



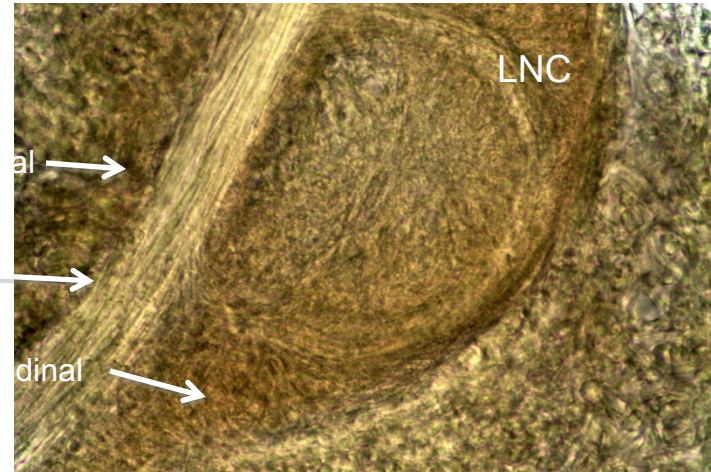
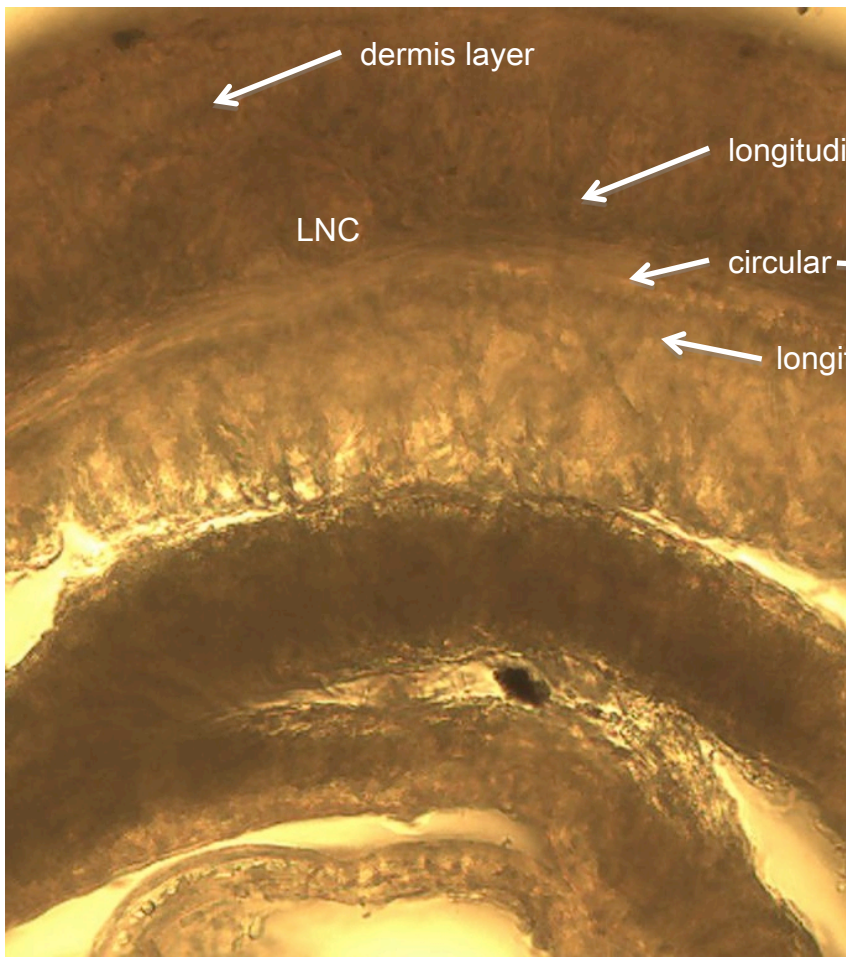
Heteronemertea of the SCB

