

SEA SLUGS & NUDIBRANCHS

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SCIENTIFIC CLASSIFICATION

COMMON NAME:	Sea slugs, nudibranchs
KINGDOM:	Animalia
PHYLUM:	Mollusca
CLASS:	Gastropoda
SUBCLASS:	Opisthobranchia
ORDER(S):	9 orders: <ul style="list-style-type: none">• Acochlidioidea• Dephalaspidea• Runcinoidea• Sacoglossa• Anaspidea (the sea hares)• Thecosomata (shelled pteropods)• Gymnosomata (naked pteropods)• Notapidea• Nudibranchia (the "true" nudibranchs)<ul style="list-style-type: none">▪ Infraorder Anthobranchia (dorid – posterior gills)▪ Infraorder Cladobranchia (eolid – with cerata)
FAMILY:	100 families
GENUS SPECIES:	2,000 species

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FAST FACTS

DESCRIPTION: Sea slugs either appear to be shell-less or lack a shell. The shell may be a very small remainder of a primitive shell that is covered by the dorsal mantle. Without a true shell, sea slugs are very vulnerable to predators. Luckily, they have many mechanisms that protect them. Some sea slugs secrete chemicals that make them distasteful. Some may be brightly colored as a warning, or camouflaged to their surroundings. Unlike other gastropods, sea slugs show 90 degrees of torsion.

Sea slugs are characterized by having the mantle cavity and organs placed on the right side of the body. They also have a second pair of tentacles, called rhinophores, located behind the first pair. The rhinophores are usually surrounded by a collar-like fold.

Nudibranchs, which are considered the true sea slugs, display some of the most spectacular coloration and body forms. Nudibranchs lack a shell, mantle cavity, and original gill. They have numerous projections called cerata, which can be filamentous, club-shaped, branched, or clustered.

SIZE:	Sea slugs in the order Anaspidea (the sea hares) can reach up to 40 cm (1.3 ft.) in length. The largest reported was a California black sea hare, <i>Aplysia vaccaria</i> , 76 cm (2.49 ft.) in length and 15.9 kg (35 lb.) in weight.
LOCOMOTION:	A sea slug “crawls” by gliding along on its foot. The foot is a broad, flat muscle. It also adheres to rocks and other surfaces. As the sea slug moves, waves of fine muscular contractions sweep along the foot. The contractions lift the animal's foot, then returns it to the surface a little farther ahead, pulling the animal forward.
FEEDING:	Sea slugs and nudibranchs have a radula— a ribbon of curved, chitinous teeth. The radula functions to scrape or tear food particles. Nudibranchs are grazing carnivores that feed on sessile animals such as hydroids, sea anemones, soft corals, bryozoans, sponges, barnacles, and fish eggs. Each family of nudibranchs is usually restricted to one type of prey.
REPRODUCTION:	Sea hares are herbivores. Some sea slugs are either male or female, while others are hermaphrodites. Fertilization is internal and eggs are deposited in gelatinous strings, ribbons, or masses.
RESPIRATION:	In eolid nudibranchs, the dorsal respiratory projections are called cerata— fingerlike structures that contain branches of the digestive gland and cover the dorsal surface. Dorid nudibranchs do not have cerata; instead they have gills arranged around their posterior end. Sea hares have a single, folded gill used in gas exchange.
LIFE SPAN:	1 year for many nudibranchs; many species are “annual” animals, maturing and dying within a year after hatching.
RANGE:	All oceans worldwide; diversity is higher in tropical waters. California also shows great diversity for a temperate region with up to 130 species.
HABITAT:	Sea slugs can be found in various habitats including tide pools, coral reefs, and rocky, sandy, or muddy areas. Some nudibranchs are pelagic.

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FUN FACTS

1. When disturbed, sea hares (Order Anaspidea) release a defensive purple ink, which comes from the pigments of the red algae that they feed on.
2. Eolid nudibranchs have the ability to utilize their prey's nematocysts. Undischarged or immature nematocysts are carried to the cerata where they are held, but not digested. They are moved to the tips of the cerata, called cnidosacs, and used by the nudibranchs for defense. Nematocysts are replaced within 3 to 12 days.
3. To deter predators, Dorid nudibranchs secrete toxic compounds that are released from the mantle surface. The dorids may make these chemicals themselves; however some obtain the chemicals from the sponges on which they feed. The "Spanish dancer" nudibranch uses a sponge chemical for its own defense and also deposits some of it into its egg cases, helping to protect the embryos until they hatch.
4. For more information, please visit the Tide Pool Infobook.

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ECOLOGY AND CONSERVATION

Gastropod habitats, such as coral reefs, are threatened by global climate change, overfishing, and other factors. These habitats are vital to sea slug populations and changes in habitats could lead to decreases in gastropod diversity and population numbers.

Beachcombers, tidepoolers, and divers must remember not to disturb or collect any specimens that they may encounter. The removal of animals from an ecosystem may disturb ecological processes and decreased the diversity in areas that are frequently visited. Because of their specific nutritional and physiological needs, certain animals, such as sea slugs have a much better chance for survival in their natural environment than in an unregulated home aquarium.

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