SET 85

AURELIA - THE LIFE CYCLE

INTRODUCTION

Aurelia is a jellyfish whose body resembles a shallow bell or an umbrella with a fringe of short tentacles (see the diagram on the back of this set). The dome usually ranges from three to twelve inches across. Unusually large individuals may reach a diameter of two feet. Hanging down from underneath the dome are four trailing lobes equipped with stinging cells.

The life cycle of *Aurelia* is most interesting and unusual. It follows the pattern known as "alternation of generation." In this pattern, a generation that reproduces sexually produces a completely different form of organism that has no sex. This asexual form, in turn produces the sexual form once again, and the cycle goes on and on.

This set illustrates the strange changes that occur in the life of this jellyfish as it alternates between sexual and asexual reproduction. Keep in mind, in this series of slides, no matter how different they may seem, the strange creatures shown are all forms of the *Aurelia* organism.

To understand the life cycle of this animal, it is necessary to study some of its tiny structures under low-power magnification.

The magnification given, for example, Microslide 1 - Planula Stage (120x), means that the microscope was set at that power when the photograph was taken.

1 PLANULA STAGE - w.m. Stained (120x)

These are three baby *Aurelias* in the planula stage. Each planula is a free-floating larva that is less than 1/50 of an inch long. The planula is completely covered with beating cilia so fine they are difficult to see in this slide.

Mature *Aurelias* (see the illustration on the back of this set) are either males with testes or females with ovaries. The males release their sperm into the water, but the females retain their eggs. Sperm enter the female's body by way of her mouth and fertilize the eggs inside her body cavity. Once fertilized, the eggs leave through the mouth. After further development they reach the stage shown on this slide. *Do these baby* Aurelias *look anything like the adult jellyfish that produced them?*

By Philip Goldstein

2 HYDROID FORM - w.m. Stained (17x)

After a relatively short life of freedom, the planula (Microslide 1) attaches itself to a rock or seaweed and settles down for a period of growth and change. Eventually it grows into the form shown on this slide. Including the tentacles, the hydroid, or polyp, form of *Aurelia* may be 1/8 inch long. *Would you ever suspect that it is the child of a jellyfish? Doesn't it look like a hydra?* Note the attachment point at the bottom, the hollow tubular body, the mouth at the top hidden in a crown of long tentacles. *Can you find any evidence of stinging cells on the tentacles?*

3 BUDDING POLYP - w.m. Stained (17x)

The *Aurelia* may live for several months in the polyp form. Meanwhile, it feeds like the ordinary hydra and produces new polyps by budding. *What evidence can you see on this slide that the budding polyp was ripped away from its attachment point? How many individuals are there in this group? Which is the youngest? How do you know?*

4 CONSTRICTIONS IN POLYP - w.m. Stained (17x)

In the Fall or Winter, the polyps undergo still another change. *Examine the polyp on this slide. Compare it with the polyp on slide 2. What change has occurred?* Biologists compare this stage of the *Aurelia* polyp with a pile of saucers stacked one inside the other. *How many such "saucers" can you count in the pile?*

5 STROBILIZATION - w.m. Stained (17x)

Microslides 4 and 5 illustrate a peculiar method of asexual reproduction known as **strobilization**. This process produces a series of horizontal constrictions that cut the *Aurelia* polyp into small segments. These segments still look like tiny saucers stacked one inside the other. You will learn the fate of these "saucers" when you examine Microslide 6. *But first count the "saucers" on Microslides 4 and 5. Note what happened to the tentacles that were present on Microslide 4. How can you tell that Microslide 5 shows a later stage in development than Microslide 4?*

6 EPHYRA STAGE - w.m. Stained (25x)

This exquisitely delicate, star-shaped creature is called an *ephyra. Do you agree that the tiny ephyra is an excellent example of radial symmetry?*

After a time the "saucers" formed by the polyp (Microslides 5 and 6) began to separate. The top one came loose first, then the next, and the next, and so on. Each little saucer is hardly 1/16" across, but it swam away as a separate individual ephyra.

This ephyra still has a lot of growing to do before it becomes an adult *Aurelia*, but many of the adult organs already show. You can look into the square mouth (M) that leads into the hollow body cavity. Notice how the corners of the mouth are beginning to change into the lobes that will eventually trail downward. Early stages of the four gonads (G) are also visible, but we cannot tell if they are testes or ovaries. Sense organs (S) are located on each of the eight points of the symmetrical ephyra.