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

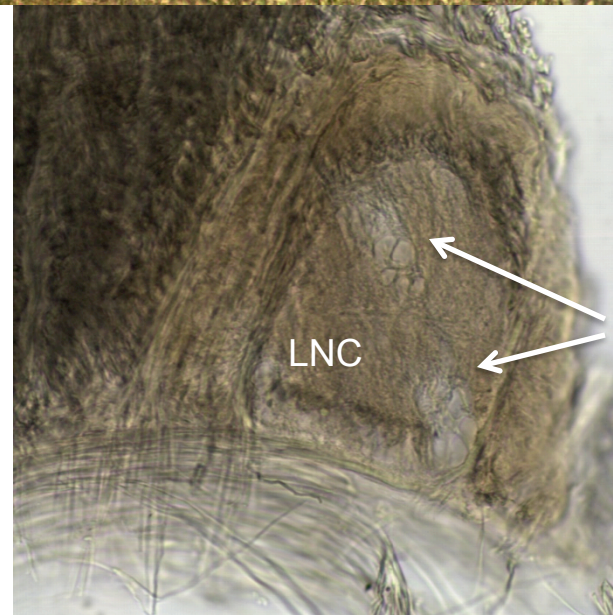
D. Pasko, 24 13Mar2017 SCAMIT Meeting

