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MORPHOLOGY AND PHYSIOLOGY: ADAPTATIONS TO MARINE LIFE

Body shape

Seals need to travel quickly to catch prey and avoid predation, and a key feature for them to do this is a hydrodynamic body shape. Like many marine animals, seals have an overall spindle shape, being narrowest in diameter at the head and tail and broadest in the middle. Such a shape minimises resistance and drag through gradual separation then reforming of lamina water-flow over the body. External protuberances are minimised (e.g. ear pinnae) or retractable (e.g. female teats and the male penis and testes). Even limbs are partially internalised to enhance streamlining, although propulsion mechanisms – the digits of fore- and hindlimbs – are enlarged.

Compared with the average terrestrial mammal, seals are also large in size; this does not pose a gravitational problem in water. Large size helps to conserve heat and facilitates oxygen storage, which enhances diving capacity.

Pelage and skin

A cross-section of the outer integument of an otariid seal traverses long guard hairs; a fine underfur; a narrow epidermis; a dermal layer containing hair follicles, and sweat and sebaceous (secretory) glands; and a fat layer (blubber or hypodermis) prior to reaching underlying muscle (Figure 3.1).

In fur seals, the primary means of insulation is the dense guard hair and underfur. Guard hairs are oval shaped in cross-section and are regularly spaced. Each one is