

# SCSL Digital Collections

## Jellyfish

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## Jellyfish

Few marine creatures are as mysterious and intimidating as jellyfish. Though easily recognized, these animals are often misunderstood. Some bathers and beachcombers react with fear upon encountering these invertebrates, but, in fact, most jellyfish in South Carolina waters are harmless. This article was prepared to help coastal residents and vacationers learn the difference between the jellyfish to avoid and the ones you can safely ignore.

Jellyfish are members of the phylum Cnidaria, a structurally simple marine group of both fixed and mobile animals: sea anemones, sea whips, corals and hydroids are polyps that grow attached to rocks or other hard

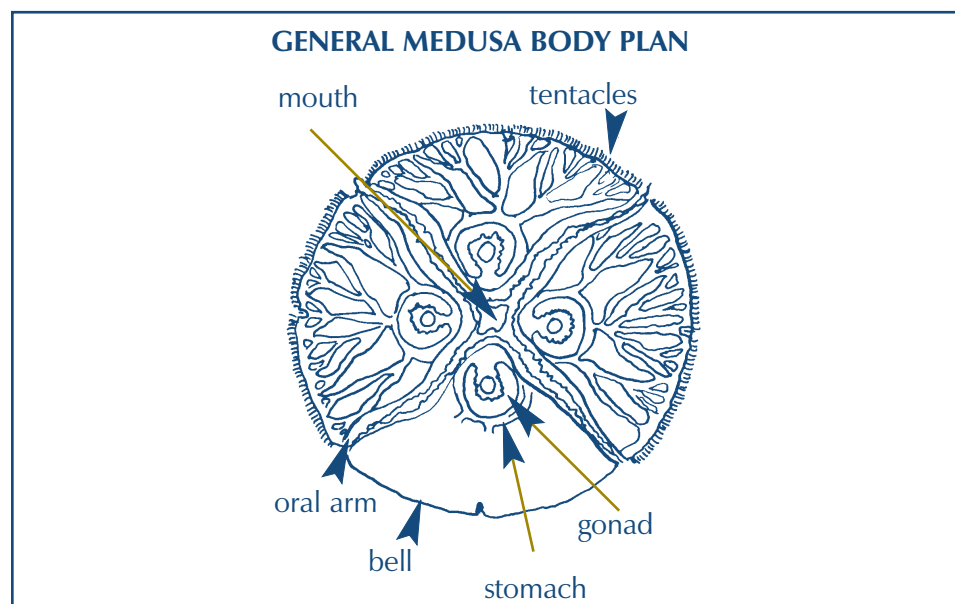
surfaces; jellyfish and colonial siphonophores like the Portuguese man-of-war are mobile (either actively swimming or subject to winds and currents). Inherent to both types of life history is their radial symmetry (body parts radiating from a central axis). This symmetry allows jellyfish to detect and respond to food or danger from any direction.

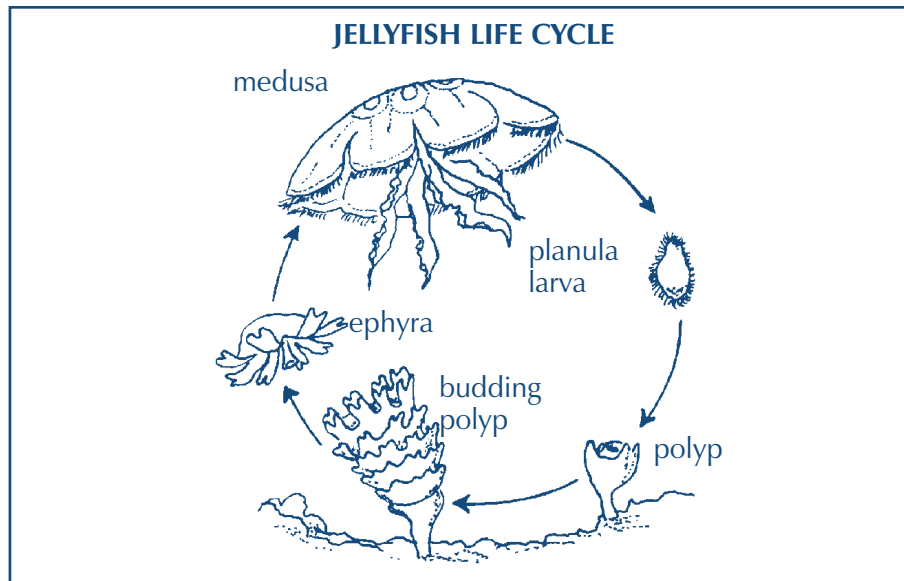
Instead of a brain, jellyfish possess an elementary nervous system, or nerve net, which consists of receptors capable of detecting light, odor and other stimuli and coordinating appropriate responses.