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.



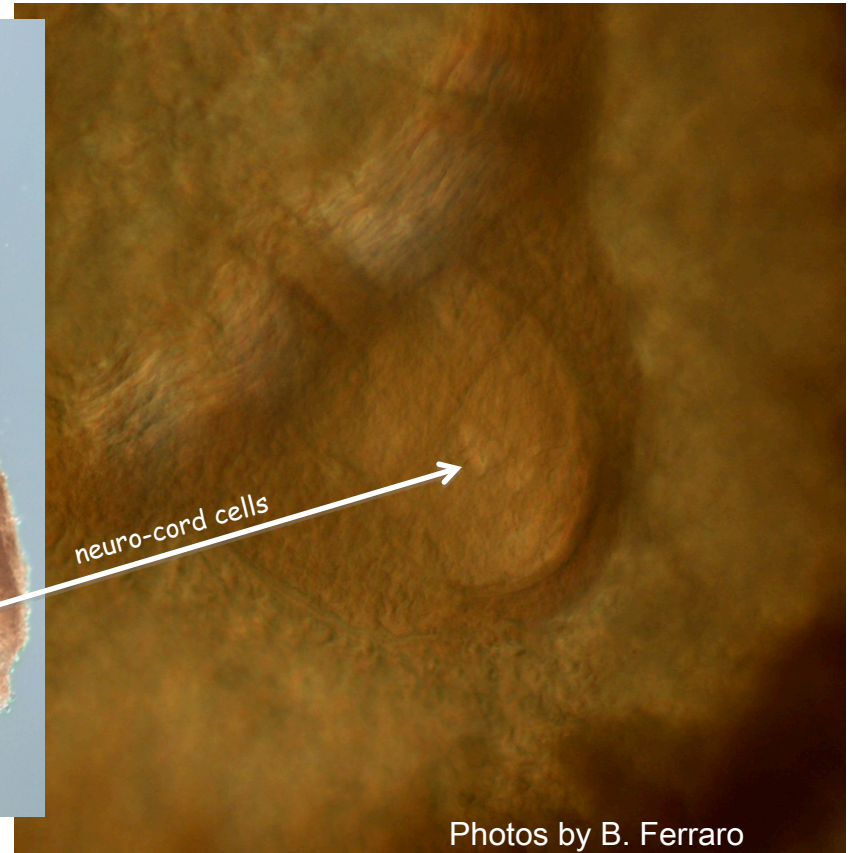
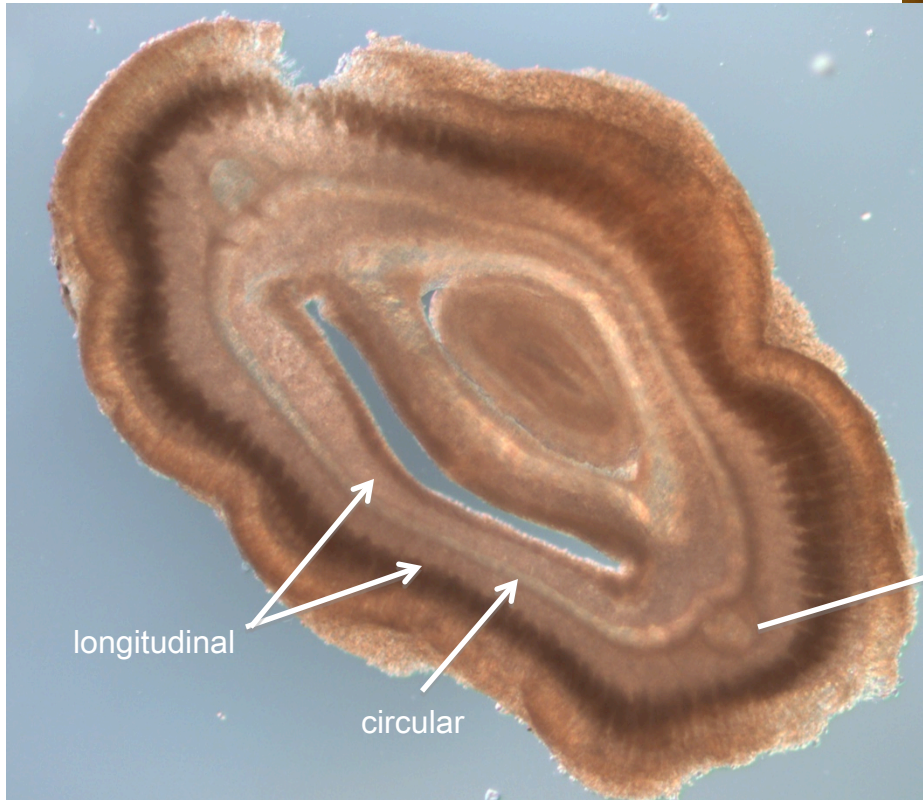
LNC from *Micrura*, without neurocord cells



