

How does a fish embryo develop?

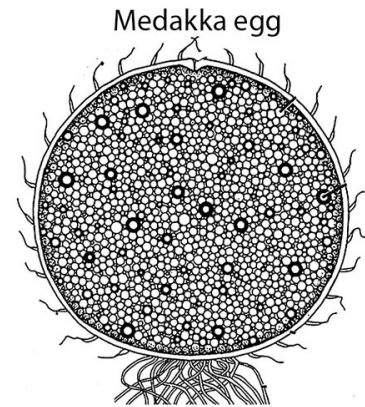
The Japanese rice fish (*Oryzias latipes*) also known as medaka and Japanese killifish, is a small fish (3.6cm or 1.4 in) native to East Asia. Medaka likes to live in rice paddies, marshes, slow-moving streams and tide pools. Their favorite food is mosquito larvae. It has been a popular pet since the 17th century because of its hardiness and nice coloration. Its coloration varies from creamy-white to orange. Fluorescent Medaka have been developed by genetic manipulation, however, they are not for sale in the US.



Spawning in Medaka usually occurs at about dawn. A very brief courtship and spreading of the milt (sperm) by the male usually occurs just as the females are shedding the eggs. The female lays approximately 10-30 eggs at one time. The eggs are perfectly transparent and hang from the mother's body for several hours. In nature they brush off on rocks or vegetation where they continue to develop. A healthy female can produce 3000 eggs over the course of one breeding season.

Medaka has several characteristics that make it an excellent organism for biological research. It has a short generation time (from adult to egg takes 7 weeks), has a relatively small genome size (800 mega base pairs), can withstand a wide range of temperatures and can be easily reared in the lab.

In this investigation we will follow a fertilized medaka egg (embryo) through development. This is an amazing process that not everybody has the chance to witness. What you will see is very similar to any vertebrate development, and to your own early development—this is similar to your own development inside your mother's womb. You will keep a journal with your observations of the changes that occur to the embryo. As always, keep a record of the questions that come to your mind.



Name: _____ Period: _____ Date: _____

Procedure:

1. If possible, try to observe the courtship and spawning behavior of the Medaka. Can you locate the egg clusters hanging from the female? The female's dorsal fin is smaller, more rounded, and has no notch, while the male has a larger, deeply notched dorsal fin.
2. Each morning the eggs will be collected and placed in labeled petri dishes for your observation.
3. Extreme care must be taken to not contaminate the egg rearing solution. If you need to touch the eggs use only the special forceps provided.
4. You can make your observations with the dissecting microscope using sub-stage light (although for some structures reflected light is better) and with the compound microscope using LOW power.
5. The egg contains yolk that has small oil droplets near its surface that can be easily confused with the cells of the developing embryo. The embryo is located at the opposite pole from the oil droplets.
6. You will make observations daily or every other day during the development of the embryo. In your development journal include the date of observation, the dish number, make a sketch of where the embryo is at, the changes that occur, and try to recognize the structures (heart, eyes, blood vessels, etc) that appear. The goal is to come up with the different stages of development.
7. Write down the questions that come up to your mind while observing the development of medaka.

