Nemertea of the SCB
(Revised from Palaeonemertea of SCB, M. Lilly, 2007)

D. Pasko, 24 February 2014 SCAMIT Meeting
**Palaeonemerteaens**
*(Carinomids vs Tubulanids)*

**Carinomids** have 2 layers of musculature: inner longitudinal and outer circular with the LNC being associated with the longitudinal muscle layer.

**Tubulanids** have 3 layers of musculature: inner circular, inner longitudinal, and outer circular. The lateral nerve cord (LNC) is associated with the outer circular layer.

*Photos courtesy of M. Lilly*
Carinoma mutablis

Internal musculature of 2 layers (outer circular and inner longitudinal) with LNC migrating into longitudinal muscle from mid-body (esophageal region) to the posterior.

Found at depths ranging from 17m to 120m; sandier sediments.
Procephalothrix sp

Internal musculature of 2 layers (outer circular and inner longitudinal) with mouth far removed from proboscis pore. Body typically thin and often coiled.
**Tubulanus polymorphus**

Internal musculature of 3 layers with LNC external to outer circular for the entire length. LSO present, distinct, but coloration variable.

Photo courtesy of M. Lilly
Tubulanus ? polymorphus

CSO is s present, pit-like; preservation band anterior to esophageal region, indicated by white band; LSO present, posterior to preservation band.

Morro Bay specimen

Photos courtesy of T. Phillips
**Tubulanus sp A**

(= *T. nothus* of SCAMIT)

Internal musculature of three layers with LNC external to outer circular for the entire length. LSO present, distinct. Coloration typically not uniform, with speckled pattern continuing posteriorly. Posterior coloration varies from dark purple (as shown) to lighter colors (see following slide).

Photo courtesy of M. Lilly
Tubulanus sp A

(= T. nothus of SCAMIT)

Preservation band color can vary from dark purple to a lighter reddish brown.
Tubulanus cingulatus

Tubulanid musculature with four longitudinal lines (2 dorsal + 2 lateral) on dark ground color; with dark rings. Pair of “eye spots” on anterior margin of head is distinctive for this tubulanid and can aid in the identification of juvenile specimens.

Photos courtesy of M. Lilly
Tubulanus frenatus

Three dark longitudinal lines (1 dorsal + 2 lateral) on lighter ground color; with rings. Found in SCB embayments.
One dark longitudinal line dorsally on brownish ground color, with white ring at esophageal region, LSO present, and darker rings posteriorly.
Tubulanus albocinctus (Coe 1904)

Body with reddish ground color and white rings; without longitudinal stripes. Found at depths ranging from 17m to 120m; finer sediments.
Tubulanidae sp A
(=Anopla sp A of Phillips & Tubulanidae sp SD 1)
Tubulanidae sp B

Photos courtesy of T. Phillips

Note thickened epidermis and thick longitudinal muscle layer. CSO present; white band present; color band in esophageal region; LSO absent; brown speckling ventrally on head.

Photos courtesy of T. Phillips
Tubulanidae sp C
(= Palaeonemertea sp C SCAMIT)

Photos courtesy of M. Lilly

Dark preservation band in esophageal region; LSO absent; CSO distinctive.

Magnification: 37X
scale bar = 1mm

Bight’13 specimen: Stn 8360

Position of above x-section
Tubulanidae sp D
(= Palaeonemertea sp A Phillips)

Anterior region pale with darker esophageal region (though often faded); CSO absent; LSO absent(?); encircling white band which runs through the mouth.

Photo courtesy of M. Lilly

Dorsal and ventral photos courtesy of T. Phillips
Tubulanidae sp E

With thickened epidermis and thick circular and longitudinal muscle layers; white ring faint; coloration limited to anterior region of body, posterior region beige. Pit-like CSO present; LSO posterior to preservation band.

Photo courtesy of M. Lilly
Tubulanidae sp Hyp2

Photos courtesy of T. Phillips
Tubulanidae sp SF1

Dana Point specimen

Humboldt Bay specimen

LAH/LB specimen

Photos courtesy of T. Phillips
Palaeonemertea sp OC1

Papillated esophageal region, slightly discolored

Epidermis thick, with two muscle layers

Specimen approx. 140 mm
Heteronemertea

Most common taxa in SCB (Lineidae, Baseodiscidae) with cephalic slit or shallow furrow; internal musculature of 3 layers (outer longitudinal muscle, middle circular, and inner longitudinal muscle); dermis often thickened; CSO often present.

