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## **Importance**

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|  | **Food Source**  Sea urchins are not only important for their ecological roles in their environment, but are found to be very beneficial to humans as well. Have you ever tasted a sea urchin before? I have not, but to my understanding are found as a delicacy in some parts of the world-mainly in Japan. The gonads (little soft yellow parts) are arranged in relatively small bowls, and served to the people. During one of my visits to the tide pools, I ran into a man that was collecting muscles, and oysters. He was wondering what I was doing, and when I explained to him I was researching sea urchins, he decided to show me a little bit about them. We walked a ways to a certain section along the coast. |

The way over was silent. When we arrived at his spot, he took his metal tool, pried one out of its crevice. I thought he was going to show me the different parts to the urchin, and give me a chance to take a picture of the underside, but before I knew it, then next words that came out of his mouth were, "I hope you aren't squirmish". He then plopped the urchin down on the rock, and smacked it open. He pulled out the yellow insides, and ate it. He offered me one, but I declined. He then repeated the process a couple of times, throwing out the small ones. What an experience!!

**Experimental Value**

Besides food, for 100 years, developmental biologists have valued the sea urchin as an experimental model organism. MBL Investigators use the sea urchin as a model for studies on the basic mechanisms of development and cell division. Such studies have helped us better understand reproduction and diseases like cancer.

Sea urchins are "solution feeders" meaning that they absorb most of the nutrients they need directly from the seawater in which they live. Because they are sensitive to dissolved pollutants (especially heavy metals) and other irritating substances, sea urchins are also popular laboratory animals for toxocologic studies.

Since the turn of the century, the sea urchins embryo has been used to establish the chromosome theory of heredity, the description of centrosomes, parthenogenesis, and fertilization. Work within the last 30 years established such important phenomena as stable mRNA and translocation control, isolation and characterization of the mitotic apparatus, and the realization that the major structural proteins of the mitotic apparatus are microtubules. Sea urchin studies provided the first evidence of actin non-muscle cells.

Currently, studies with sea urchins are important for understanding fertilization, cell division, and gastrulation. Many cell biological phenomena such as exocytosis, endocytosis, cell surface receptors, and the control of cell growth have involved studies with sea urchins.

Recent studies have demonstrated that the flagellar apparatus of the sea urchin sperm obtains its energy from a unique phosphocreatine cycle. Along with this, the study of sperm has been taken to space, by using sea urchin's sperm to see how it reacts in space. The sea urchin egg also provided the first demonstration of the amiloride-sensitive NA+ -H+ exchanger, which is an important component of pH regulation in all cells and is a special target for growth factor action in mammalian cells.

The sea urchin embryo has been used to determine how the genome is differentially transcribed during development. This system has several experimental advantages; a gene transfer system has been accomplished; there is a large collection of cloned genes; there are gene markers for every cell type; and a large quantity of synchronized embryos can be used.