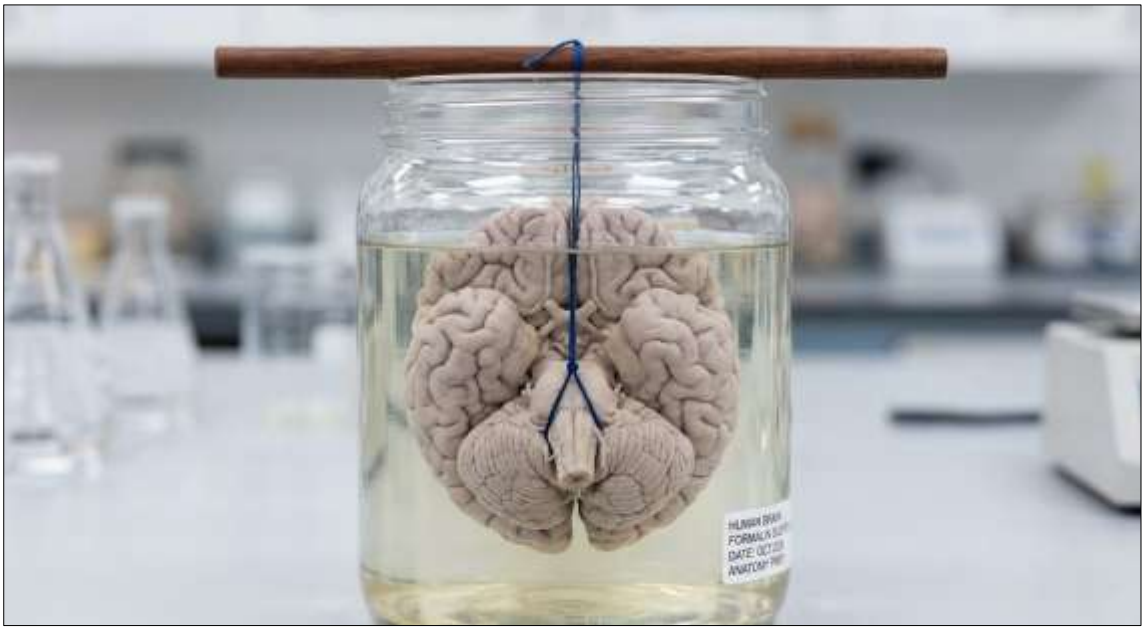


7.2 Step 2: Fixation

- Place the whole brain in a container filled with 20% Neutral Buffered Formalin (NBF). (If we used 10% formalin brain will sink and get deformed but in 20% Formalin brain will float)
- Keep it for at least 2 to 3 weeks so the tissue hardens properly. Change the formalin solution on day 3.