Neurocord photos courtesy of M. Lilly
Lineus bilineatus

One of the more common Lineids typically with greenish-olive background color, whitened anterior margin of head, and white mid-dorsal stripe. The head is often bluntly squared to gently rounded, and the cephalic slits are typically narrow and smooth. Caudal cirrus absent. L. bilineatus is reported from all shelf depths.
Lineus pictifrons

Tip of head white, often continuing along margin of cephalic slit; white rings present against darker background color

Cephalic slit

Photo courtesy of T. Phillips
Micrura alaskensis

Body generally uniform in width, rounded throughout or narrowed posteriorly, typically smooth but may also be wrinkled; head not set-off by difference in color; body often ochre to brownish coloration, and uniform; cephalic slit narrow, smooth. Cirrus present.
**Micrura wilsoni**

Body generally uniform in width; white head set-off from dark body, often with pigment spots; white coloration does not necessarily continue along cephalic slit. Cephalic slit narrow, smooth. Cirrus present.
Cerebratulus albifrons

Coloration of *Cerebratulus albifrons*, *C. montgomeryi* and *Micrura wilsoni* are similar. X-section may be required to view presence of neurocord cells in larger specimens. *Micrura* typically do not have an expanded anterior/head region as seen in *Cerebratulus*. 
Cerebratulus lineatus

Specimens from Avalon
Longitudinally oriented pigment stripes typical.

Cephalic slit

Photo courtesy of T. Phillips
Baseodiscus delineatus

Baseodiscidae are recognized by their typical heteronemertean musculature and absence of a cephalic groove, though they are sometimes apparent as a barely visible shallow furrow or whitish line. *B. delineatus* has longitudinal pigment lines and eyes along each side of the head.

Specimens from San Diego Bay
Baseodiscus punnetti

Specimen from Avalon, 42 m

Eyes visible in uncleared specimens
Baseodiscus princeps

Photos courtesy of T. Phillips
Zygeupolia rubens

Sharply tapered anterior end; cephalic slit/depression absent; caudal cirrus present. Anterior end often highly contracted making CSO difficult to see. Typical heteronemertean musculature. Most often found in sandy substrates.
Heteronemertea sp Hyp1

Specimens from Santa Monica Bay, CLA-EMD Monitoring

Elongate heteronemertean with cephalic groove absent, CSO prominent; cirrus present; and typical heteronemertean musculature.
Heteronemertea sp Hyp2

Elongate, smooth heteronemertean without cephalic groove or any hint of a furrow; CSO is apparent as a distinct pit and slightly thinned area; mouth seemingly far removed from tip of strongly tapered head; cirrus present. Musculature consists of well developed inner and outer longitudinal muscle layers (separated by a circular layer) with thickened dermis external to outer longitudinal. Color beige.
Heteronemertea sp SD2

Smooth bodied heteronemertean without cephalic groove or furrow; CSO is distinctly C-shaped and often glistening; mouth often open or protruded; head more narrow than body but gently rounded. Most specimens represented by anterior fragments only. Most common at 60 m.
Lineidae sp LAH1

Specimens from Bight’13 Port of Los Angeles/Long Beach stations 8333, 8399, 8360, 8340, 8356. All between 10 – 20 m depth.

Elongate heteronemerteans with narrow, thin, very shallow cephalic slit (furrow-like); mouth large, centrally located, often gaping; head tapered with slightly rounded anterior end; anterior portion of body often wrinkled or deeply lined; cirrus present. Musculature typical heteronemertean type. Color beige to off-white. Body mostly uniform width except for tapering head and tail; not distinctly flattened posteriorly. Neurocord cells not observed.
Lineidae

Some specimens look distinctive; but may not provide enough information or distinguishing characters to ID with confidence. When in doubt, dissect to confirm musculature, clear for eyes if necessary, and back off to Class, Order, or Family.

Palaeonemertea

Mouth

Cephalic groove