UG – Research Experiments

Module 2 - Neurobiological methods

(Mouse Blood Perfusion and Brain Extraction)

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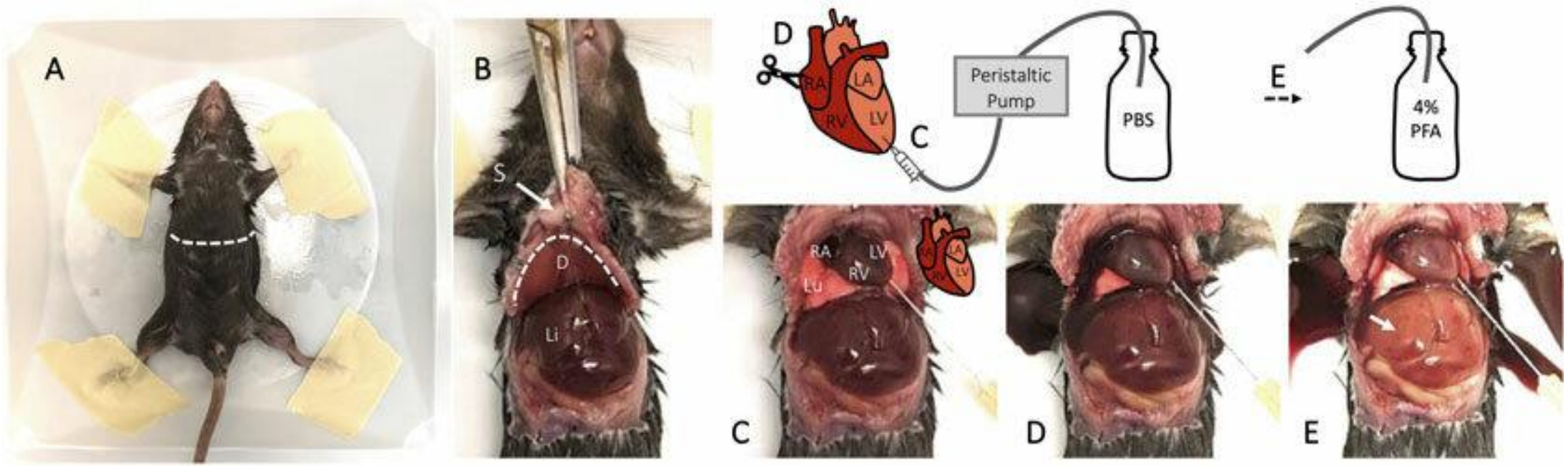
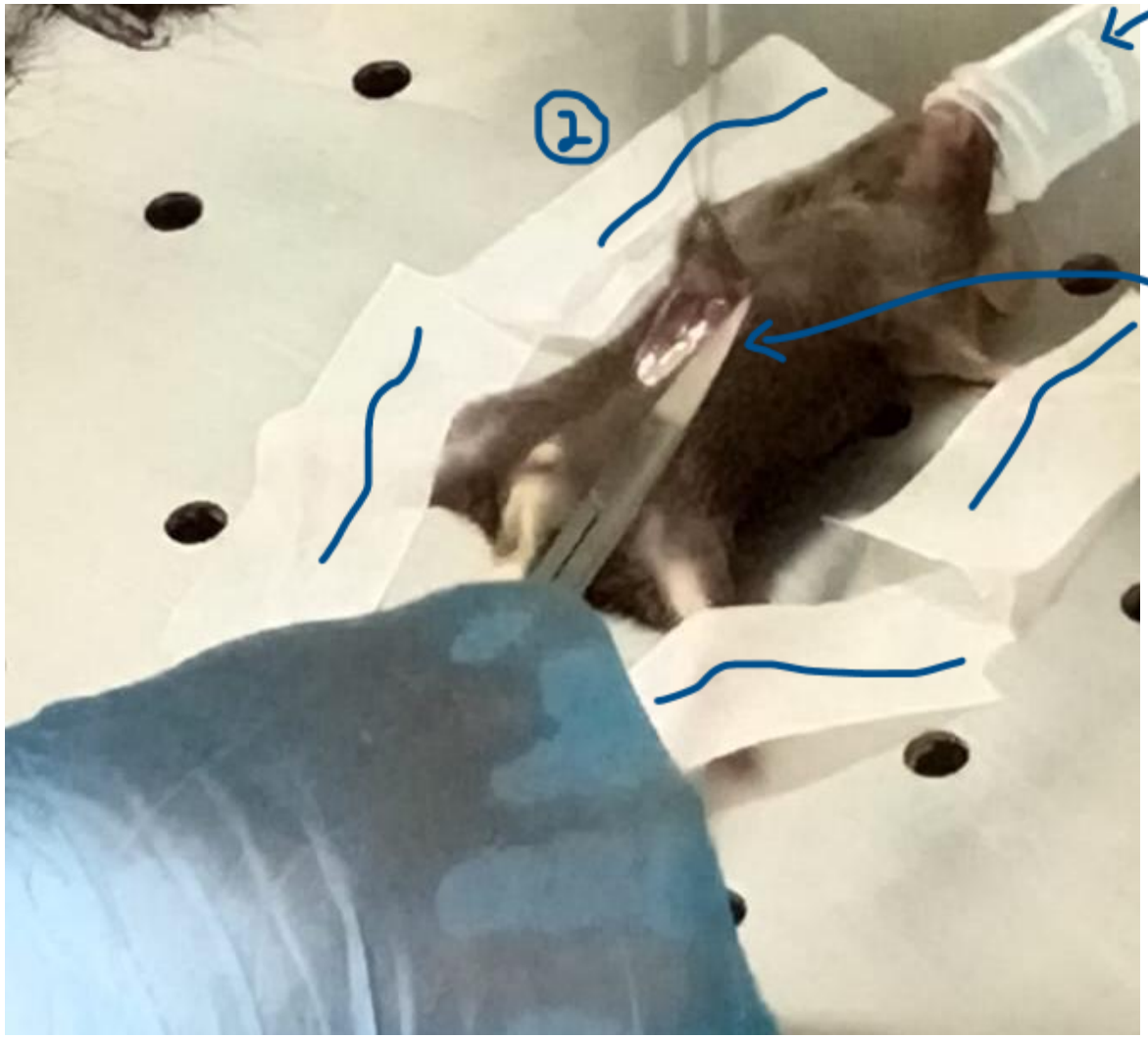
Blood Perfusion