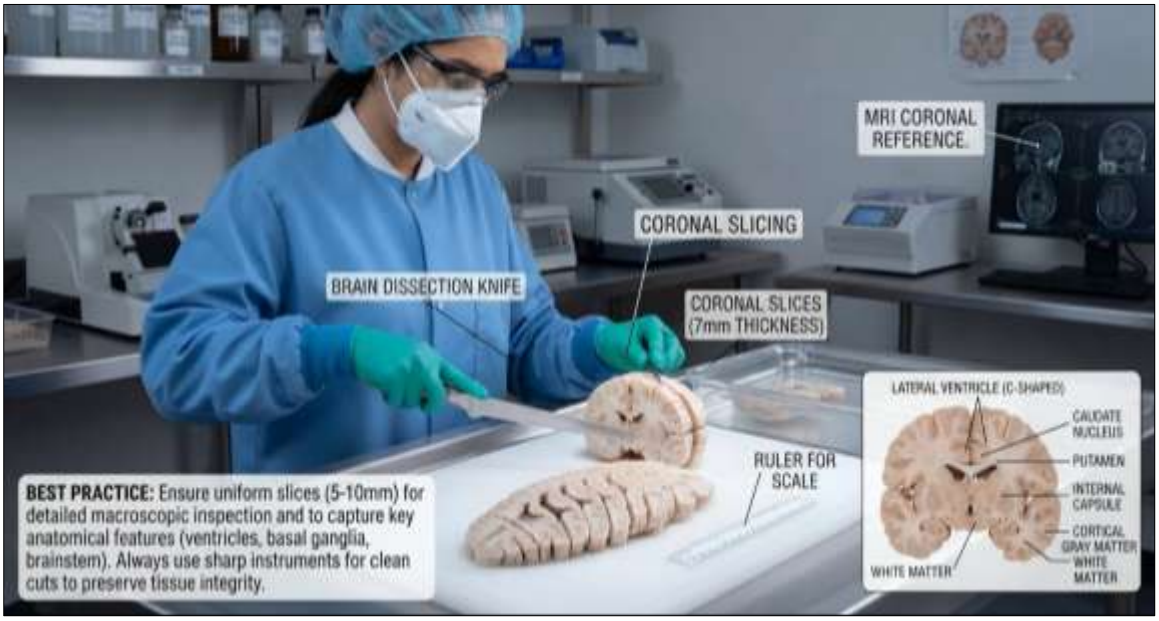


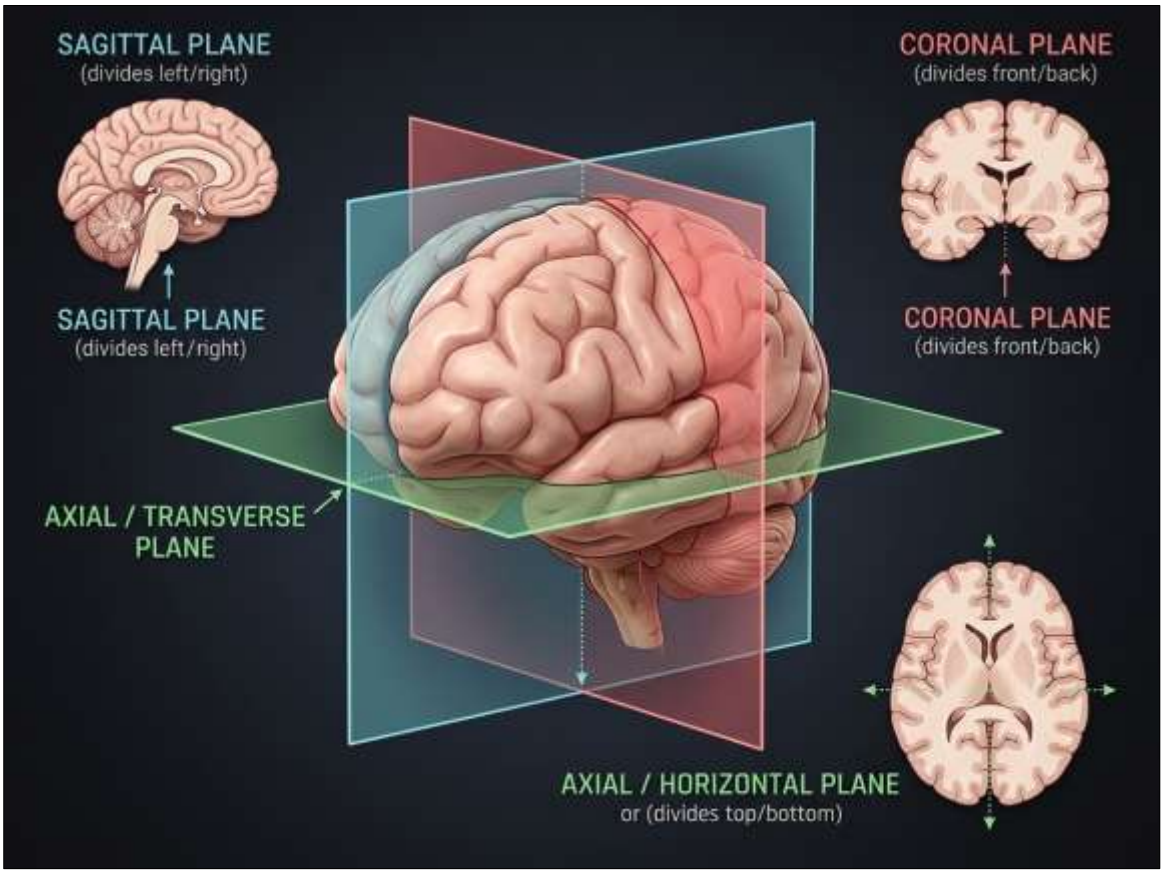
- In past to prevent a soft, fresh brain from flattening and distorting under its own weight, anatomists suspend it in formalin while it hardens. They do this by threading a strong piece of string underneath the tough basilar artery on the brainstem, rather than inserting a rigid rod directly into the blood vessel. The string is then tied to a rod resting across the top of the container, allowing the brain to float freely and perfectly preserve its natural shape.