Jellyfish are composed of an outer layer (epidermis), which covers the external body surface, and an inner layer

(gastrodermis), which lines the gut. Between the epidermis and gastrodermis is a layer of thick elastic jellylike substance called mesoglea ("middle jelly"). Jellyfish have a simple digestive cavity, (coelenteron), which acts as a gullet, stomach and intestine, with one opening for both the mouth and anus. Four to eight oral arms are located near the mouth and are used to transport food that has been captured by the tentacles to the mouth.

Jellyfish come in a wide variety of sizes, shapes and colors. Most are semi-transparent or glassy and bell-shaped, measuring less than an inch to more than a foot across the bell, although some may reach 7 feet in diameter. The tentacles of some jellyfish can reach lengths





greater than 100 feet. Regardless of their size or shape, most jellyfish are very fragile, often containing less than 5% solid organic matter.

Jellyfish inhabit every major oceanic area of the world and are capable of withstanding a wide range of temperatures and salinities. Most live in shallow coastal waters, but a few inhabit depths of 12,000 feet!

### Life Cycles

The life cycle of a typical jellyfish is complex and involves an alteration of generations in which the animal passes through two different body forms. The dominant and conspicuous medusa is the familiar form, while the smaller polyp form is restricted to the larval stage. Jellyfish reproduce sexually, and individuals are either male or female. The reproductive organs (gonads) develop in the lining of the gut. During reproduction, the male releases sperm through its mouth into the water column. Some of the swimming sperm are swept into the mouth of the female, where fertilization occurs. Early embryonic development begins either inside the female or in brood pouches along the oral arms. Small swimming larvae (planulae) leave the mouth or brood pouches and enter the

water column. After several days the larvae attach themselves to something firm on the sea floor (rocks, shells, etc.) and gradually transform into flower-like polyps (scyphistoma). These polyps use tentacles to feed on microscopic organisms in the water column. Polyps can multiply by producing buds or cysts that separate from the first polyp and develop into new polyps. When conditions are right, fully developed polyps develop constrictions in their bodies that eventually produce a larval stage (the strobila), which resembles a stack of saucers. Each individual saucer develops into a tiny jellyfish (ephyra stage), which separates itself from the stack and becomes free swimming. In a few weeks, the ephyra will grow into an adult jellyfish (medusa), thus completing the complex life cycle. Jellyfish normally live for a few months; however, the polyp stage may be perennial.

### Locomotion

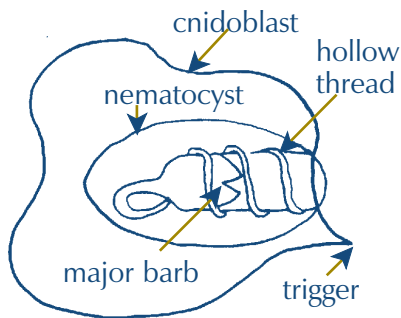
The adult jellyfish drifts in the water with limited control over its horizontal movement. It is, however, endowed with muscles that allow it to contract its bell, reducing the space under it and forcing water out through the opening. This pulsating rhythm allows for regulation of vertical

movement. Because jellyfish are sensitive to light, this vertical movement can be important. Some jellyfish, like the sea wasp, descend to deeper waters during the bright sun of the midday and surface during early morning, late afternoon and evening. Despite this ability to move vertically, jellyfish largely depend upon ocean currents, tides and wind for horizontal movement.

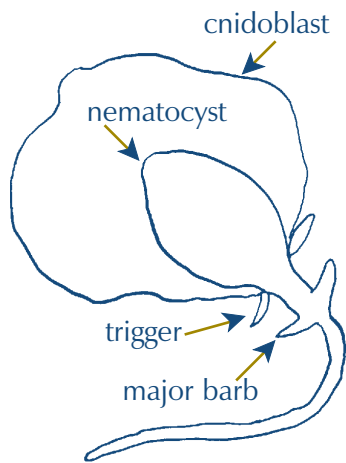
### Food

To some, jellyfish may appear to have no apparent value, but they are, in fact, a very important part of the marine food web. Jellyfish are carnivorous, feeding mostly on a variety of zooplankton, comb jellies and occasionally other jellyfish. Larger species, however, are capable of capturing and devouring large crustaceans and other marine organisms. Jellyfish are themselves preyed upon by spadefish, sunfish, sea turtles and other marine organisms. Some species, including the mushroom and cannonball jellyfish, are even considered a delicacy by humans. Pickled or semi-dried mushroom jellyfish are consumed in large quantities in Asia, where they constitute a multimillion-dollar part of the seafood business.

