

STANDARD OPERATING PROCEDURE:

Performing an eye 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

Eye dissections are conducted to examine the structure of an eye and to consider how the components of the eye work separately and together. Good hygiene practices should be observed. Eyes suitable for dissections include fresh cow, sheep or pigs eyes purchased from a butcher, abattoir or a supplier that has passed relevant health inspections. Fresh eyes need to be used as soon as possible as the lenses go cloudy after a few days.

2. Context

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

3. Safety notes

- Eyes differ from standard offal because they are not sold as food. Bacteria and viruses could be present.
- If using preserved eyes, it is important to take note of the preservative solution that the eyes are in:
 - Rinse the preserved eyes under running water immediately upon removal from the preservative solution.
 - Work in a well-ventilated area.
 - It is recommended that people wearing contact lenses should not dissect eyes that are in preservative solution.
- 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 a 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 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 procured from a butchers shop, abattoir or biological supplier is suitable for dissection. Eyes can be obtained for educational purposes with safe handling procedures put in place. 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)
- Scalpel
- Scissors
- Forceps
- Dissecting board covered in newspaper, or disposable foam tray
- Newspaper to protect bench and for wrapping biological materials after dissection
- 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

- 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 instruments to students. Scalpels and scissors should be counted out, and counted in when returned.

Performing an eye dissection

1. Place the eye on the dissection board or tray. With forceps and the scalpel or scissors, carefully remove the fatty tissue from around the eyeball.
2. Locate the transparent skin of the cornea and note that the eyeball is protected by a tough protective layer (sclera).
3. Locate the optic nerve. It should look like a thick white tube at the back of the eye. You may have to remove some fat to see it.

Figure 1 shows the eyeball and optic nerve.



Figure 1. External view of bullock’s eye. The probe points to the optic nerve at the back of the eye. At the front of the eye note the sharp curve of the sclera coating the cornea.
(Image by K. Szalai, 2015)

(Operating procedure cont....)

5. Look at the coloured part of the eye (iris) and the black part in the centre (pupil).
6. Using a scalpel carefully cut a small window in the side of the eyeball, just behind the iris. Be careful that aqueous or vitreous humour fluid does not run out. Try looking through this window and record your observations.
7. Starting from this window, using scissors or scalpel cut forward and around the iris so you have cut the eye into two parts.

Figure 2 shows the two halves of the eye.

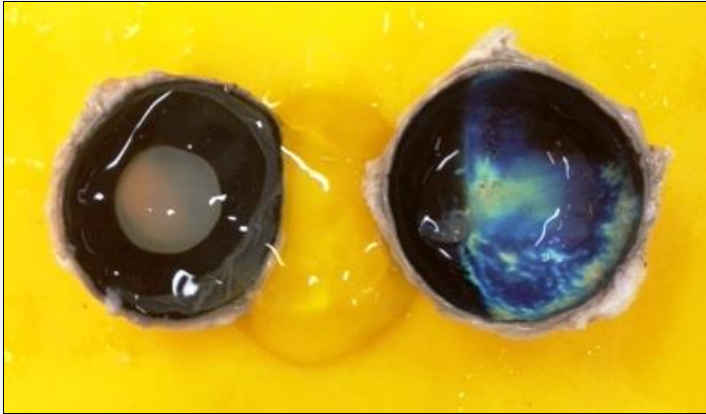


Figure 2. On the left the iris and pupil can be seen with the lens in the centre and jelly-like material of the vitreous humour. On the right the black, pearly-green inside layer of the retina can be seen. (Image by K. Szalai, 2015)

8. With forceps lift off the top part of the eye; this consists of the cornea, iris and pupil, aqueous humour and lens.
9. Carefully separate the lens from the rest of the eye with forceps. Some of the jelly-like material of the vitreous humour may adhere to the lens. Rinse the lens with water and put it on a piece of newspaper. Try gently squeezing the lens from the side as you look. Note what you observe.
10. Gently remove the rest of the vitreous humour from the eyeball, rinse out the inside of the eye with water and notice the black, pearly-green inside layer. Observe the retina.
11. Examine the back of the front part of the eye from which you took the lens. The muscular ring-like structure of the iris surrounding the pupil is now exposed.
12. With forceps carefully remove the iris exposing the cornea.

Figure 3 shows the labelled structure of an eye.

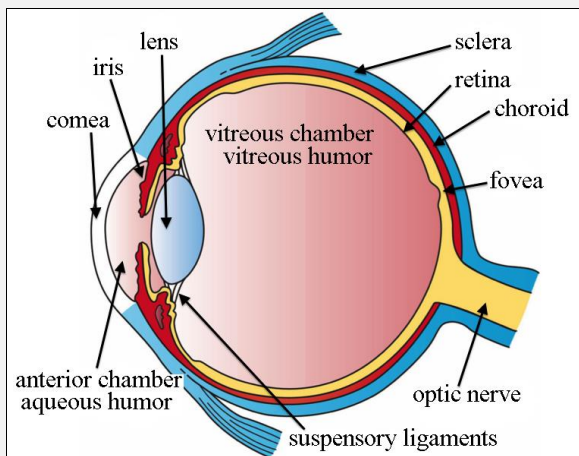


Figure 3. Shows the labelled cross-section of an eye.

Image by Holly Fischer, Three main layers of the eye, [CC BY 3.0](http://commons.wikimedia.org/wiki/File:Three_Main_Layers_of_the_Eye.png#/media/File:Three_Main_Layers_of_the_Eye.png)
http://commons.wikimedia.org/wiki/File:Three_Main_Layers_of_the_Eye.png#/media/File:Three_Main_Layers_of_the_Eye.png

(Operating procedure cont....)

Clean up

- Make sure all instruments are returned.
- All parts of the eye must be wrapped in newspaper, as well as the disposable foam tray (if used) and placed in a dedicated plastic garbage bag. When all waste material is collected, double bag for disposal.
- Dissecting boards, scissors, forceps and scalpels must be immediately soaked in disinfectant, then washed in hot soapy water, then rinsed.
- 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.
- Disinfect workplace 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:

Cash, S; Quinton, G; Tilley, C 2012. *Oxford Big Ideas Science 9 Australian Curriculum*. Oxford University Press Australia

Chemwatch Gold. 2013. *Safety Data Sheet: Hospital grade disinfectant*.

<http://jr.chemwatch.net/chemwatch.web> (subscription required accessed October 2014).

History of reviews

Date	Version Number	Notes
July 2014	Version 1.0	
April 2015	Version 2.0	First aid for disinfectant included Photos and diagrams added