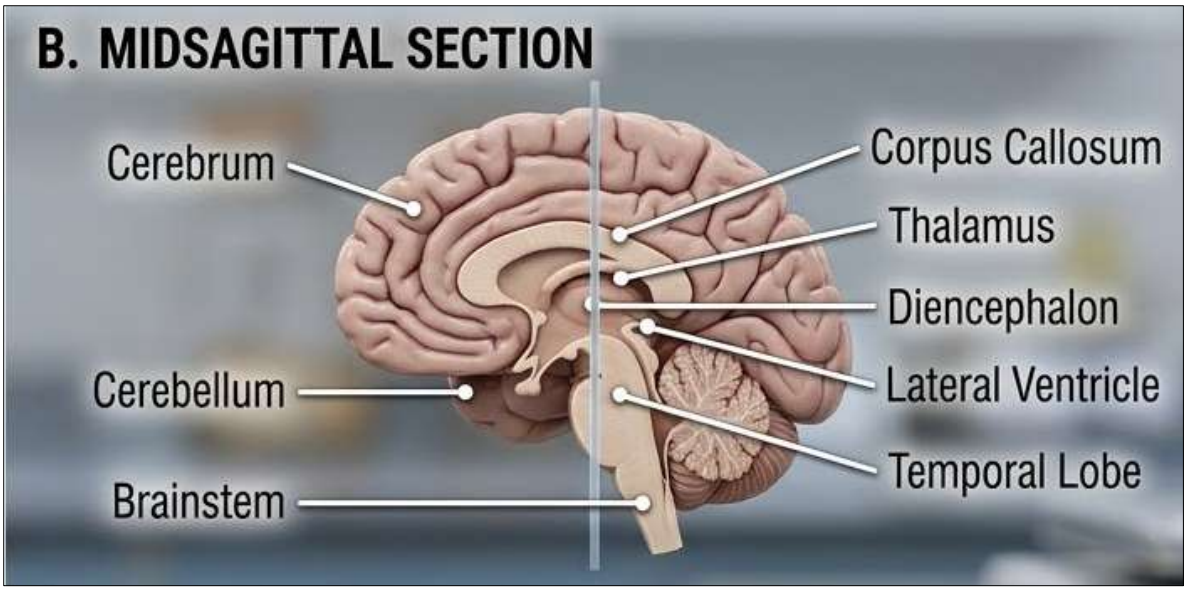


7.3 Step 3: Slicing (Macroscopic Cutting)

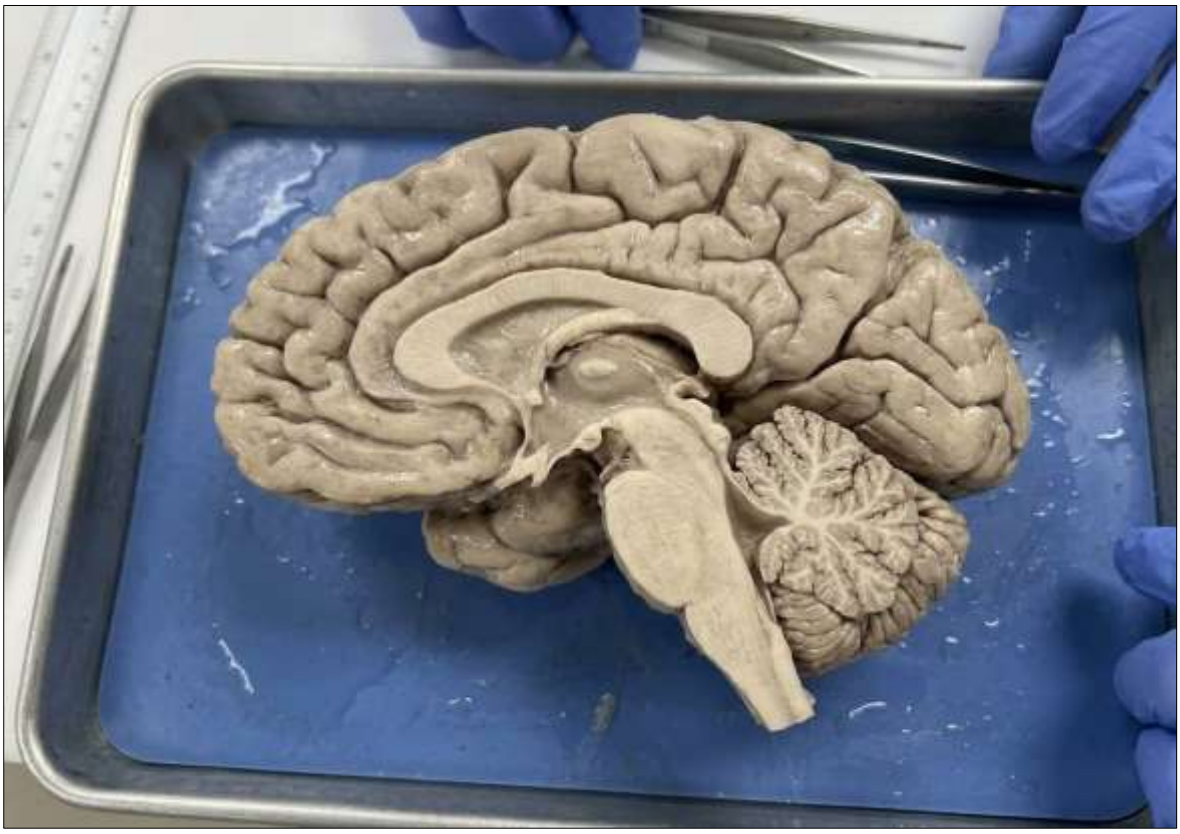
- Place the fixed brain on a clean cutting board.
- Use a long, sharp brain knife to cut uniform slices (5–10 mm thick) to check internal structures like ventricles and the brainstem.



