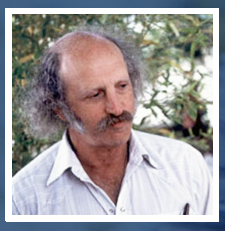
The Purple Sea Urchin Reveals the Evolutionary History of Development



Eric H. Davidson
Norman Chandler Professor of Cell Biology

CURRENT RESEARCH

Unraveling the functional history of gene regulatory networks

Life is dependent upon ordinary processes that are wired with rigid programming in the genomic DNA. For instance, for life to begin, an egg must become an embryo thus signaling the wave of steps that follow to create a living, breathing organism. Dr. Eric Davidson, Norman Chandler Professor of Cell Biology at the California Institute of Technology, offers an integrated approach to the study of embryonic development in purple sea urchins. By studying the control system that determines precisely how eggs turn into embryos, he is unraveling the evolutionary and functional history of gene regulatory networks (GRNs), the networks of interacting regulatory genes that control the development of an organism from embryo to adult. It goes without saying that until we thoroughly understand the mechanism of the gene control system that operates animal cells in development, we will not understand where our body parts come from, or how they really work, or how to fix them when they don't work.

Dr. Davidson's research is conducted on sea urchin embryos, which provide key experimental advantages making them the ideal model for investigating GRNs. With over fifty years of investigating these simple but beautiful creatures, Dr. Davidson and his team have become the world's main laboratory in the understanding of how GRNs are structured and how their structure generates their function. Among numerous awards and honors, Dr. Davidson has been awarded the prestigious International Prize for Biology by Emperor Akihito in Japan, has been in the National Academy of Sciences since 1985 for his pioneering the concept of GRNs, and his continued research to expand upon their purpose. Despite his success, he continues to approach his...

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AFFILIATION

California Institute of Technology

EDUCATION

- B.A., 1958 , University of Pennsylvania
- Ph.D., 1963 , Rockefeller Institute Univeristy

AWARDS

- US National Academy of Sciences
- International Prize in Biology, 2011

RESEARCH AREAS

Oceanic, Life Science, Regenerative Medicine, Evolution

FUNDING REQUEST

Your contributions will support the continued research of Dr. Eric Davidson, of the California Institute of Technology. Specifically, funding will make his fascinating evolution project a possibility. Donations of $220K/year will support visionary and curious personnel to solve relevant evolutionary questions and to seek answers to the genomic changes that led to the divergence of development millions of years ago. In modern biology we have learned that problems should be solved where they can be solved, and the sea urchin project offers both unusually clear problem definition and unusually advanced technology to solve a basic problem general to all animal evolution (including our own).