# Comparative account of brain

- The most posterior region is the **hindbrain**, which includes the **medulla oblongata**, **pons**, and **cerebellum**.
- Next is the **midbrain**, which includes a **sensory tectum** and a **motor tegmentum**.
- The **brain stem** includes all regions of the **hindbrain and midbrain** except for the cerebellum.
- The most anterior region of the brain, the **forebrain**, includes the **telencephalon, or cerebrum**, and the **diencephalon**, which is the source of the **thalamus**.

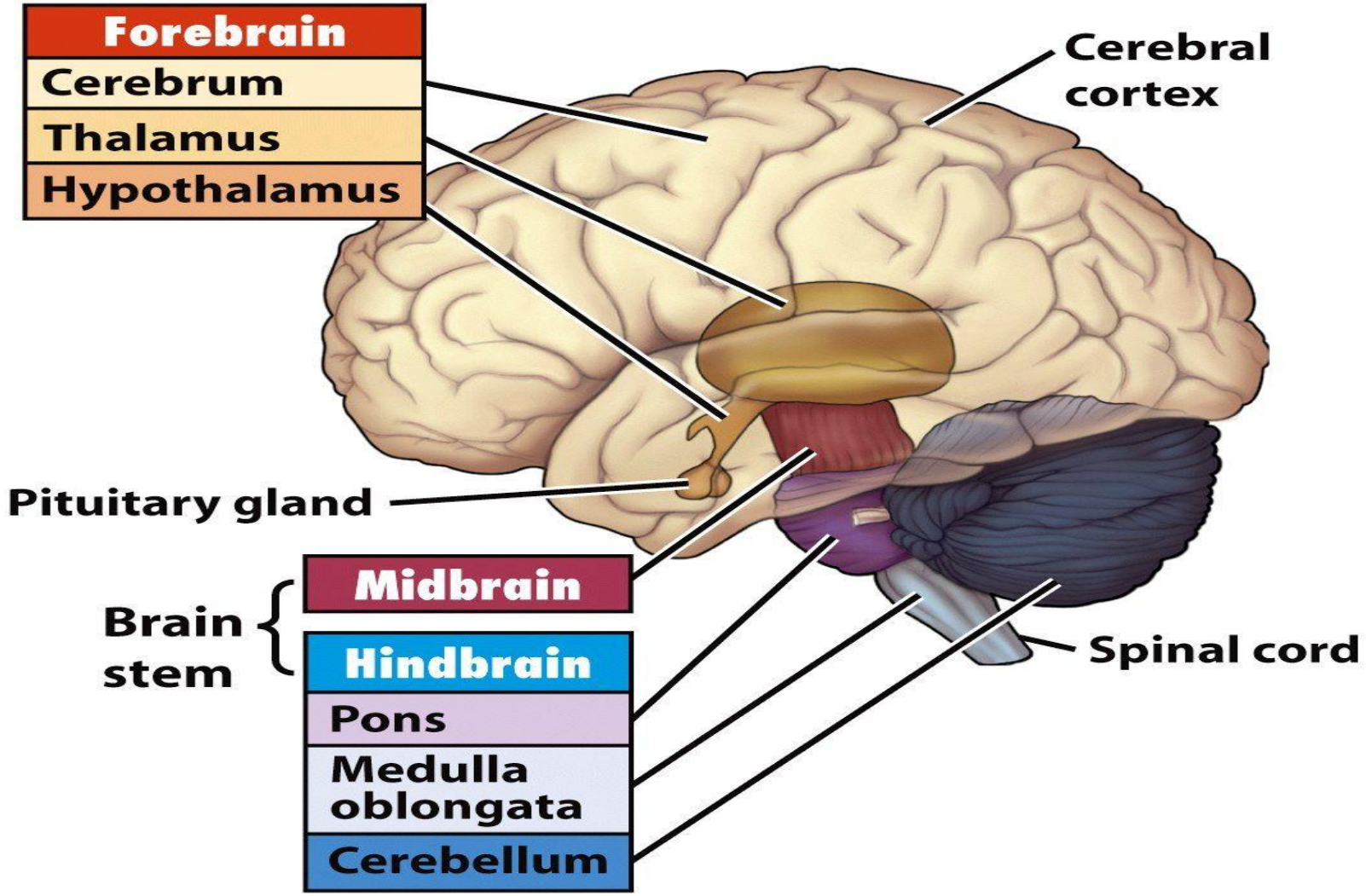
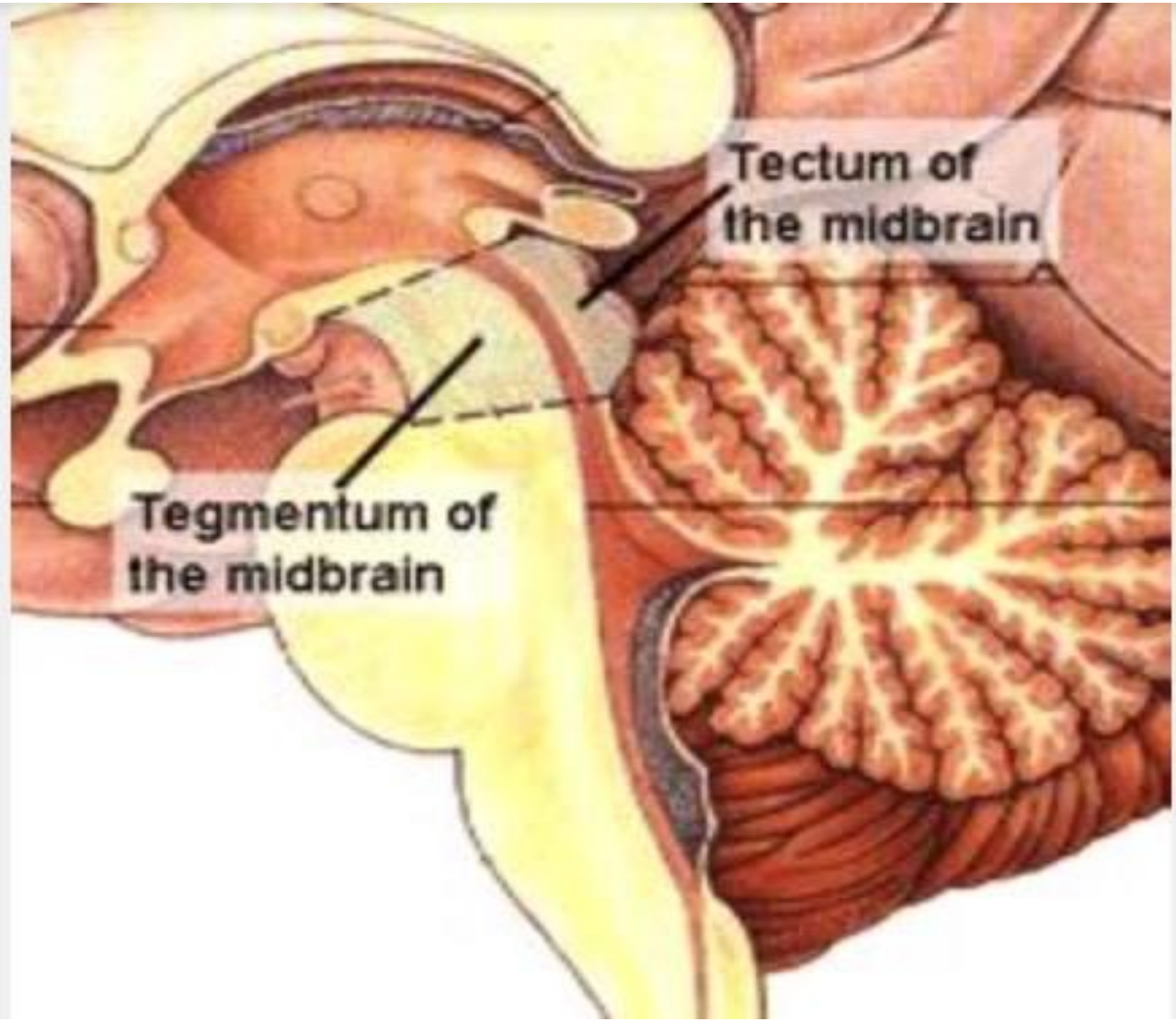