LNC from *Cerebratulus* with neuro-cord cells

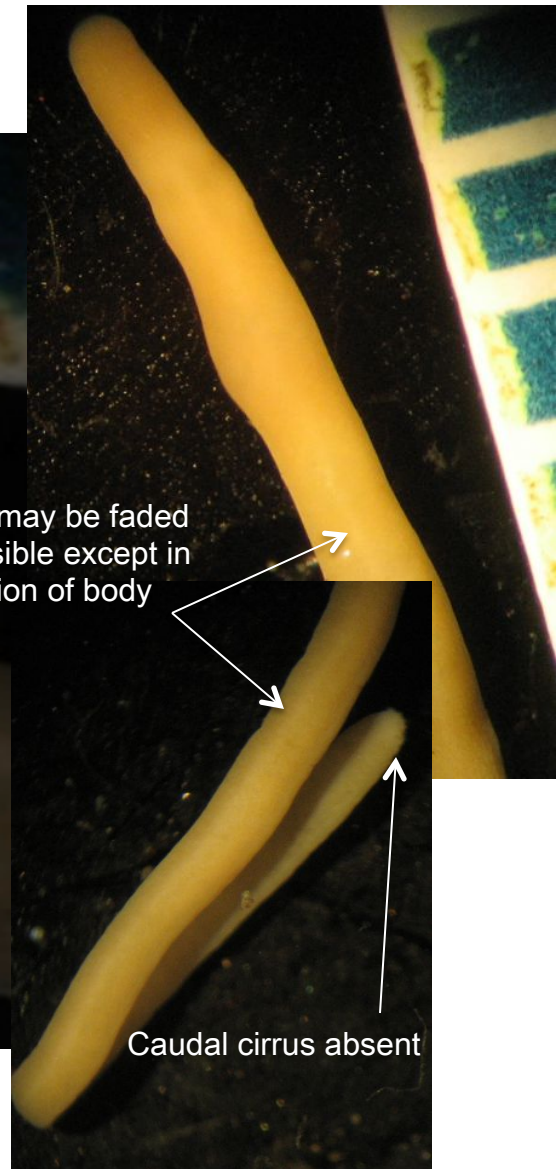
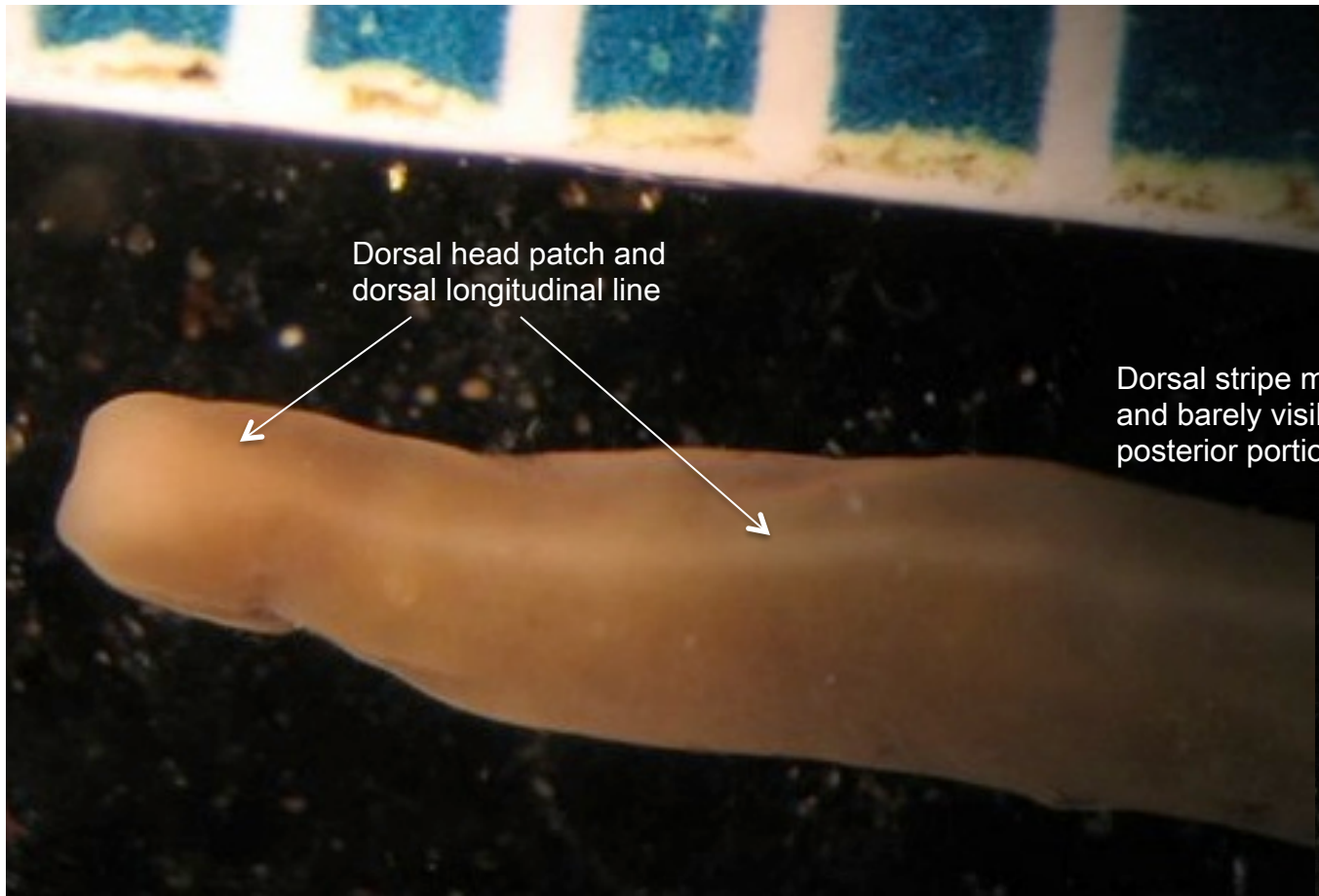
Heteronemertea: Cerebratulus

