LEARNING PORTAL

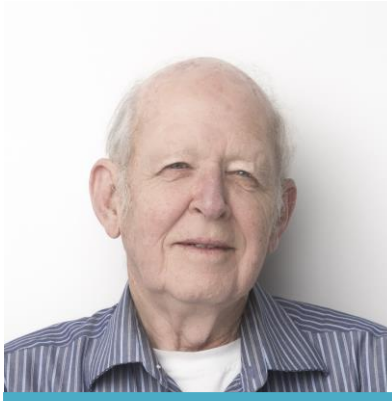
ROYAL BC MUSEUM

Question and Answer with Dr. Henry Reiswig

Can you tell us a bit about glass sponges?

Well, "glass sponges" is the common name for one of the four classes of the phylum Porifera or "sponges". The others are classes Demospongea, Calcarea and Homoscleromorpha. Why are they called *glass sponges*? Because their skeletons when first discovered were made of glass or silica and they were very transparent; indeed the first name for the group was "Vitrea"[1]. But it was changed when a more precise character was found in all members that could be used to separate them from the other classes. That is that the all members of the group have some glass skeletal elements or spicules that have a cubic symmetry with 6 rays perpendicular to each other, or spicules derived from that symmetry. Two of the other classes also make glass spicules but with different symmetry. So now we know what the constraints are in telling if a sponge is a "glass sponge".

Another unique character of the class is that all known members are mostly syncytial[2] that is their cell membranes are mostly continuous throughout a specimen. All the other sponges are almost completely cellular so cell membranes are usually restricted to a small domain around each single nucleus, as in our own bodies. The upshot of this organization of the living tissues are that if one spot is physically stimulated that stimulus slowly, through membrane conduction, spreads throughout the whole sponge. This may explain their general absence in shallow water and main center of distribution at and below depths of 1000 meters. The glass sponges forming the reefs in B.C. and Alaska are unusual in their abundance at 100-–200 meter depths and rarely found up at 5 meters. From what little we know about larval development, the syncytial character occurs secondarily; almost all of the larval cells are cellular with the area around each nucleus having a small separate cell membrane.



Dr. Henry Reiswig. Renowned glass sponge expert and research associate at the Royal BC Museum.

1. Vitrea: A term used for antique glass vessels or fragments.
2. Syncytial: Not separated into singular cells.

What inspired you to become an expert on glass sponges?

During my middle years in research work I was primarily interested in ecology and physiology of demosponges in West Indian coral reefs. I found it difficult to obtain a reasonable level of funding to support graduate student research due to the time it takes to complete field work. I also wanted to address a larger uncertainty in sponge research -- the uncertainty about cellular or syncytial structure of class Hexactinellida. At the time (late 1970s) the subject was still known only from early 1900s work with light microscopy. I decided to take some time from coral reef sponges to attack the problem with electron microscopy. I became involved with George Mackie and we independently proved the syncytial nature of glass sponges from B.C. I found that there was no taxonomic specialist in Hexactinellida alive at the time so I then decided that I would develop that expertise to solve the problems with identification of species we worked with. This subsequently lowered the cost per publication since travel was no longer a major research requirement. I soon became the go to specialist for the Hexactinellids.

Can you tell us about your glass sponge research?

Today I have more work on identifying and describing Hexactinellids than I ever imagined possible. Specimens are sent from all over the world, and the volume is accelerating. When I came on the scene in the 1980s, interest in actual identification of glass sponges was low. Now, especially with most countries with large coastlines and with world conservation interests increasing, it seems everyone wants to have a better inventory of their Exclusive Economic Zones as a baseline for future management.

In identifying specimens I prepare spicules from various parts of sponge bodies and make measurements of spicules. I then narrow down what family, genus and even species a given specimen belongs to with use of a library I keep at home. Often I cannot find a species-level group to contain the specimen so I have to decide if it is of sufficient quality to merit description as a new species. This requires illustration of the spicules with electron microscopy which costs about $300 per specimen. The time involve in identification, preparing spicule slides, making measurements, manipulating figures and writing is about 150 hours of my time .... per specimen. This is what I do on a daily basis. Right now I have in my garage at least 40 new species awaiting description. Tomorrow it may be much more.

What does being a research associate with the Royal BC Museum entail?

I physically attend the Museum one day a week but, of course, most of my taxonomic work in preparing spicule slides, comparing to literature descriptions, etc. takes place at my home laboratory. When in the Museum, I may be reviewing manuscripts, editing a spicule measurement excel file, working on images taken by U.Vic's Biology SEM, going through the Museum's specimens of unidentified Hexactinellids, writing up a new species or genus description, or working with Museum staff and other research associates. One of the most valuable assets of being a research associate at RBCM is the assistance I get in receiving and sending loaned material from or to other institutions. Every day at the Museum is an adventure; discovery of a small piece of the earth's biodiversity puzzle that I strive to solve before I leave the endeavor to the next generation.