Living in water: what does it take?

Rakali (*Hydromys chrysogaster*) are specialised mammals, equipped with structural adaptations for life in a semi-aquatic environment.

adaptation 1
need for speed

Rakali have broad, partially-webbed feet that improve acceleration when swimming. The large surface area of their feet provides rakali with propulsive force necessary when swimming; a distinct advantage when chasing aquatic prey.

1. Suggest another mammal with webbed feet, and describe its habitat. What is the function of webbed feet in your mammal?

.....

.....

.....

.....

adaptation 2
sleek and streamlined

Rakali have a sleek, streamlined body shape. Water has a higher density and viscosity than air, and is therefore more resistant to movement. Streamlining reduces drag in water, enhancing agility and speed in the pursuit of underwater prey.

2. Name another mammal with similar body shape. What is the function of this body shape?

.....

.....

.....

.....

adaptation 3
diminutive features

Rakali's small ears have several functions in its semi-aquatic home. They add to its streamlined body shape. They are retractable, which keeps water out during underwater dives. Their small size also helps to reduce heat loss in cold water.

3. Describe a different structure used for heat regulation in another organism.

.....

.....

.....

.....

adaptation 4
underwater navigation

Rakali hunt along waterway edges and dive after their prey. Visibility in water is often poor so rakali rely on their whiskers to generate spatial information necessary for these tasks.

4. Other than using whiskers, how do aquatic animals collect sensory information underwater?

.....

.....

.....

.....

adaptation 5
dining out

Rakali teeth are adapted for a predominantly aquatic diet. Most rodents have three molars with a ridged surface, ideal for grinding. Rakali have just two molars with a smooth surface. These teeth are perfect tools for crushing aquatic prey, such as crustaceans.

5. Name another aquatic animal with specialised teeth. What function do the teeth perform?

.....

.....

.....

.....

adaptation 6
swimming tools

Rakali has a long, muscular tail that acts as a counterweight, helping rakali balance in water. It also works as a rudder, enabling rapid direction changes.

6. What other structures do aquatic animals use to maintain balance?

.....

.....

.....

.....

adaptation 7
it's all in the coat

Water has a higher specific heat and greater thermal conductivity than air, so mammals lose body heat more rapidly in an aquatic environment. Rakali has a fine layer of fur next to its skin that traps air and keeps the animal warm, while a dense, water-repellent top layer keeps it dry. Trapped air also aids buoyancy.

7. Name other structural adaptations aquatic animals have to aid buoyancy.

.....

.....

.....

Images 1, 3–5, 7 (Andrew McCutcheon) and 6 (Chad Loxsom) used by permission. Image 2 by Paul Ricketts © UWA.