### NEMATOCYST BEFORE DISCHARGE



### NEMATOCYST AFTER DISCHARGE



### Venom Apparatus

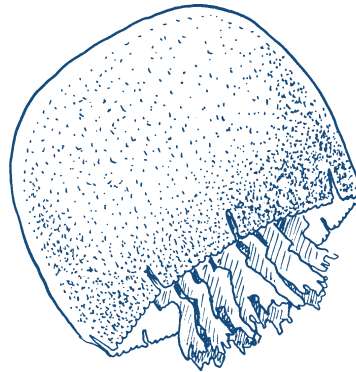
Jellyfish are equipped with a specialized venom apparatus (cnidoblast) for defense and feeding. A capsule (nematocyst) inside the cnidoblast contains a trigger and a stinging structure. The stinging structure varies according to species but generally consists of a hollow coiled thread with barbs lining its length. Nematocysts are concentrated on the tentacles or oral arms. A single tentacle can have hundreds or thousands of nematocysts embedded in the epidermis. Nematocysts are activated when tentacles make contact with an object. Pressure within the nematocyst forces the stinging thread to rapidly uncoil. The thousands of nematocysts act as small harpoons, firing into prey, injecting paralyzing toxins.

Stings usually paralyze or kill only small creatures (fish, small crustaceans), but some jellyfish

are harmful to humans. Although jellyfish do not “attack” humans, swimmers and beachcombers can be stung when they come into contact with the jellyfish tentacles with functional nematocysts. The severity of the sting depends on the species of jellyfish, the penetrating power of the nematocyst, the thickness of exposed skin of the victim and the sensitivity of the victim to the venom. The majority of stings from jellyfish occur in tropical and warm temperate waters. Most species off the southeastern coast are capable of inflicting only mild stings that result in minor discomfort.

### Local Jellyfish

Although most jellyfish that inhabit South Carolina waters are harmless to humans, a few require caution. Learning how to identify the different species can help you decide which ones can be safely ignored.



**CANNONBALL JELLY**

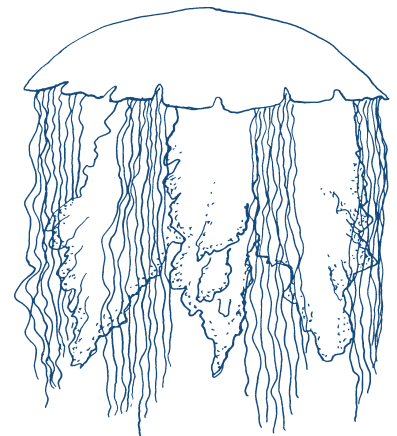
### Cannonball Jelly

(*Stomolophus meleagris*)

(Also known as the jellyball, and the cabbage head jelly)

Cannonball jellyfish are the most common in our area. During the summer and fall, large numbers of this species appear near the coast and in the mouths of estuaries. Cannonball jellies can be easily identified by their round white bells that are bordered below by a brown or purple band of pigment. They have no tentacles, but they do have a firm, chunky feeding

apparatus formed by the joining of the oral arms. Cannonballs rarely grow larger than 8-10 inches in diameter. They are considered to be pests by commercial trawl fishermen because they clog and damage nets and slow down sorting and trawl times, although turtle excluder devices in trawl nets somewhat alleviate that problem. Fortunately, this species is one of the least venomous of our jellyfish.



**LION'S MANE**

### Lion's Mane

(*Cyanea capillata*)

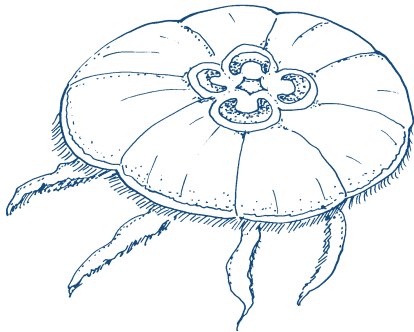
Also known as the winter jelly, the lion's mane typically appears during colder months of the year. The bell, measuring 6-8 inches, is saucer-shaped with reddish-brown oral arms and eight clusters of tentacles hanging underneath. *Cyanea* are generally considered moderate stingers. Symptoms are similar to those of the moon jelly but, usually more intense. Pain is relatively mild and often described as burning rather than stinging.