Blood perfusion is a crucial step in neuroscience research, to remove blood and fix tissues for histological analysis later on.





Isoflorine - Deeply anesthetize and check for reflexes.

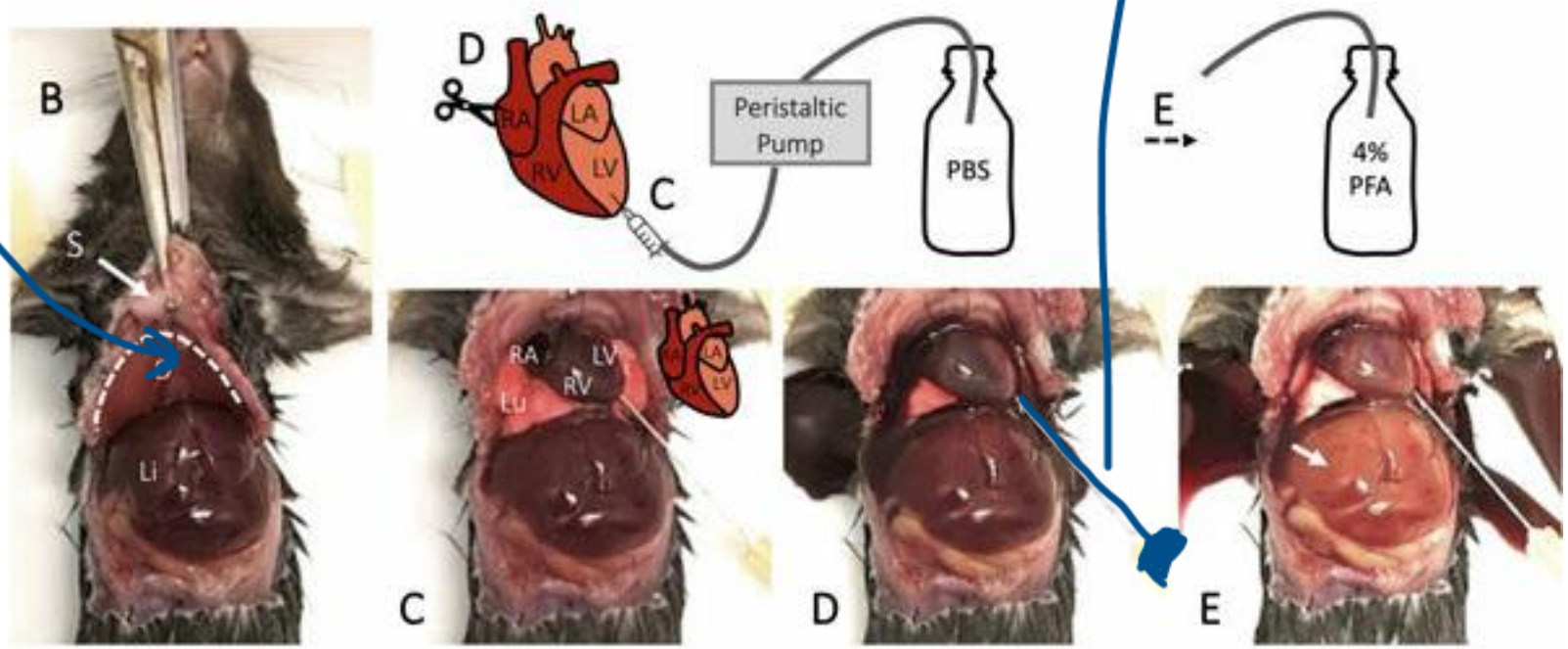
Midline incision through the skin and chest wall. Cut through the ribcage carefully to expose the heart.

4

Open the thoracic cavity by opening into diaphragm and expose the heart.

5

Insert the needle in the left ventricle.



