STANDARD OPERATING PROCEDURE:
Performing a kidney dissection

Note: To be undertaken only by trained personnel in conjunction with a current safety data sheet (SDS) and site specific risk assessment.

1. Introduction
Kidney dissections are conducted to explore the function of a kidney by examining the external and internal structures. The kidney filters out metabolic wastes such as urea and some salts and regulates the water and salt balance in the body. Kidneys suitable for dissection include fresh sheep or bullock kidneys purchased from a butcher, abattoir or a supplier that has passed relevant health inspections. It is best to get them left in fat if possible with some of the ureter and blood vessels left attached. The kidneys can be obtained some weeks beforehand and stored in a freezer.

2. Context
- These instructions are for the use of experienced science teachers and technicians.
- Students must be closely supervised when performing kidney dissections.

3. Safety notes
- Good hygiene practices should be observed at all times.
- Keep hands away from mouth, nose, eyes and face during and after dissection and wash hands immediately after handling dissection material.
- Safety with scalpels:
  - Ensure students demonstrate responsible behaviour while using scalpels.
  - Only staff should carefully attach and remove scalpel blades with pliers or disposable blade remover.
  - The scalpel blade size and handle must be compatible e.g. number 4 handle and number 23 blades.
  - Keep the blade in the foil wrapper and attach to the handle with the sharp side of the blade pointing away from the body.
  - Blades should be removed carefully using pliers, forceps or a commercial scalpel blade remover.
  - An alternative is to use disposable scalpels.

4. Regulations, licences and permits
Offal that has passed a health inspection by a meat inspector or obtained from a butchers shop, abattoir or biological supplier is suitable for dissection. In some jurisdictions, all dissections need to be reported to the school animal ethics committee.
5. Equipment

- PPE (Lab coat/apron, gloves and safety glasses)
- Scalpels
- Scissors
- Forceps
- Probe
- Dissecting boards covered with newspaper. Glazed ceramic tiles, nylon plastic boards or disposable foam trays are suitable
- Paper towel
- Disinfectant – hospital grade general purpose disinfectant (the label on the front of the pack must state ‘hospital grade’, which is a general purpose hard surface disinfectant which will kill micro-organisms)

6. Operating procedure

Preparation

- If any blood is associated with the kidneys rinse them in cold running water.
- Prepare disinfectant solution according to manufacturer’s instructions. Place disinfectant in a container ready for instruments to be placed at the end of the dissection.
- Ensure students have appropriate PPE.
- Distribute the instruments to students. Scalpels, scissors, forceps and probes should be counted out, and counted in when returned.

Dissecting the kidney

1. Place the kidney on the dissecting board or tray. Remove any protective fatty tissue surrounding the kidney taking care not to damage any of the tubes emerging from the kidney.
2. Examine the external structure of the kidney.
3. Gently separate, as much as possible, the three tubes emerging from the kidney’s concave side (these may have been cut from the kidney).

Figure 1 shows a photo of sheep kidney before dissection.

Figure 1. External view of sheep kidney. The red pin identifies the renal artery and the blue pin shows the renal vein. Below the green pin identifies the ureter which has been cut close to the kidney. (Image by K. Szalai, 2015)

4. Try to identify the:
   - renal artery, a narrow tube with thick elastic walls which takes blood into the kidney
   - renal vein, a wide tube with limp walls which carries blood out of the kidney
   - ureter, a tough white tube which carries urine from the kidney to the bladder.
5. Use the scalpel to cut open the kidney in half lengthways, starting from the concave side just to one side of the centre line. Leave the tubes intact in one side of the dissection.

6. Observe the internal appearance and structure of the kidney.

7. Identify the cortex, medulla and pelvis of the kidney. Note the colour, thickness and texture of these structures.

Figure 2 shows photo of completed dissection of sheep kidney.

Figure 2. Two halves of the kidney. On the left side the green pin identifies the medulla, the white pin shows the pyramid and the yellow pin identifies the cortex. On the right side the black pin shows the pelvis. (Image by K. Szalai 2015)

Figure 3 shows the labelled structure of the kidney.

Figure 3. Labelled kidney.

Clean up

- Make sure all instruments are returned.
- All parts of the kidney must be wrapped in newspaper, as well as the disposable foam tray (if used) and placed in a dedicated garbage bag. When all waste material has been collected, double bag for disposal.
- Dissecting boards, scissors, forceps, probes and scalpels must be immediately washed in hot soapy water, then rinsed or placed in dishwasher to minimise handling.
- After washing, dissecting instruments can be soaked in 70% alcohol for 20 minutes as an optional additional disinfectant and to avoid rusting.
- Dry all equipment thoroughly.
- Clean workplace with hot soapy water and wash hands thoroughly.
7. Trouble shooting/emergencies

- First aid: See latest disinfectant SDS for more detailed information
  - **If swallowed**: Do not induce vomiting. Rinse mouth with water, and then give water to drink. Seek urgent medical attention.
  - **If in eyes**: Hold open and irrigate with copious quantity of water for at least 15 minutes. Seek medical attention.
  - **If on skin/clothes**: If spilt on skin or clothes quickly wipe off with a dry cloth to absorb as much liquid as possible. Remove contaminated clothes and drench the area with excess water under a safety shower. Seek medical attention.
  - **If inhaled**: Remove to fresh air and seek medical attention if symptoms persist.
  - For further advice contact the Poisons Information Centre on 131 126.

- Care should be taken with sharps such as scalpel blades and scissors.
- See safety notes if it is necessary to remove broken or used scalpel blades.
- Store all dissecting instruments securely.
- First aid: cuts and lacerations should be washed under running water, then patted dry and covered with a clean paper towel or tissue, in the first instance and referred to the school first aid officer for assessment.

8. Waste disposal

- Used and damaged scalpel blades must be placed in an approved sharps container after use.
- Biological material must be wrapped in newspaper, placed in a double plastic garbage bag and sealed for immediate disposal in the industrial bins.

9. Related material

- Risk Assessment
- Manufacturer’s Safety Data Sheet for disinfectant

References:


  