



## Evidence of a dorsal pharynx in the marine polychaete *Capitella teleta* (Polychaeta: Capitellidae)

MICHAEL J. BOYLE & ELAINE C. SEAVER<sup>1</sup>

Pacific Biosciences Research Center, University of Hawaii, Kewalo Marine Laboratory, 41 Ahui Street, Honolulu, Hawaii 96813, USA.  
E-mail: boylem@hawaii.edu, seaver@hawaii.edu

<sup>1</sup>Corresponding author

### Abstract

Observations from compound, confocal, and scanning electron microscopy reveal that the buccal organ in *Capitella teleta* Blake, Grassle & Eckelbarger, 2009 should be classified as a dorsal pharynx. This buccal organ is an eversible proboscis that has the following characters: (1) dorsal ciliated pad, (2) well-developed pharyngeal retractor muscles, (3) pharyngeal gland-like structures, (4) cuticular fold surrounding the dorsal ciliated pad, and (5) unciliated buccal cavity and anterior ventral epithelium. All of these features are characteristic of dorsal pharyngeal organs present in oligochaetes and one terrestrial polychaete. Our observations in *C. teleta* confirm the presence of a dorsal pharynx in larvae, juveniles, and adults. *C. teleta* is a subsurface deposit feeder and a dorsal pharynx may have evolved independently in Capitellidae through selection of feeding mode in benthic marine habitats. Our results represent the first detailed description of a dorsal pharynx in a marine polychaete.

**Key words:** Pharyngeal, foregut, proboscis, buccal organ, eversible, deposit feeder, annelid, capitellid

### Introduction

Polychaete annelids have successfully colonized nearly every benthic marine habitat. Such evolutionary success likely stems from their ability to access and process different food resources with a diversity of feeding structures and gut architectures (Dales 1962; Fauchald & Jumars 1979; Penry & Jumars 1990; Rouse & Pleijel 2001). Indeed, it has been said that the evolution of polychaetes is mirrored by the evolution of their feeding methods (Dales 1967). Most polychaete feeding methods include a structurally differentiated foregut, which is the anterior region of the digestive tract consisting of the buccal cavity, pharynx and esophagus (Tzetlin & Purschke 2005). If a foregut region can be everted through the mouth, it is called a proboscis, and the proboscis may or may not contain a muscular pharynx, jaws, ciliated and/or unciliated cuticular regions. Adult structures of the buccal cavity and eversible foregut regions are collectively referred to as a buccal organ (Rouse 2000; Rouse & Pleijel 2001; Tzetlin & Purschke 2005).

The symmetry, composition, and structural arrangement of different foregut tissues (e.g., muscles, epithelia, cilia) are used to classify buccal organ types. In accordance with current terminology and descriptions (Saulnier-Michel 1992; Rouse & Pleijel 2001; Purschke 2002, 2003; Tzetlin & Purschke 2005), annelid buccal organs are classified by six general plans of organization. These are: (1) axial non-muscular proboscis, (2) axial muscular proboscis (pharynx), (3) ventral