CDB SEMINAR

Nicholas D. Holland

Biology, SIO, Univ. California at San Diego

Tuesday, September 16, 2014

16:00~17:00 C1F CDB Auditorium

A quantum jump in acorn worm diversity: deep-sea technology meets molecular phylogenetics

Summary

Fifty years ago, deep-sea photographs revealed acorn worms (phylum Hemichordata) crawling on the deep ocean floor, but the crude state of undersea technology at that time did not permit collection of the actual animals. For the last five years, we have used modern submersibles to collect numerous specimens of so-called lophenteropneusts from the abyss all over the world ocean. By now, seven new species of these wide-collared enteropneusts have been formally described and more keep coming to hand. Molecular phylogenetic analysis surprisingly showed all these new found worms grouped into a single, deeply branching clade now recognized as the fourth family in the class Enteropneusta -- quite a jump in biodiversity. Ecologically these deep-sea worms differ strikingly from their burrow-inhabiting shallow water relatives; the deep-living worms crawl on the surface of the sea floor and rarely if ever burrow; instead they ascend into the water column and float along near the bottom to travel to new foraging sites. The evolution of the group is considered in the light of fossil evidence plus current zoogeographical and bathymetric data.

refs:

Biol Bull. 2013 Oct;225(2):113-23.
An externally brooding acorn worm (Hemichordata, Enteropneusta, Torquaratoridae) from the Russian arctic.
Osborn KJ, Gebruk AV, Rogacheva A, Holland ND.

Nature. 2007 Feb 8;445(7128):613-7. Epub 2007 Jan 21.
Axial patterning in cephalochordates and the evolution of the organizer.
Yu JK, Satou Y, Holland ND, Shin-I T, Kohara Y, Satoh N, Bronner-Fraser M, Holland LZ.

Nature. 2005 Mar 17;434(7031):374-6.
'Lophenteropneust' hypothesis refuted by collection and photos of new deep-sea hemichordates.
Holland ND, Clague DA, Gordon DP, Gebruk A, Pawson DL, Vecchione M.

Nat Rev Neurosci. 2003 Aug;4(8):617-27.
Early central nervous system evolution: an era of skin brains?
Holland ND.

Science. 2003 May 30;300(5624):1372; author reply 1372.
Comment on "A new species of yunnanozoan with implications for deuterostome evolution".
Mallatt J, Chen J, Holland ND.

Host:
Takayuki Onai
Evolutionary Morphology, CDB
tonai@cdb.riken.jp
Tel: 078-306-3064
(ext: 4543)