Neurocord Cells within lateral nerve chord



Photos by B. Ferraro

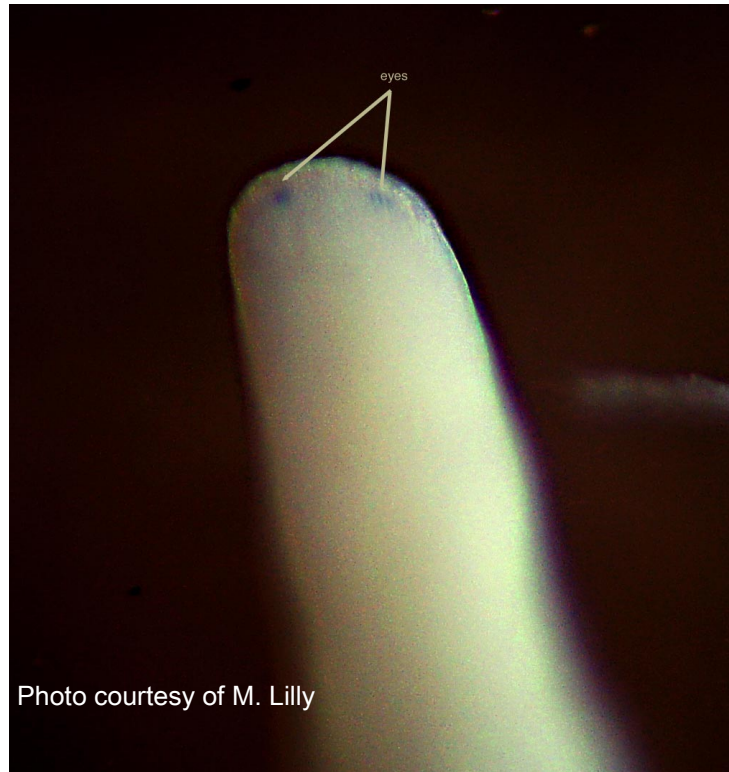
Lineus bilineatus



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 flavescens

Tip of head somewhat flattened, anterior margin often paler than the rest of the body; cephalic slit present; 3 to 7 ocelli (eyes) present with anterior most pair dark, and larger than the rest - often distinctive even without clearing; cirrus absent; background color often yellow to light brown



Lineidae sp Hyp1

Lineidae sp. HYP1

SCAMIT Vol. , No

Group: Nemertea: Anopla

SCAMIT CODE: None

Date Examined: 16 November 2006

Voucher By: Tony Phillips

SYNONYMY: None

LITERATURE: Bernhardt, P. 1979. A key to the Nemertea from the intertidal zone of the coast of California. (Unpublished).

Coe, W.R. 1901. Papers from the Harriman Expedition, 20, the Nemerteans. Proc. Wash. Acad. Sci., 3:1-110.

Coe, W.R. 1905. Nemerteans of the west and north-west coasts of North America. Bull. Mus. Comp. Zool. Harvard Coll. 47:1-319.

Coe, W.R. 1940. Revision of the nemertean fauna of the Pacific Coast of North, Central and northern South America. Allen Hancock Pacific Exped. 2(13):247-323.

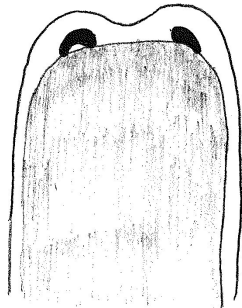
DIAGNOSTIC CHARACTERS:

1. Body of uniform width, becoming thinner posteriorly (largest specimen 23mm x 0.6mm)
2. Anterior edge of head not pigmented, posteriorly grayish-green to light red dorsal coloration, ventrum creme
3. anterior border of head with indentation in center
4. Cephalic slits not deep, reach to anterior edge of mouth
5. eyes visible uncleared; two large crescentic to tear-drop shaped eyes along anterior edge of head