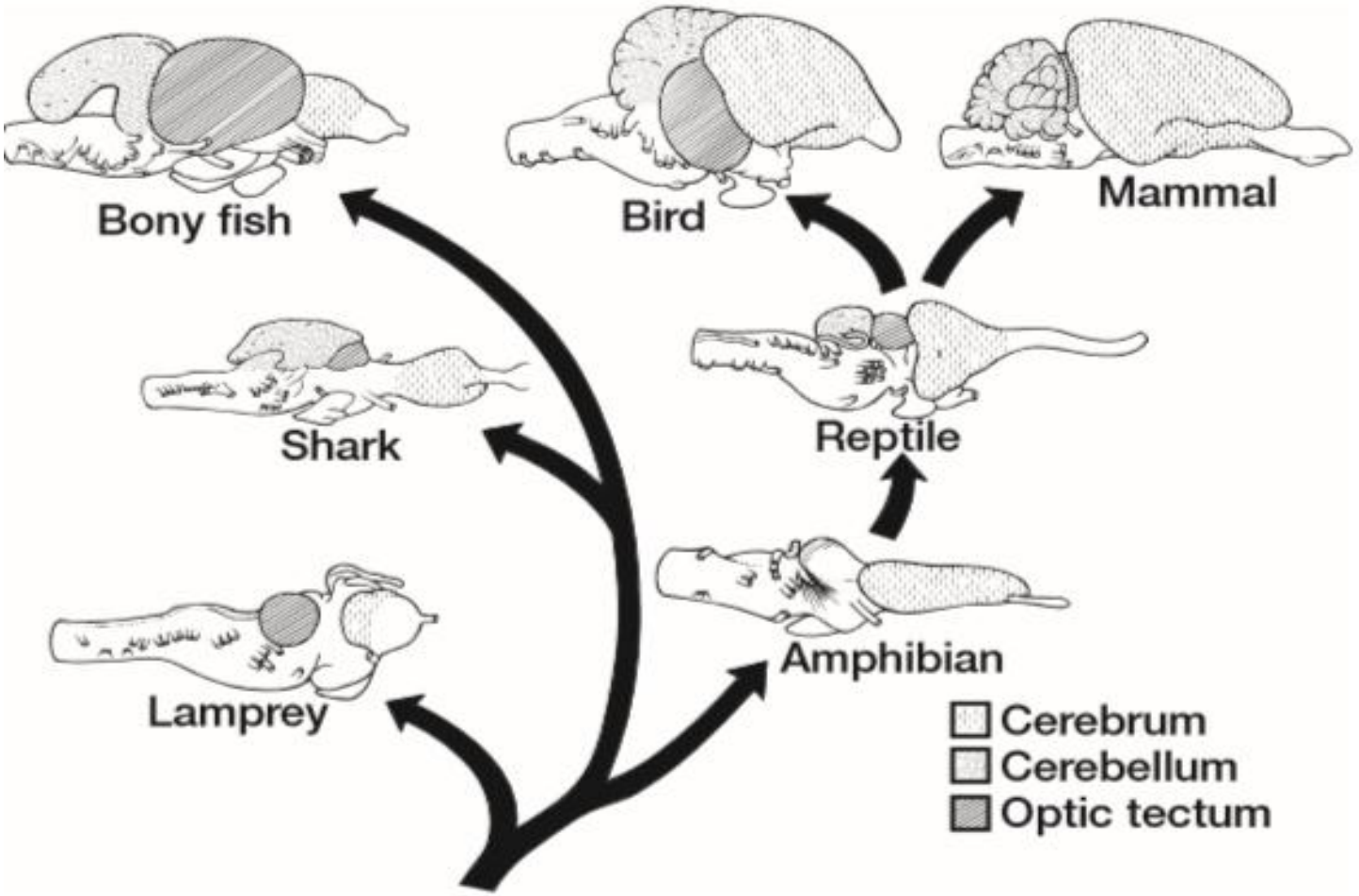

Figure 25-7 Discover Biology 3/e


Tectum of
the midbrain
Tegmentum of
the midbrain

# Phylogeny

- Independently, the **forebrain tends to enlarge** in various vertebrate groups, including hagfishes, some sharks, rays, teleost fishes, and tetrapods. Some of this is correlated with the **increased importance of olfactory** (smell) information, as occurs, for example, in hagfishes. Forebrain enlargement also accompanies increasingly **complex behaviors and muscle control**. In **amniotes**, **limb posture and body carriage** change as terrestrial modes of locomotion become predominant. The enlargement of the amniote forebrain reflects its increasing role in this mediation within the locomotor system.

