WJEC Wales Biology A Level

SP 2.2b: Dissection of a fish head

Practical notes

Introduction

Fish have a relatively **small** surface area to volume ratio so require a **specialised** internal **gaseous exchange surface**, the **gills**. Water is taken in through the **mouth**, driven over the **gills** (where gaseous exchange occurs) and forced out through the **operculum**.

Dissections are essential to the understanding of **internal processes** such as gaseous exchange.

Equipment

- Fish head
- Dissection board
- Scalpel
- Large scissors
- Fine scissors
- Fine forceps
- Glass rod
- Pipette
- Microscope slide
- Coverslip
- Microscope
- Distilled water
- Bowl
- Paper towels
- Disinfectant
- Non-latex disposable gloves

Risk assessment

Hazard	Risk	Precaution	Emergency
Sharp tools e.g. scalpel, scissors	Cuts	Direction of cut away from the body; do not attempt to change blade; keep scalpel away from the edge of the desk	Elevate cuts and apply pressure; wash minor cuts in cold water; seek medical assistance
Broken glass	Cuts	Keep glassware away from the edge of the desk; handle microscope slides carefully	Dispose of broken glassware carefully; elevate cuts; do not remove glass from cuts; seek medical assistance

Biohazard	Contamination	Cover any cuts; wear disposable gloves (optional); wash hands after handling fish head; use disinfectant	Seek medical advice
Disinfectant	Flammable	Make sure that there are no naked flames in the room	Put out small fires with a damp cloth; evacuate the building

Method

1. Under cold running water, **rinse** the fish head to remove **excess mucus** from the gills
2. Open the **mouth**. Note the movement of the **lower jaw**. *Its movement is limited to a hinge mechanism, opening and closing to take in water and prey*.
3. Use fine forceps to show the action of the **operculum** (or 'gill cover') during ventilation. *The operculum moves back and forth to enable the flow of water over the gill arch and filaments*.
4. Lift the operculum. Locate the **gill slits** and **gill filaments**. *The gill slits form the entrance to the gills. The gill filaments are feathery structures where gaseous exchange takes place.*
5. Fill up a bowl with water. Submerge the fish head and observe the **large surface area** produced by the gill filaments as they expand.
6. Take a glass rod and use it to mimic the **flow of water** during ventilation; push it into the mouth, through the buccal cavity and out through a gill slit.
7. Using fine scissors, **remove the operculum** from the fish head to expose **four gills**, each attached to a **bony gill arch.**
8. Use large scissors to cut off a section of the gill arch.
9. Identify **gill rakers** attached to the arch. *These are small finger-like projections that prevent damage to the gills by small food molecules*.
10. Use fine scissors or a scalpel to cut off a section of **gill filament** (a couple of mm long) from the arch. Place it in the centre of a **microscope slide**.
11. Use a pipette to add **2 drops** of **distilled water** onto the filament and apply a **cover slip**. *Lower the cover slip at an angle to prevent the formation of bubbles.*
12. Absorb any **excess** water on the microscope slide using a paper towel.

13. Place the microscope slide under the clips on the microscope stage and observe the gill filament using the ×4 and ×10 objective lenses.

14. Make annotated scientific diagrams of your observations.

Dissection diagram