RELATED SPECIES AND CHARACTER DIFFERENCES:

DEPTH RANGE: 15 meters

DISTRIBUTION: Santa Monica Bay; fine to medium sands; found within mid-core of Diopatra tube



Lineus pictifrons

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



Cephalic slit

Tip of head white

Lineus pictifrons

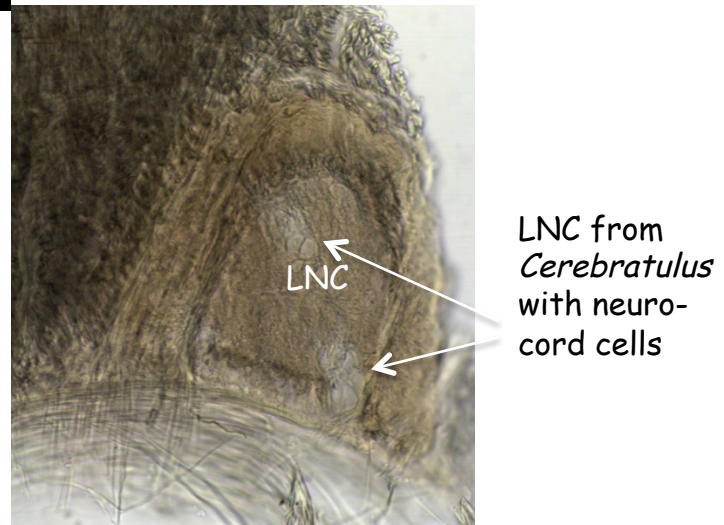
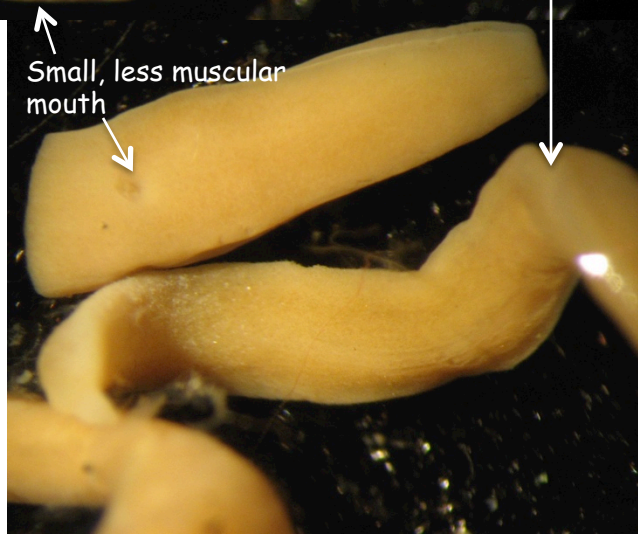
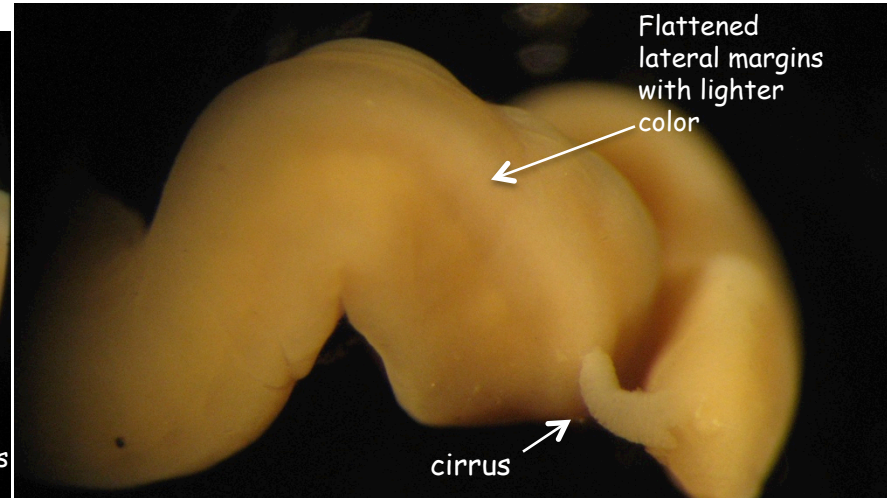


