



BACKGROUND INFORMATION

Just six hours after fertilization, a sand dollar (*Dendraster excentricus*) egg has become a busily dividing embryo. Sand dollars are echinoderms, a group of invertebrates related to vertebrates like fish and humans. The embryo in the image is in an early stage of development, consisting of nearly 128 cells formed into a hollow, fluid-filled ball called a blastula. Certain groups of cells in the blastula are synchronized to divide at the same time through mitosis, a type of cell division.

Most of the cells in this blastula are midway through their eighth division, as indicated by the chromosomes aligned in the center of each cell. However, a small cluster of cells in the upper-right corner of the image are on a different schedule. The four smallest cells at the center of the cluster are beginning their last division before the embryo becomes a larva. These four cells will eventually give rise to the sand dollar's germ cells, which make sperm or eggs. The cells in the immediately surrounding area have just completed their sixth division. These cells will ultimately play an important role in various developmental processes, such as cell differentiation, the formation of the digestive system, and the development of an exoskeleton called a test.

Despite their different characteristics and roles, all of the sand dollar's cells (except for eggs or sperm) are genetically identical due to mitosis.