7 SENSE ORGAN - w.m. Stained (52x)

Each point of the symmetrical ephyra is divided into two lobes (L) that control the pulsing rhythm of the swimming movements. A complex sense organ (S) on Microslide 6 is also present.

Most of the sense organ is covered by a hood (H). A pigmented eye spot, sensitive to light (E), and a balance organ (B) are partly visible, but two pits sensitive to chemicals in the water are completely hidden underneath the balance organ.

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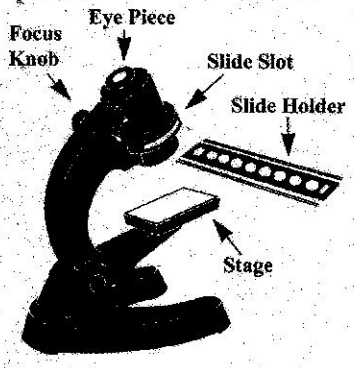
MICRO-SLIDE-VIEWER™



Face the Micro-Slide-Viewer so that as much light as possible falls on the white Stage.

Insert the numbered end of the Slide Holder into the Slide Slot of your Viewer, moving it from your right to left.

View with our eye close to the Eye Piece.

With Slide No. 1 in place, focus by turning the Focus Knob.

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8 YOUNG JELLYFISH - w.m. Stained (13x)

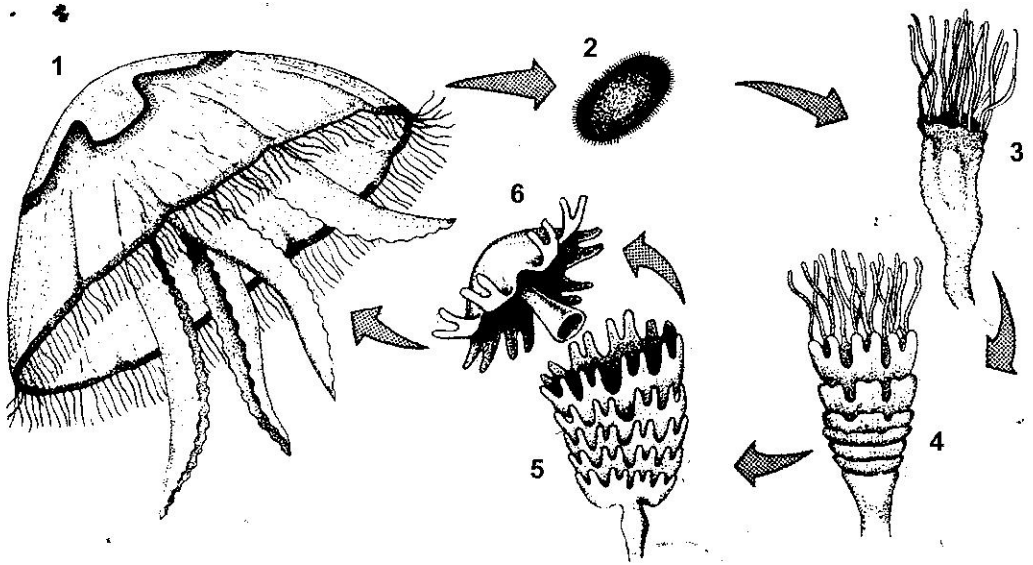
This Microslide shows an ephyra that has grown to about 1/4 of an inch across. At last it is beginning to take on the appearance of a jellyfish like the original parent.

It already swims about in the typical rhythmic, pulsing manner of the adult *Aurelia*. After further growth it will mature into either a male or female. Sexual reproduction will occur, and the whole cycle will begin again.

The entire life of Aurelia is summarized in the diagram below. Look back at the eight Microslides, and try to fit each one into its proper place in the diagram.

Can you now answer the following questions?

1. *Which parts of Aurelia's life represent the sexual generation?*
2. *Which parts of Aurelia's life represent the asexual generation?*
3. *How many different forms of asexual reproduction are represented in Aurelia's life?*



AURELIA LIFE CYCLE

1. Mature Aurelia, 2. Planula, 3. Hydroid Form (Polyp), 4. Constrictions in Polyp, 5. Strobilization, 6. Ephyra