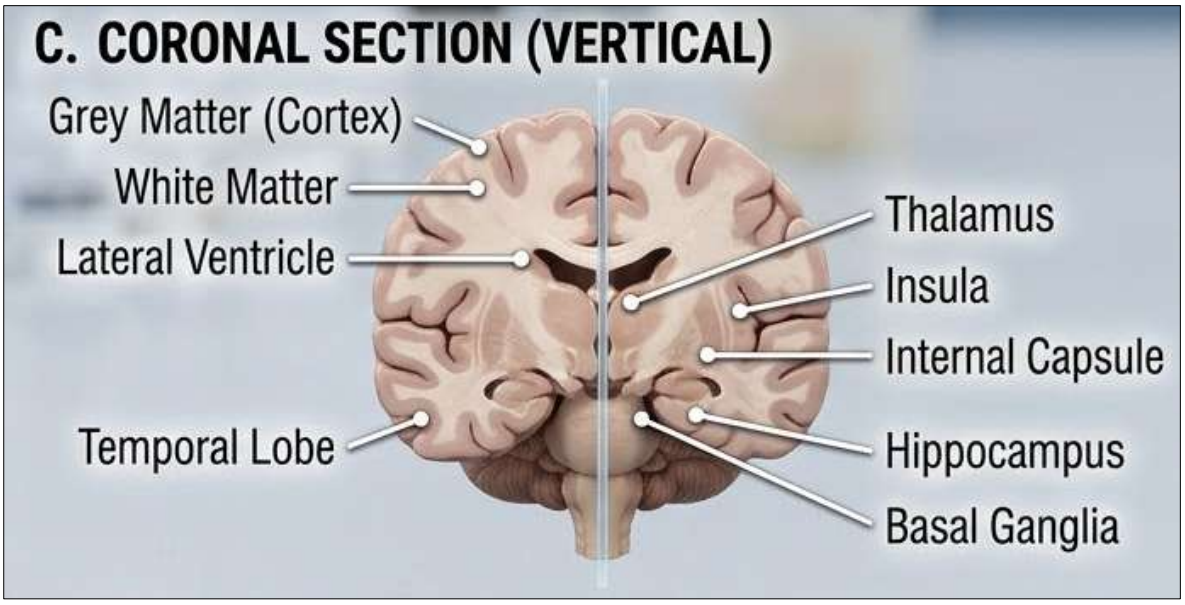




Sagittal plane



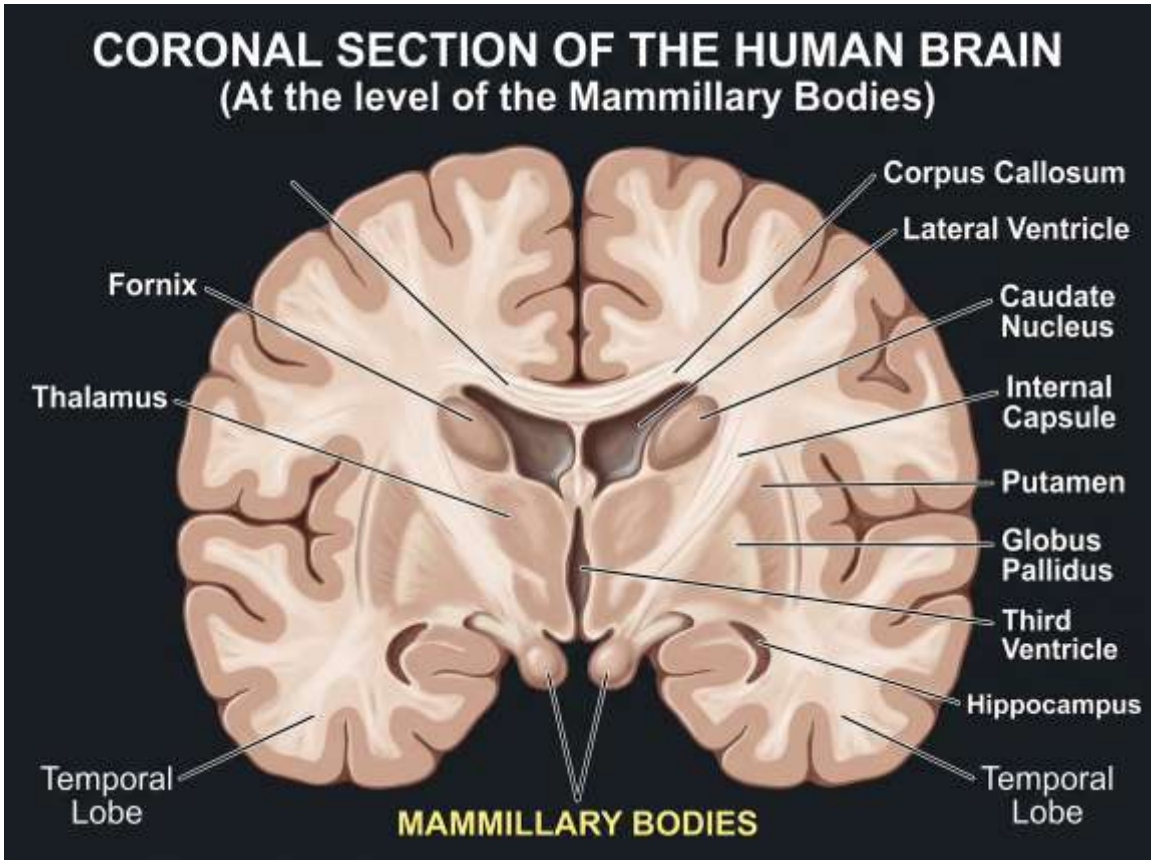


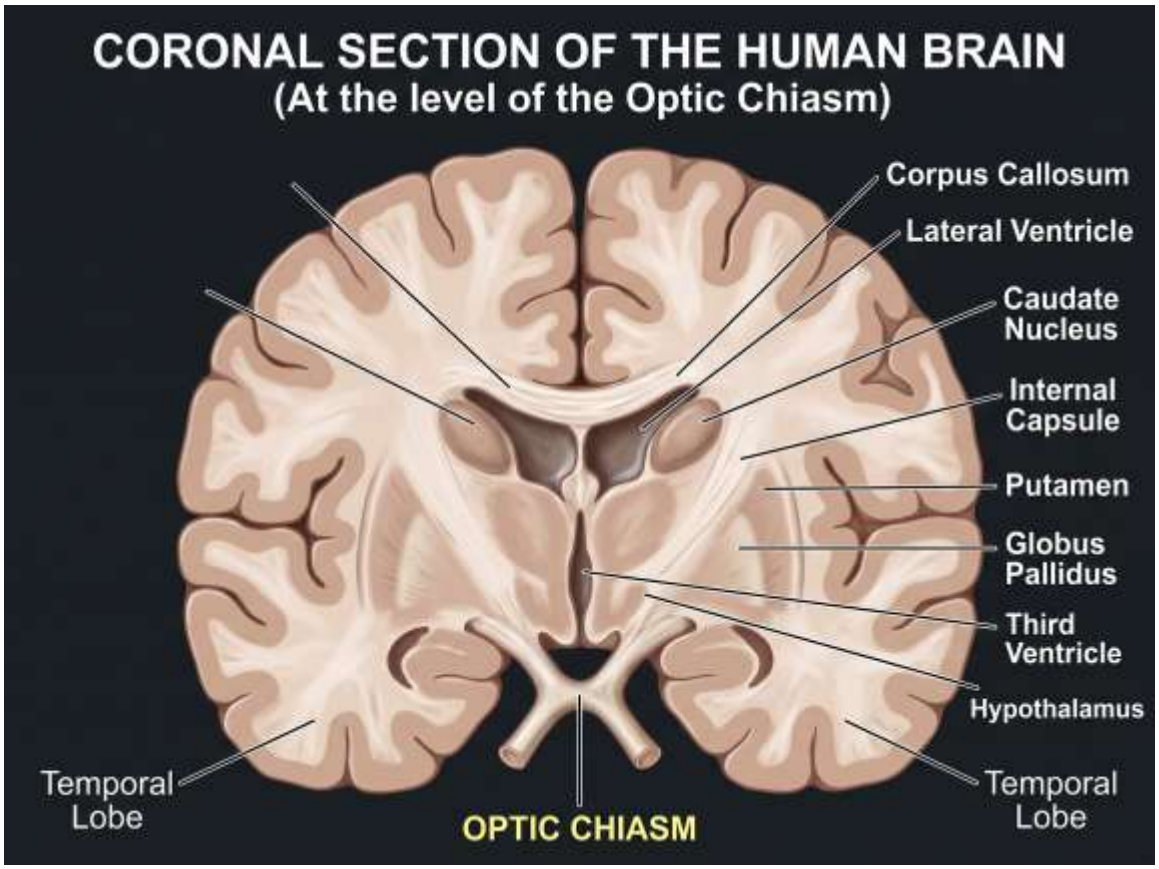

C. CORONAL SECTION (VERTICAL)
Grey Matter (Cortex)
White Matter
Lateral Ventricle
Temporal Lobe
Thalamus
Insula
Internal Capsule
Hippocampus
Basal Ganglia