### Mushroom Jelly

(*Rhopilema verrilli*)

The mushroom jelly is often mistaken for the cannonball jelly, but it differs in many ways. The larger mushroom jelly, growing 10-20 inches in diameter, lacks the brown band associated with the cannonball and is much flatter and softer. Like the cannonball, the mushroom jelly has no tentacles

and chunky feeding apparatus; however, it possesses long finger-like appendages hanging from the feeding apparatus. This species is also considered a pest by commercial fishermen, but they are much less of a problem than cannonball jellies. The mushroom jelly does not represent a hazard to humans.



### MOON JELLY

#### Southern Moon Jelly (*Aurelia marginalis*)

Probably the most widely recognized jellyfish, the moon jelly is relatively infrequent in South Carolina waters. It has a transparent, saucer-shaped bell and is easily identified by the four pink horseshoe-shaped gonads visible through the bell. It typically reaches 6-8 inches in diameter, but some are known to exceed 20 inches. Recent evidence suggests that there are several similar-looking species of moon jellies within a group of species that were once called the moon jelly, *Aurelia aurita*. The southern populations, including those in South Carolina, are now considered to be a distinct species (*A. marginalis*). The moon jelly is only slightly venomous. Contact can produce symptoms from immediate prickly sensations to mild burning. Pain is usually restricted to immediate area of contact.

#### Sea Nettle (*Chrysaora quinquecirrha*)

The sea nettle is frequently observed in South Carolina waters

during summer months. This jellyfish is saucer-shaped with brown or red pigments, usually 6-8 inches in diameter. Four oral arms and long marginal tentacles hang from the bell and can extend several feet. Considered moderate to severe, symptoms from sea nettle stings are similar to those of the lion's mane. Given that they are most abundant in the summer, when the greatest number of people are likely to be swimming in the ocean, this species is thought to be responsible for most of the jellyfish stings that occur in South Carolina. Exercise caution if sea nettles are observed in the water, and do not swim if large numbers are present.

#### Sea Wasp

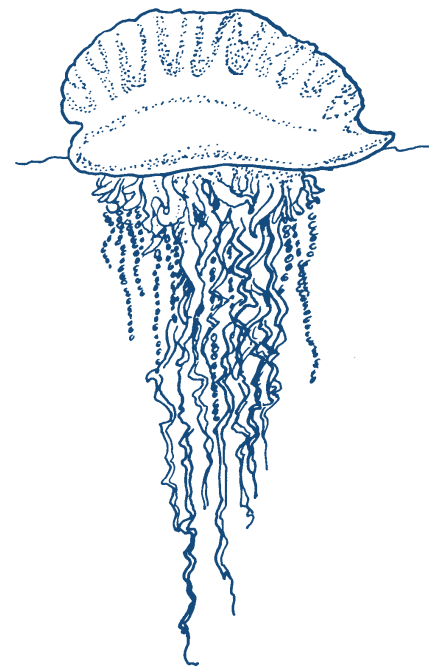
(*Chiropsalmus quadumanus*)

Known as the box jelly because of its cube-shaped bell, the sea wasp is the most venomous jellyfish inhabiting our waters. Their potent sting can cause severe dermatitis and may even require hospitalization. Sea wasps are strong, graceful swimmers reaching 5-6 inches in diameter and 4-6 inches in height. Several long tentacles hang from the four corners of the cube.

A similar species, the four-tentacled *Tamoya haplonema*, also occurs in our waters.



SEA NETTLE



PORTUGUESE MAN-OF-WAR

#### Portuguese Man-of-War (*Physalia physalis*)

Although a member of the phylum Cnidaria, the Portuguese man-of-war is not a "true" jellyfish. These animals consist of a complex colony of individual members, including a float, modified feeding polyps and reproductive medusae.

*Physalia* typically inhabit the warm waters of the tropics, subtropics and Gulf Stream. Propelled by wind and ocean currents, they sometimes drift into nearshore waters of South Carolina. Though they infrequently visit our coast, swimmers should learn to identify these highly venomous creatures.

The gas-filled float of the man-of-war is purple-blue and can reach lengths of 10 inches. Under the float, tentacles equipped with thousands of nematocysts hang from the feeding polyps extending as much as 30 to 60 feet.

The man-of-war can inflict extremely painful stings. Symptoms include severe shooting pain described as a shock-like sensation, and intense joint and muscle pain. Pain may be accompanied by headaches, shock, collapse,



faintness, hysteria, chills, fever, nausea and vomiting.