6

Perfuse **PBS** (1X)(~10–20 mL) through the left ventricle. preventing clot formation and allowing for better fixation.

The liver should turn pale, indicating successful blood removal.

7

Switch to **4% paraformaldehyde (PFA)** Perfuse fixative solution (~10–20 mL) to preserve brain and tissue structure. Body stiffens up.

How They Work:

- Cross-link proteins by forming **covalent bonds** (mainly between amino groups of proteins).
- Stabilize cellular structures while maintaining antigenicity.
- Prevent enzymatic degradation by inactivating proteases.

Fixes tissues for histological analysis later on for techniques like imaging to be performed later.

Brain Extraction

A) Decapitation

B) Expose the Skull

• Make a **midline incision** in the skin using scissors or a scalpel from the **forehead to the neck**.

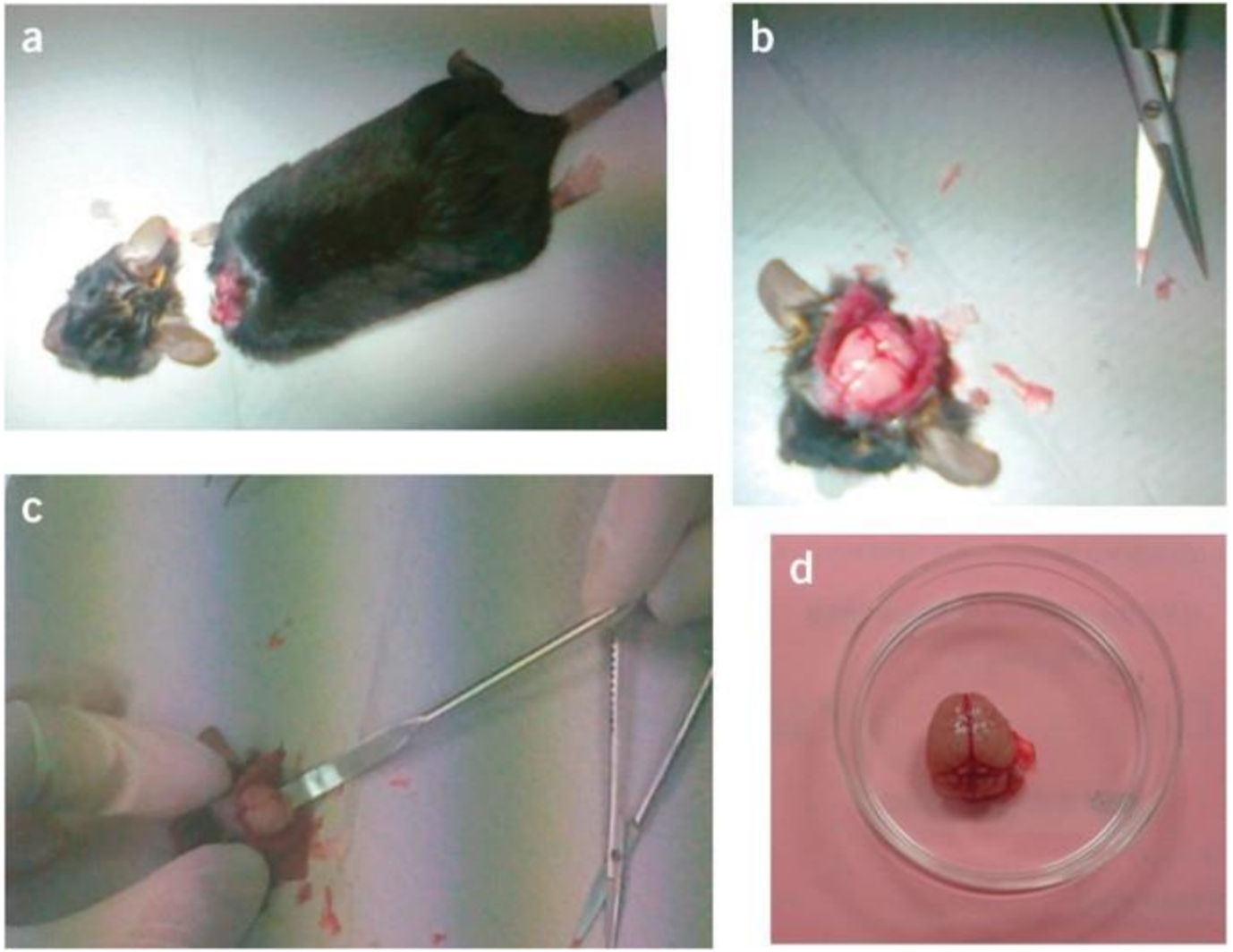
C) Open the Skull (Craniotomy)

• Use fine scissors to carefully **cut along the midline** of the skull.

D) Extract the Brain

• Use a spatula to **carefully lift the brain from the skull base**.

• Cut the **optic nerves and spinal cord attachment** to free the brain completely.



References

- Rodent brain extraction and dissection: A comprehensive approach Refat Aboghazleh, Silvia D. Boyajian, et.al
- Immunofluorescence Labeling of Skeletal Muscle in Development, Regeneration, and Disease, Esper Marie,Kodippili Kasun, el.al

Thank You