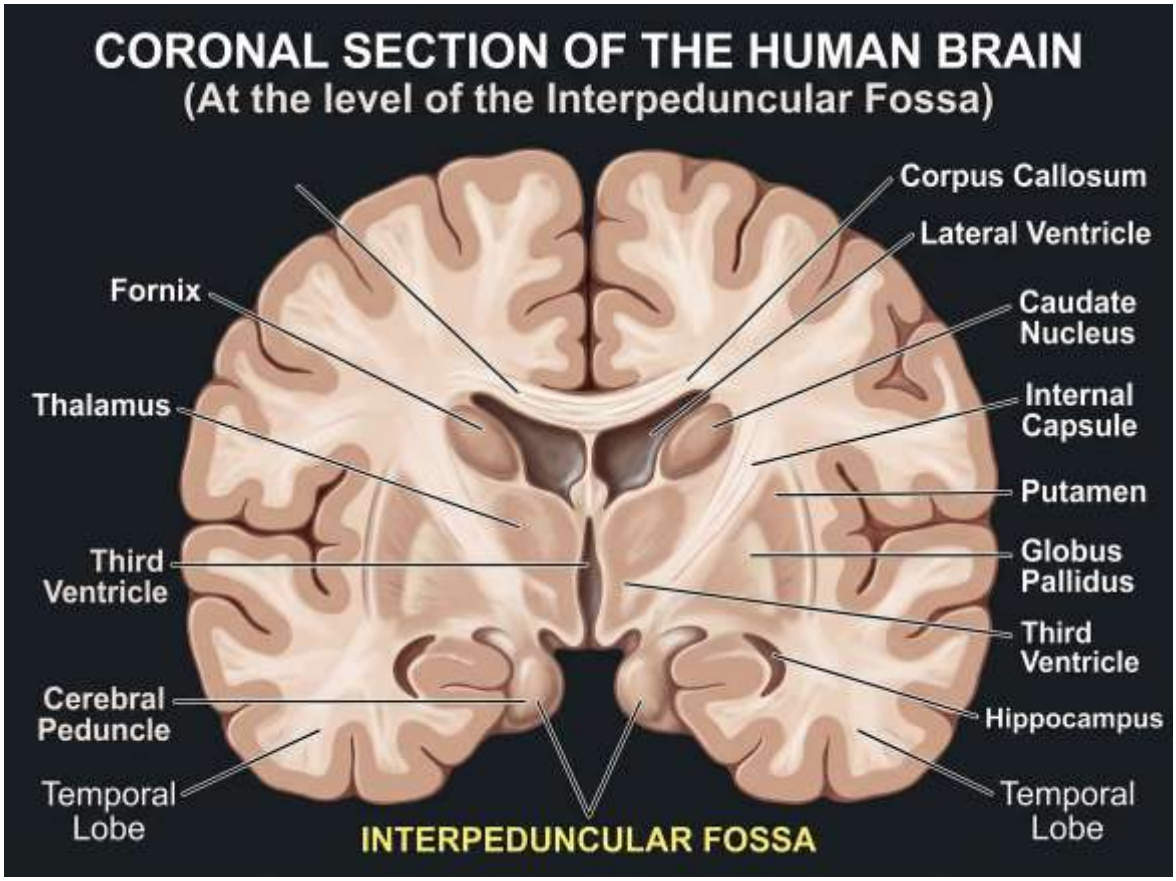
Coronal plane

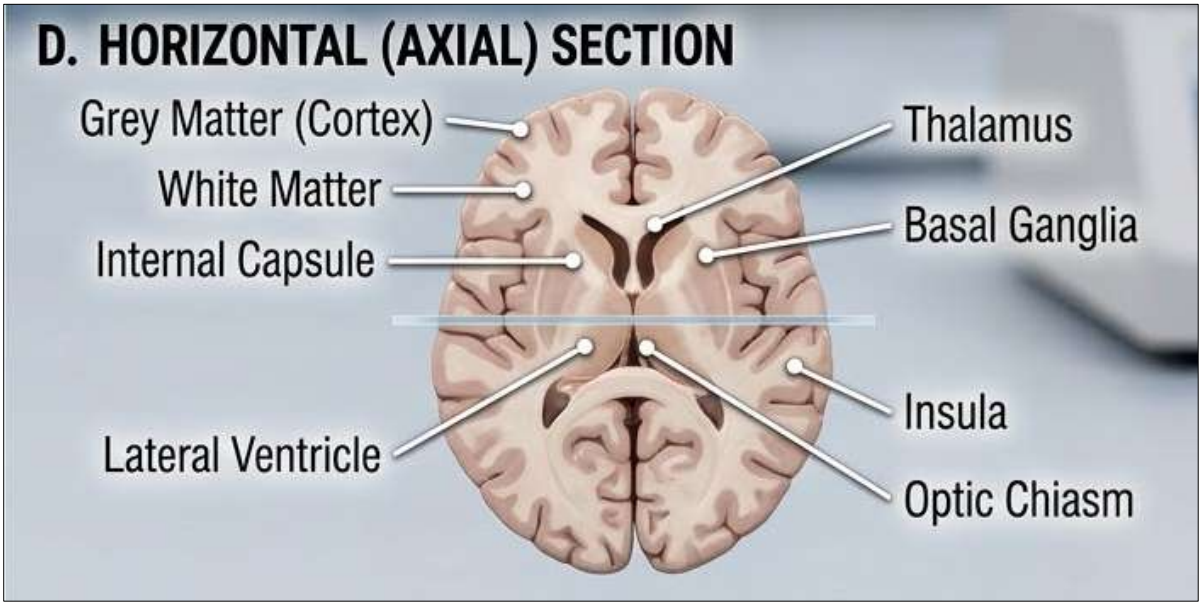




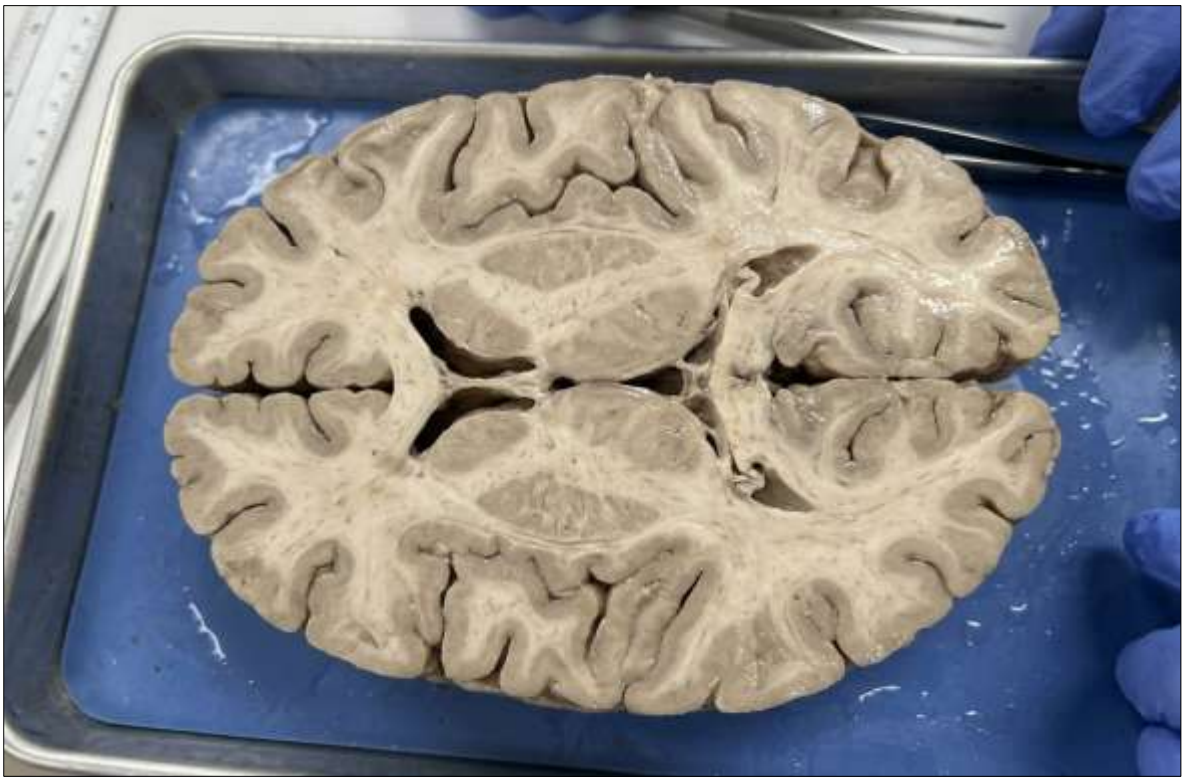

CORONAL SECTION OF THE HUMAN BRAIN
(At the level of the Mammillary Bodies)
Corpus Callosum
Lateral Ventricle
Fornix
Caudate Nucleus
Thalamus
Internal Capsule
Putamen
Globus Pallidus
Third Ventricle
Hippocampus
Temporal Lobe
Temporal Lobe
MAMMILLARY BODIES


CORONAL SECTION OF THE HUMAN BRAIN
(At the level of the Optic Chiasm)
Corpus Callosum
Lateral Ventricle
Caudate Nucleus
Internal Capsule
Putamen
Globus Pallidus
Third Ventricle
Hypothalamus
Temporal Lobe
Temporal Lobe
OPTIC CHIASM


CORONAL SECTION OF THE HUMAN BRAIN
(At the level of the Interpeduncular Fossa)
Corpus Callosum
Lateral Ventricle
Fornix
Caudate Nucleus
Thalamus
Internal Capsule
Putamen
Third Ventricle
Globus Pallidus
Third Ventricle
Cerebral Peduncle
Hippocampus
Temporal Lobe
Temporal Lobe
INTERPEDUNCULAR FOSSA


D. HORIZONTAL (AXIAL) SECTION
Grey Matter (Cortex)
White Matter
Internal Capsule
Lateral Ventricle
Thalamus
Basal Ganglia
Insula
Optic Chiasm