Photo courtesy of L. Harris

Cerebratulus ?marginatus

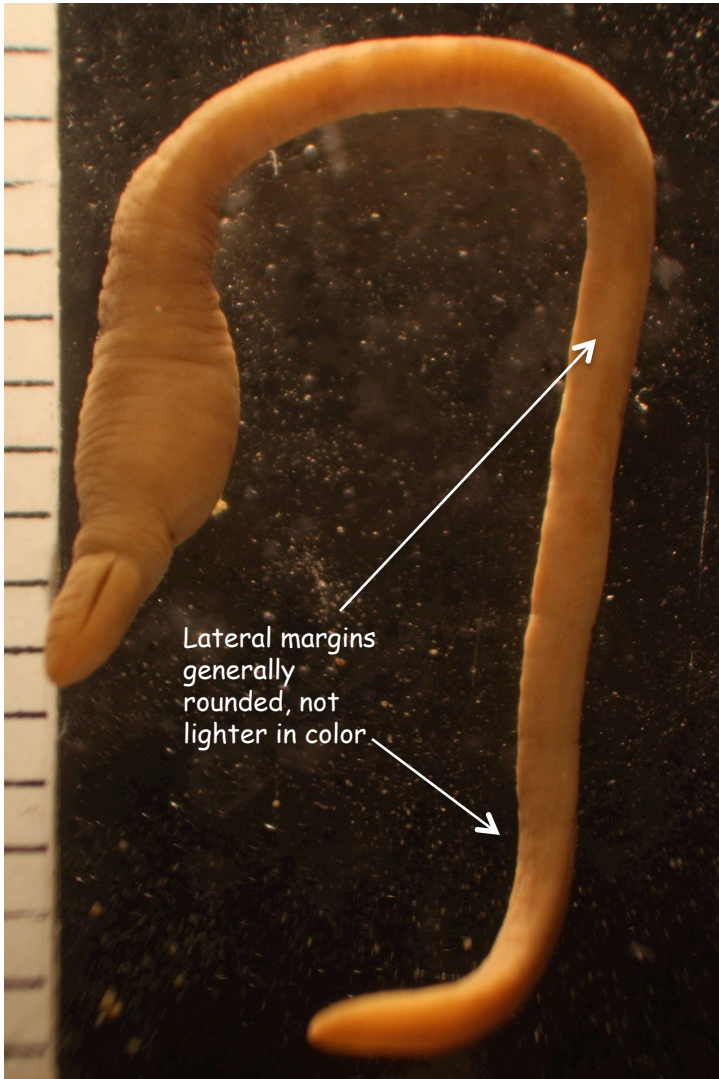
Recognized by the smaller, less muscular mouth (i.e., absence of ribbing along margin of mouth), more flattened lateral margins, particularly posteriorly, that are also distinctly lighter than the buff background color of the body.

Confirmation should include validating the presence of neurochord cells within the lateral nerve cord. These are best viewed in anterior cross-sections.

