

Standard Operating Procedure (SOP) for Handling and Processing Human Biological Materials

Title: Safe Handling and Processing of Human Biological Materials (Brain Tissue, Blood Serum, and Plasma)

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1. Purpose

This Standard Operating Procedure (SOP) outlines the safe handling, processing, and storage of human biological materials, including fixed and frozen brain tissue, blood serum, and plasma, to ensure compliance with biosafety regulations and minimize risk to personnel.

2. Scope

This SOP applies to all personnel handling human biological materials in laboratory and clinical settings. It covers procedures for receiving, handling, processing, and storing fixed and frozen brain tissue, as well as blood serum and plasma.

3. Responsibilities

- **Laboratory Personnel:** Must follow all safety procedures as outlined in this SOP.
- **Principal Investigator (PI)/Laboratory Supervisor:** Ensures compliance with biosafety regulations and proper training of personnel.
- **Biosafety Officer (if applicable):** Monitors adherence to biosafety guidelines.

4. Safety Precautions

4.1 Biosafety Level Considerations

- Any procedures that may generate aerosols must be conducted in a **Class II Biosafety Cabinet (BSC)**.

4.2 Personal Protective Equipment (PPE)

- **Mandatory:**
 - Disposable **nitrile gloves** (double-gloving recommended for high-risk materials).
 - **Lab coat or disposable gown.**

- **Face shield or safety goggles** (especially when handling frozen samples to protect against splashes or breakage).

4.3 General Precautions

- Treat **all human materials as potentially infectious**.
- Do not eat, drink, or apply cosmetics in the laboratory.
- Minimize exposure by working efficiently and keeping materials contained.
- Use **mechanical pipetting devices**—never mouth pipette.
- Maintain a clean and organized workspace.

5. Procedures

5.1 Receiving and Storing Human Biological Materials

5.1.1 Fixed and Frozen Brain Tissue

- Fixed brain tissue should be stored in **10% formalin or paraformaldehyde**.
- Frozen brain tissue should be stored at **-80°C** in a freezer with a backup power source.
- Label all containers with **sample ID, date of collection, and hazard warnings**.

5.1.2 Blood Serum and Plasma

- Store **serum and plasma samples at -80°C**.
- For short-term storage, maintain at **-20°C**.
- Clearly label vials with **sample ID, date of collection, and biosafety level**.

5.2 Handling and Processing

5.2.1 Fixed and Frozen Brain Tissue Processing

- Use a **cryostat** or dedicated cold room for cutting frozen tissue.
- Dispose of **used blades, tissues, and disposable materials in biohazard waste containers**.
- Decontaminate work surfaces with **10% bleach followed by 70% ethanol**.

5.2.2 Blood Serum and Plasma Processing

- **Thawing:** Place frozen vials in a biosafety cabinet at **4°C or room temperature** inside a secondary container to prevent spills.
- **Aliquoting:** Perform under a **BSC using sterile pipette tips**.
- **Centrifugation:** Use **sealed rotors** or **safety cups** to prevent aerosol generation.
- Dispose of pipette tips and contaminated materials in **biohazard waste bins**.

5.3 Waste Disposal

- **Solid waste:** Discard all contaminated PPE, pipette tips, and disposable materials in **biohazard bags**.
- **Liquid waste:** Treat with **bleach (final concentration of 10%) for 30 minutes** before disposal.
- **Sharp objects:** Dispose of scalpels, needles, and glass slides in **designated sharps containers**.

6. Spill and Exposure Procedures

6.1 Spill Response

- Small spills: Cover with absorbent material, apply **10% bleach for 10 minutes**, then clean with **70% ethanol**.
- Large spills: Notify the **Biosafety Officer**, evacuate the area if necessary, and follow institutional spill protocols.

6.2 Exposure Management

- **Skin exposure:** Immediately wash with soap and water for **at least 5 minutes**.
- **Eye exposure:** Rinse eyes with **copious amounts of water** at an eyewash station for **15 minutes**.
- **Needlestick or sharps injury:** Allow the wound to bleed freely, wash with soap and water, and **seek medical attention immediately**.
- **Report all exposures** to the supervisor and **institutional biosafety officer**.

7. Documentation and Training

- **Training:** All personnel must complete Bloodborne Pathogens training before handling human materials.
- **Record Keeping:** Maintain logs of sample storage, processing, and any incidents.

- **Annual Review:** This SOP must be reviewed and updated annually.