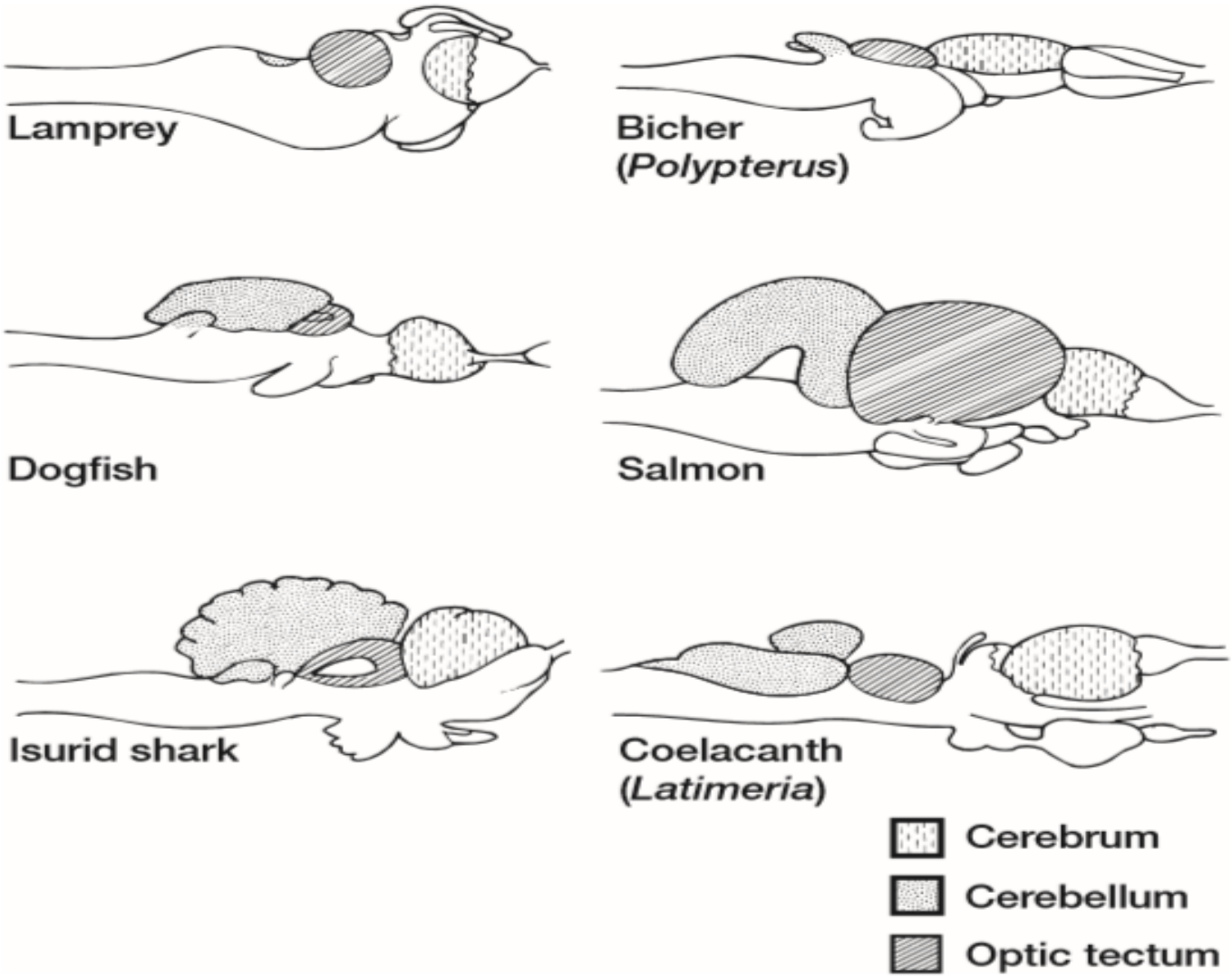
# Evolution of vertebrate brain



- In advanced **teleost fishes**, the **midbrain** tends to **enlarge** rather than the forebrain. This seems to be correlated with the **processing of visual information**, as well as the increasing importance of **sensory input from the lateral line system**, and with **greater movement** of teleosts in the three-dimensional space of their aquatic environment.
- Within these general patterns, the **brain of each species reflects the demands of information processing required by its habitat and mode of life** (figure). Cavefish, for instance, have reduced eyes and live in caves, a permanently dark subterranean environment. Correspondingly, the tectum of the midbrain, which normally receives visual input, is reduced as well.

- On the other hand, when **visual information** constitutes a large part of the brain's sensory input, as in **salmon**, the **tectum is enlarged**.
- Thus, reduction or loss of sensory input from an exteroceptor or interoceptor results in a corresponding reduction or loss of brain nuclei that receive and process this information, whereas increased sensory input leads to increased prominence of the appropriate association.

# Brain of fishes



# Form and function
# HINDBRAIN