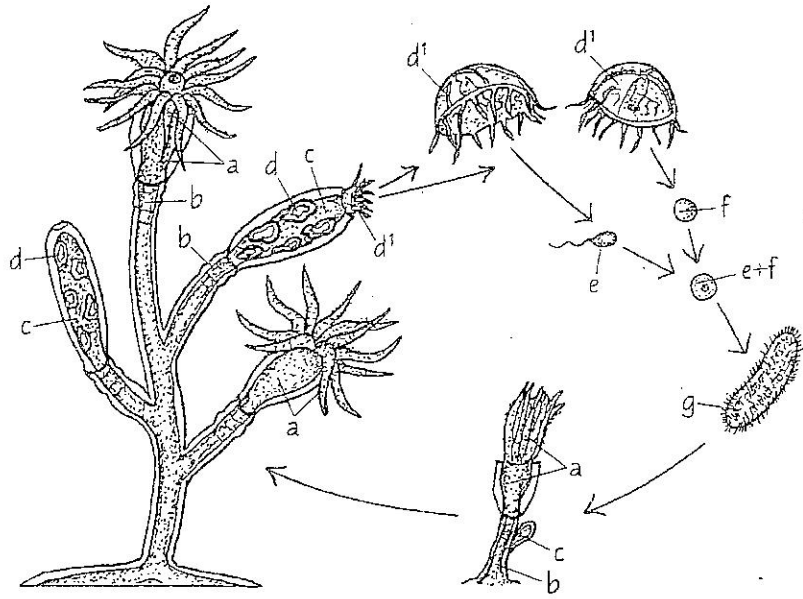
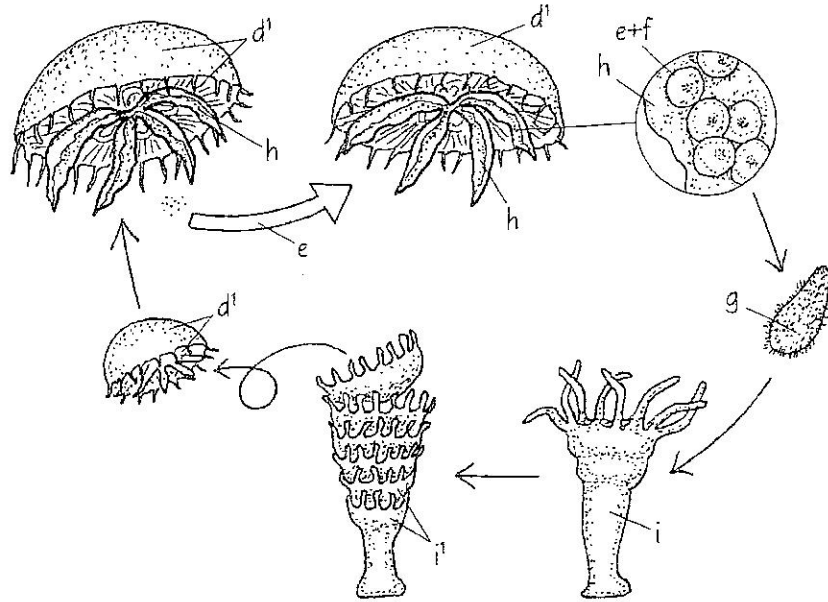


# CNIDARIAN LIFE CYCLES

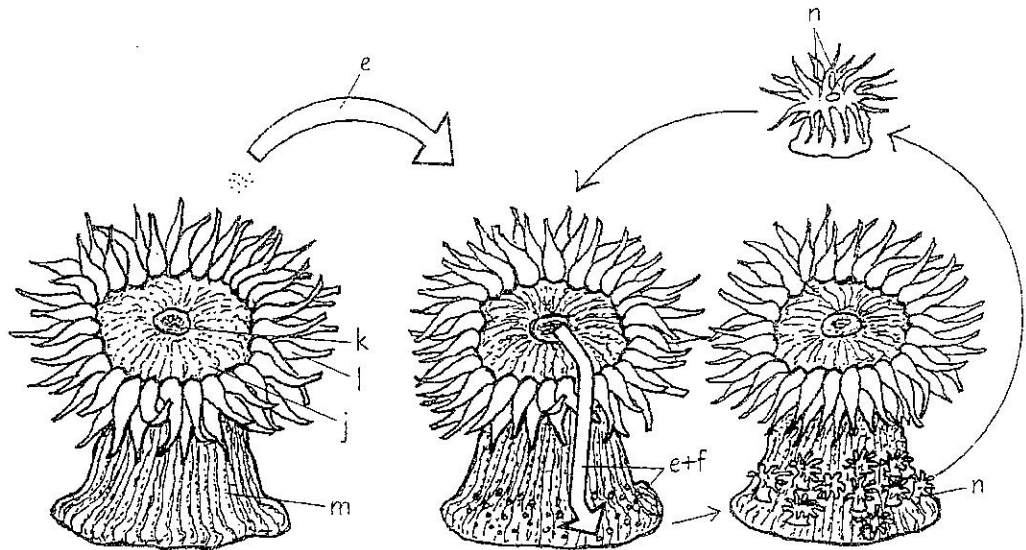
OBELIA\*  
COLONY\*  
HYDRANTH<sub>a</sub>  
STALK<sub>b</sub>  
GONZOZOID<sub>c</sub>  
MEDUSA BUD<sub>d</sub>  
MEDUSA<sub>d'</sub>  
SPERM<sub>e</sub>  
EGG<sub>f</sub>  
ZYGOTE<sub>e+f</sub>  
PLANULA<sub>g</sub>