Axial plane

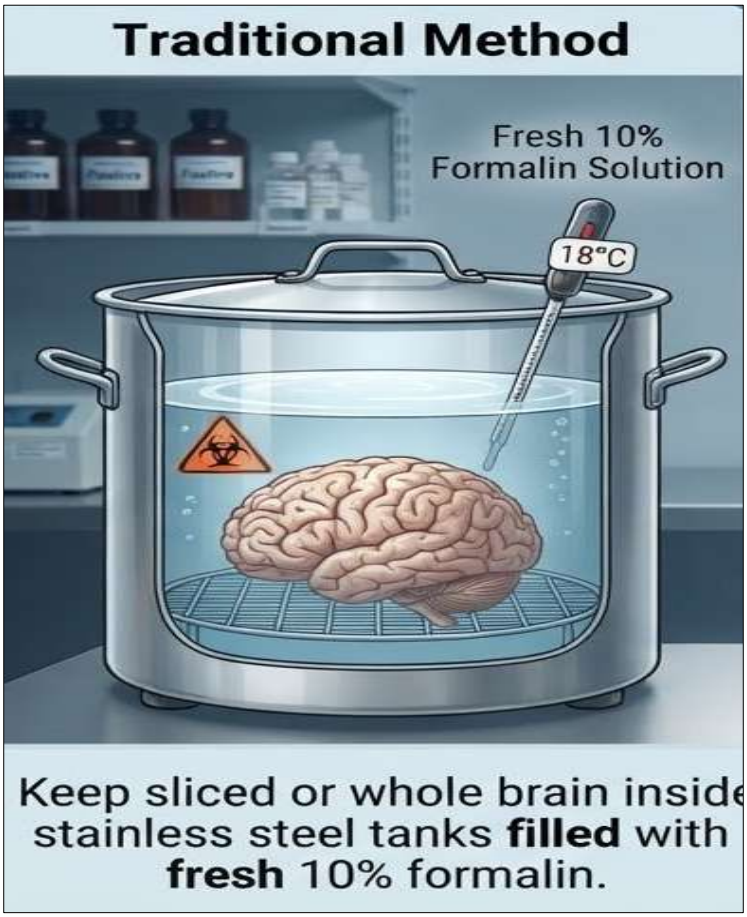




7.4 Step 4: Storage & Packaging

- Traditional Method: Keep the sliced or whole brain inside stainless steel tanks filled with fresh 10% formalin.
- Modern Method: Wrap the specimen in polythene sheets and seal it inside heavy-duty zipper bags.
- Store them in a room with a stable temperature (10-25 Celsius)











(8). Quality Control

- Make sure brain surfaces have no mold or fungus growth.
- Check that internal brain parts (like gray and white matter) are clearly visible.
- Ensure all ID tags are clean and easy to read.

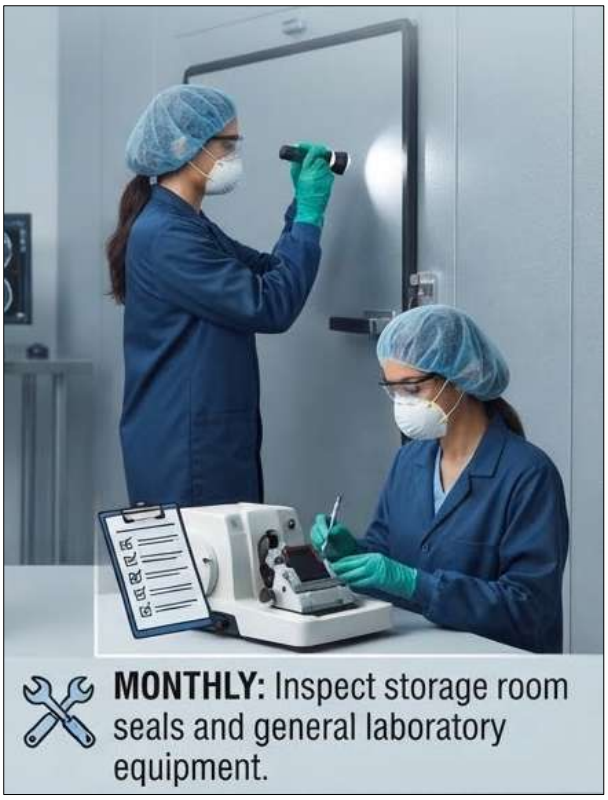


(9). Cleaning and Maintenance

- Daily: Clean dissection tables and check ventilation fans.
- Bi-Weekly: Check fluid levels in tanks, remove any scum using a strainer, and add fresh preservative solution.
- Monthly: Inspect storage room seals and general laboratory equipment.







- Chemical & Biohazard Waste Management: Never dispose of used formalin directly down regular laboratory drains. Collect old formalin and chemical waste in designated hazardous waste containers and dispose of them strictly in accordance with national environmental authority guidelines.

(10). Troubleshooting summary

Problem	Possible Cause	Corrective Action
Soft or mushy brain tissue	Not enough fixation time or delayed fixing	Increase the primary fixation time in fresh 10% formalin.
Fungal growth on specimen	Weak preservative or dirty tank fluid	Clean the tank completely and add fresh preservative solution.
Distorted brain shape	Poor positioning during initial fixing	Suspend the brain properly using its blood vessels.
Strong irritating fumes	Broken exhaust fan or loose container lids	Check the ventilation system and seal all containers tightly.

1. SOFT OR MUSHY BRAIN

Indicates poor fixation, autolysis, or improper handling. Tissue lacks structural integrity and may disintegrate.



2. FUNGAL GROWTH ON SPECIMEN

Appearance of mold (e.g., *Aspergillus*) indicates contamination, inadequate fixative concentration, or improper storage conditions.



3. DISTORTED BRAIN SHAPE

Caused by inadequate initial fixation support, uneven fixative distribution, or physical trauma during transport or storage.



4. STRONG IRRITATING FUMES

A primary indicator of inadequate formalin/fixative buffering, improper container sealing, or a potential leak in the ventilation system.



References

(1). Mescher AL. Junqueira's Basic Histology: Text and Atlas. 17th ed. New York: McGraw-Hill Education; 2024.

(2). Young B, O'Dowd G, Woodford P. Wheater's Functional Histology: A Text and Colour Atlas. 7th ed. Philadelphia: Elsevier; 2023.

(3). Kiernan JA. Histological and Histochemical Methods: Theory and Practice. 5th ed. Banbury: Scion Publishing; 2021.

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