Integumentary Systems

If an animal in the wild is exposed to ultraviolet (UV) rays, how do they protect themselves from UV exposure?
Integument and UV Rays
Integumentary System

• A external system that protects the internal organs and structures of animals
The Importance of the Integument

Protection from

• Abrasion
• Puncture
• Invasive bacteria
• desiccation
• water saturation
• UV rays
Key organ of the human integumentary system:

- The skin; made up of:
  - epidermis: a single-layered outermost tissue
  - dermis: the inner layer that contains follicles, sweat glands, muscles, nerves, and blood vessels
The integumentary system may also provide additional protection in the form of:

- Exoskeleton (found in arthropods)
- Hair or fur
- Feathers
- Scales (in reptiles and fish)
- Pigments
- Structural Coloration
Exoskeleton

- Found in arthropods such as insects and crustaceans
- A two-layered complex cuticle
- A non-cellular material secreted by the epidermis
Hair or fur

- Found in mammals
- Originates from the epidermis
- A thread-like protein composed of keratin
- Found in a range of earth-tone colors (brown, black, red, or yellow)
Feathers

- Found in birds
- Originates from the epidermis
- A highly branched structure composed of keratin
- One of the most complex integumentary systems in the biological world
Scales

• Found in reptiles, fish, butterflies and moths, the feet of birds
• Originates from the epidermis
• Small rigid plates of protein composed of keratin
• Found in a range of sizes and colors
Pigment

• Large molecules that reflect light
• The most common melanin is a group of black or brown colors
• Melanin can range from yellow and to red in color
• Produced by special cells in the epidermis
Structural Coloration

• Found in butterflies, certain beetles, and a few fish
• They can reflect light
• They give off iridescent and metallic hues
• Found in the cuticle or scale
• Composed of several stacks of plate-like structures
Why is UV protection important?

Sunlight plays a key role in synthesizing vitamin D in the human body; however, overexposure to UV rays over time can:

• Age the skin prematurely
• Cause the skin to become dry and leathery
• In high doses, it can cause genetic mutations
• Cause skin cancer
  – 1 million new cases of skin cancer occur in humans each year