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Sedgwick Museum
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***Oesia* – a new tube worm from deep Cambrian times**

The discovery of new fossils of an ancient seabed dwelling hemichordate called *Oesia*, reveals clues about their deep ancestry which is shared with humans. *Oesia* was found in 500 million year old, Mid Cambrian age, Burgess Shale strata of British Columbia in Canada. The fossil has been described by Professor Simon Conway Morris of the University of Cambridge and colleagues from the universities of Toronto and Montreal and the Royal Ontario Museum in Toronto in the latest issue of the journal BMC Biology.

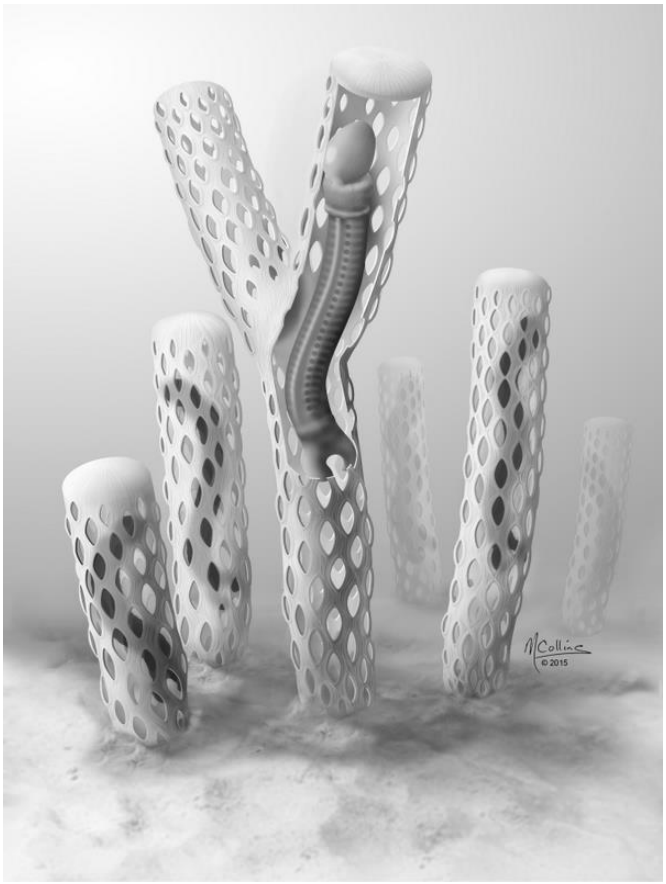

Image shows artist's impression of Oesia inside its tubular home. Credit: Marianne Collins

Over the last 100 years the ancient strata of the Burgess Shale, exposed in the mountains and canyons of the Canadian Rockies, have been explored by generations of palaeontologists. In the 1960s the late Professor Harry Whittington (1916-2010), then Woodwardian Professor in the University of Cambridge, initiated a research programme on the extraordinarily well preserved fossils of the Burgess Shale, their biological relationships, ecology and evolution. Simon Conway Morris was part of Harry Whittington's team from the 1970s and continues the research with colleagues in Cambridge and Canada.

Despite the recovery of some 200,000 fossil specimens belonging to some 200 different species, the Burgess Shale biota continues to provide surprising new insights into seabed life in Mid Cambrian times, such as the surprising life habits of this new hemichordate *Oesia*. The new fossils were found in the Marble Canyon outcrop of the Burgess Shale in Kootenay National Park.

Although *Oesia* fossils were first found over 100 years ago, their rarity held back reliable identification. Now that over 1500 specimens of this worm-like hemichordate have been recovered from Marble Canyon they can be clearly identified as one of the oldest known acorn worms. The hemichordates may be an obscure group of worms but their development throws light on how key features in the vertebrates evolved.

Today's living hemichordates are made up the burrowing, worm-like acorn worms and their sister group the tube dwelling pterobranchs. They also belong to a bigger biological group known as the deuterosomes to which all vertebrates, including ourselves, are related. Until recently the acorn worms, whose soft bodies are not readily preserved, were thought to have a very poor fossil record that did not extend back beyond Carboniferous times. The discovery of such early Cambrian representatives as *Oesia* and *Spartobranchus,* another enteropneust described from the Burgess Shale by Simon Conway Morris and colleagues, may well help in the characterization of the common ancestor of all our deuterosome relatives.

What is particularly surprising about *Oesia* is its mode of life. Whilst the living acorn worms mostly live buried in seabed sediments to escape from predators, *Oesia*, which grew to around 5 cm long, lived within a long (up to 50 cm) perforated tube. *Oesia* appears to have secreted and enclosed itself

within the tube, which was thus both protective and allowed for a flow of seawater with nutrients and oxygen to reach its filter-feeding inhabitant.

Curiously, fossils of *Oesia*'s tubular home were first found in the 1920s but were described as a kind of algae called *Margaretia.* Only now that dozens of fossils of *Oesia* have been found within *Margaretia* has their biological connection has been made and the name *Margaretia* discarded. The tube secreting habit of this early acorn worm also provides a previously unsuspected link with the closely related sister-group of hemichordates - the pterobranchs, whose most ancient representatives have also been found in the Burgess Shale.

A selection of Burgess Shale fossils is on display in the Sedgwick Museum along with information on their palaeontology.

Reference: Karma Nanglu, Jean Bernard-Caron, Simon Conway Morris and Christopher B. Carmeron. Cambrian suspension-feeding tubiculous hemichordates. *BMC Biology.* DOI 10.1186/s12915-016-0271-4.

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