Initial contact with *Physalia* may result in only a small number of stings. However, efforts to escape from the tentacles may further discharge nematocysts and intensify stings. Care should be taken when removing the adhering tentacles. Severe stings can occur even when the animal is beached or dead. Another jellyfish that could potentially be confused with the man-o-war is the *Vellela vellela*, which has the common name of "by-the-wind-sailor." This relatively small (4 inches) colonial hydrozoan has a bright blue bladder. It is typically oceanic but may be blown into coastal waters. This species is of little threat to humans, causing perhaps a mild tingling. Given the significant danger of *Physalia*, all jellyfish having a blue float should be considered dangerous unless specified by an expert.

### **Treatment of Sting**

Primary first aid for any jellyfish sting should be to minimize the number of nematocysts discharging into the skin and to reduce the harmful effects of the venom.

If stung by a jellyfish, the victim should carefully remove the tentacles that adhere to the skin by using sand, clothing, towels, seaweed or other available materials. As long as tentacles remain on the skin, they will continue to discharge venom.

A variety of substances have been used to reduce the effects of jellyfish stings. Meat tenderizer, sugar, vinegar, plant juices and sodium bicarbonate have all been used with varying degrees of success. Methylated spirits and other forms of alcohol formerly recommended for inhibiting stinging cells actually stimulate them and may increase pain and cause severe skin reactions. Picric acid and human urine also cause

a discharge of nematocysts and should not be used.

Victims of serious stings should make every effort to get out of the water as soon as possible to avoid drowning. If swelling and pain from more serious stings persist, prompt medical attention should be sought. Recovery periods can vary from several minutes to several weeks.

The following information should not be regarded as informed medical advice. Courses of treatment for jellyfish stings vary among medical practitioners, and recommended treatment changes over time. Primary care should be followed by qualified medical examination in all but mild cases.

### **Prevention**

Care should be taken when swimming in areas where dangerous jellies are known to exist or when an abundance of jellies of any type is present. Keep in mind that tentacles of some species may trail a great distance from the body of the organism and should be given lots of room. Stings, resulting from remnants of damaged tentacles, can occur in waters after heavy storms. Rubber skin-diving suits offer protection against most contact.

Be careful when investigating jellyfish that have washed ashore. Although they may be dead, they may still be capable of inflicting stings. Remember to take precautions when removing tentacles after contact or additional stings may result.

### **Saltwater Fishing Conservation & Ethics**

Although most people once considered ocean resources to be unlimited, recent rapid declines in the populations of many commercial and recreational species have demonstrated the opposite.

Numerous types of saltwater game fish now are being over-harvested, and other species will face a similar fate unless all anglers practice wise conservation and adopt an ethical approach to fishing.

Size and catch limits, seasons and gear restrictions should be adhered to strictly. These regulations change from time to time as managers learn more about fish life histories and how to provide angling opportunities without depleting stocks.

The challenge of catching, not killing, fish provides anglers with the excitement and the reward of fishing. Undersized fish or fish over the limit should be released to ensure the future of fish populations. The number of saltwater finfish tagged and released annually in South Carolina has increased significantly in recent years as more and more fishermen take up this practice, providing information on growth and movement of fish as well as conserving resources.

Saltwater fishermen can further contribute to conservation by purchasing a Saltwater Recreational Fishing License, which is required to fish from a private boat or gather shellfish in South Carolina's salt waters. Funds generated by the sale of licenses must be spent on programs that directly benefit saltwater fish, shellfish and fishermen. Help ensure the outdoor enjoyment of future generations by strictly adhering to all rules, regulations, seasons, catch limits and size limits, and through the catch and release of saltwater game fish.

This publication was made possible in part with funds from the sale of the South Carolina Saltwater Recreational Fishing License and the U.S. Fish and Wildlife Service Sportfish Restoration Fund. The South Carolina Department of Natural Resources publishes an annual Rules and Regulations booklet that lists all saltwater fishing regulations. Have an enjoyable fishing trip by reading these requirements before you fish.

**Author credentials:** J. David Whitaker, Dr. Rachael King and David Knott, Marine Resources Division

### **DNR Mission Statement**

Our mission is to serve as the principal advocate for and steward of South Carolina's natural resources.

### **DNR Vision Statement**

Our vision for South Carolina is an enhanced quality of life for present and future generations through improved understanding, wise use, and safe enjoyment of healthy, diverse, sustainable and accessible natural resources.

Our vision for the DNR is to be a trusted and respected leader in natural resources protection and management, by consistently making wise and balanced decisions for the benefit of the state's natural resources and its people.



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