AURELIA\*  
MEDUSA<sub>d'</sub>  
ORAL ARM<sub>h</sub>  
SPERM<sub>e</sub>  
ZYGOTE<sub>e+f</sub>  
PLANULA<sub>g</sub>  
SCYPHISTOMA<sub>i</sub>  
STROBILA<sub>i'</sub>



EPIACTIS\*  
ADULT\*  
ORAL DISC<sub>j</sub>  
MOUTH<sub>k</sub>  
TENTACLES<sub>l</sub>  
COLUMN<sub>m</sub>  
SPERM<sub>e</sub>  
ZYGOTE<sub>e+f</sub>  
JUVENILE<sub>n</sub>



## REPRODUCTION IN CNIDARIANS: CNIDARIAN LIFE CYCLES

Cnidarians (also known as coelenterates) exhibit two basic body forms, or morphs: the polyp and the medusa (Plates 23, 24). In general, polyps are sessile and reproduce by asexual methods (budding), while the medusae are free-floating and reproduce by sexual means. (There are many exceptions and modifications to this basic plan.) Both morphs occur in the life cycles of some cnidarians, while others lack one or the other form. In addition, most cnidarian life cycles involve both sexual and asexual reproduction. This plate discusses the life cycles of a representative of each of the classes of the phylum Cnidaria.

Begin with the life cycle of *Obelia*. First color the animal colony on the left, then follow the arrows through the cycle as it is discussed. The medusae are exaggerated in size, as are the sperm, eggs, and planula larva. Note that the entire colony is surrounded by a clear, non-living covering that is not colored.

The feeding polyp stage of the class Hydrozoa (here represented by *Obelia*) is called a *hydranth*. These hydranths occur singly in some species, but more commonly as colonies of asexually produced individuals connected by a branching *stalk* which contains their common gut tube or coelenteron (Plate 23). An *Obelia* colony resembles a small bushy alga to the naked eye, but microscopic examination reveals the tiny (0.2 mm, 0.008 in) hydranths along the colony's branches. At certain times of the year, one can find reproductive polyps or *gonozooids* interspersed among the hydranths. Visible in the illustration are numerous *medusa buds* forming on the gonozooids. These are produced asexually and released as tiny free-swimming *medusae*. Each medusa is either male or female, and as they mature, each produces either *sperm* or *eggs*, which unite to form a *zygote*. The zygote develops into a free-swimming *planula* larva, which eventually settles on a firm substratum and becomes a small hydranth that begins a new colony by asexual budding.

Color the *Aurelia* life cycle, beginning with the male (on the left) and female adult medusae. Continue as each stage is discussed.

In the common jellyfish *Aurelia* (class Scyphozoa), the medusa is the largest and dominant stage of the life cycle. Medusae 10 to 20 cm (4–8 in) in diameter often aggregate in very high numbers in the coastal waters of North America. The sexes are separate in *Aurelia*, and the female broods the zygotes on her *oral arms* until they reach a free-swimming planula stage. The planula swims for a short while, until settling on a solid substratum, whereupon it grows into the polyp stage called a *scyphistoma*. The scyphistoma feeds for some time in typical polyp fashion on small zooplankton and may produce other scyphistomas asexually. Eventually, each polyp begins to partition its body into a stack of tiny potential medusae. This process is called *strobilation*, and the polyp is now called a *strobila*. One at a time, these asexually produced (budded) young medusae are released, swim away, and mature to begin the cycle once again.

Color the life cycle of *Epiactis*. The arrow (e+f) indicates the transfer of the zygotes from the female's mouth to the base of her column.

Sea anemones and corals (class Anthozoa) have only the polyp stage in their life cycle, but most are still capable of both sexual and asexual reproduction. The small sea anemone illustrated here, *Epiactis*, is a common species on the west coast of North America, and has been subject to some past misunderstanding. The adults of this anemone are often found with many small *juveniles* attached to the base of their *columns*. Since anemones commonly reproduce asexually, it was assumed that these young individuals were the result of budding by the adult, hence the vernacular name "proliferating anemone." The faulty assumption was exposed some years ago by Dr. Daphne Fautin, who studied these anemones while at the University of California, Berkeley. Based on her work, it is now known that adult *Epiactis* retain their zygotes within their gut cavity where they are brooded for some time. The embryos eventually emerge from the anemone's mouth, crawl to the base of the column, and attach. Here juveniles grow to about 4 mm (0.16 in) in basal diameter, before crawling away to establish their own independent adult life.

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

### Cnidarian Life Cycles

1. What are the two basic body forms that cnidarians exhibit?
2. Which body form is generally sessile and reproduces asexually?
3. Which body form is generally free floating and reproduces sexually?
4. What is a hydranth?
5. What are gonozooids?
6. To which class does the common jellyfish, *Aurelia*, belong?
7. According to the pictures, which cnidarian has ONLY a polyp phase and NO medusa phase?