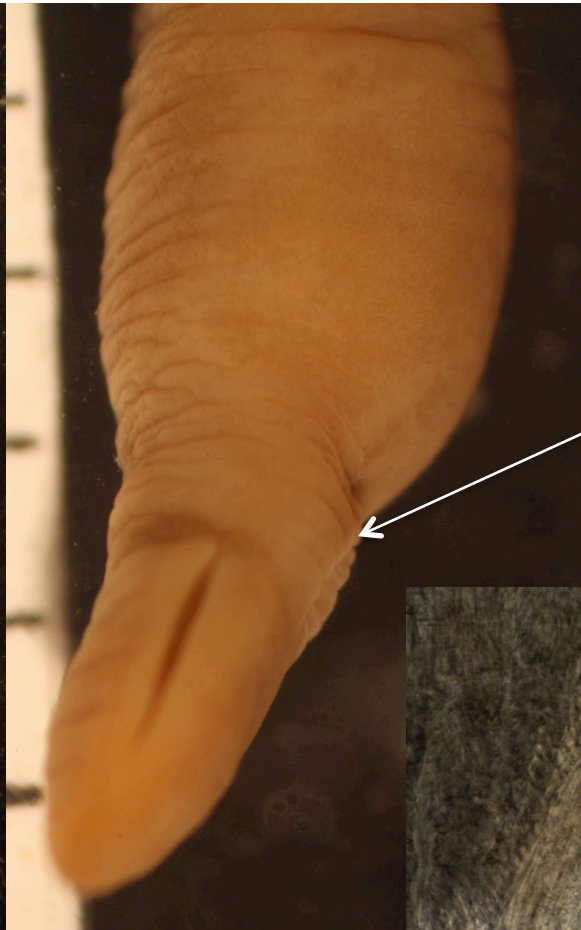


Cerebratulus ?californiensis

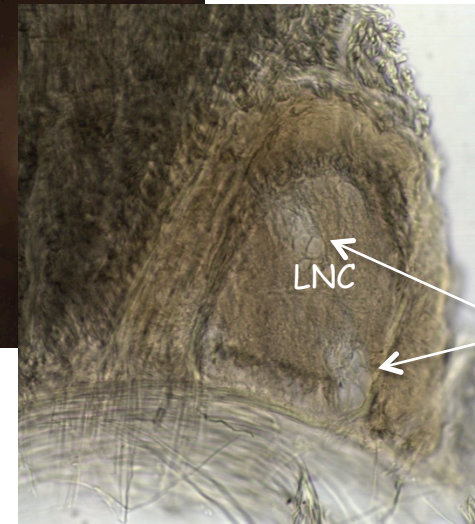
C. californiensis is recognized by a large, muscular mouth, where the muscular nature of the mouth is indicated by the ribbed margin, particularly along the posterior margin. It also has more rounded lateral margins, and a uniform body color (i.e., does not have distinctly white lateral margins posteriorly).



Lateral margins generally rounded, not lighter in color

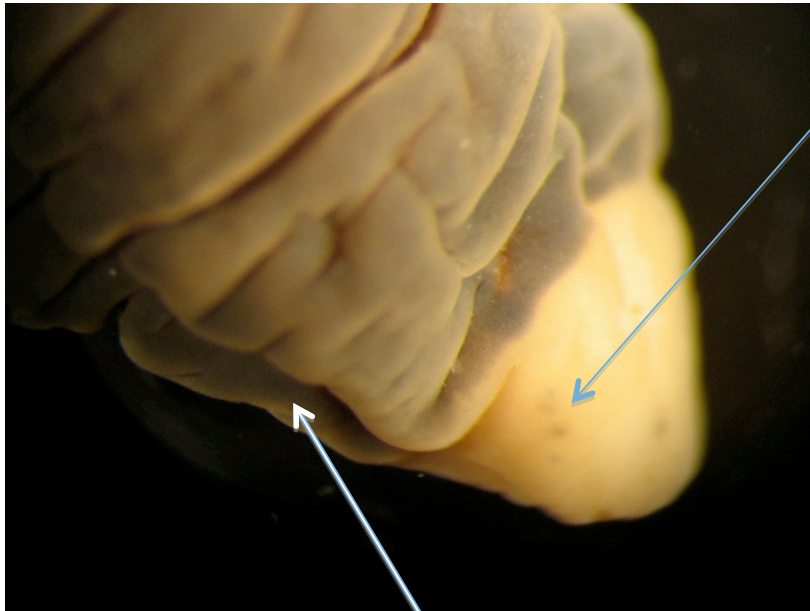


Large, strong, muscular mouth with posterior ribbing



LNC from *Cerebratulus* with neurocord cells

Cerebratulus albifrons



Pigment spots

Body broadened anteriorly, head spatulate, posteriorly flattened

Cephalic slit, large, wide, thick and often gaping



Specimen from Goleta Station B4, 2006.

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*.

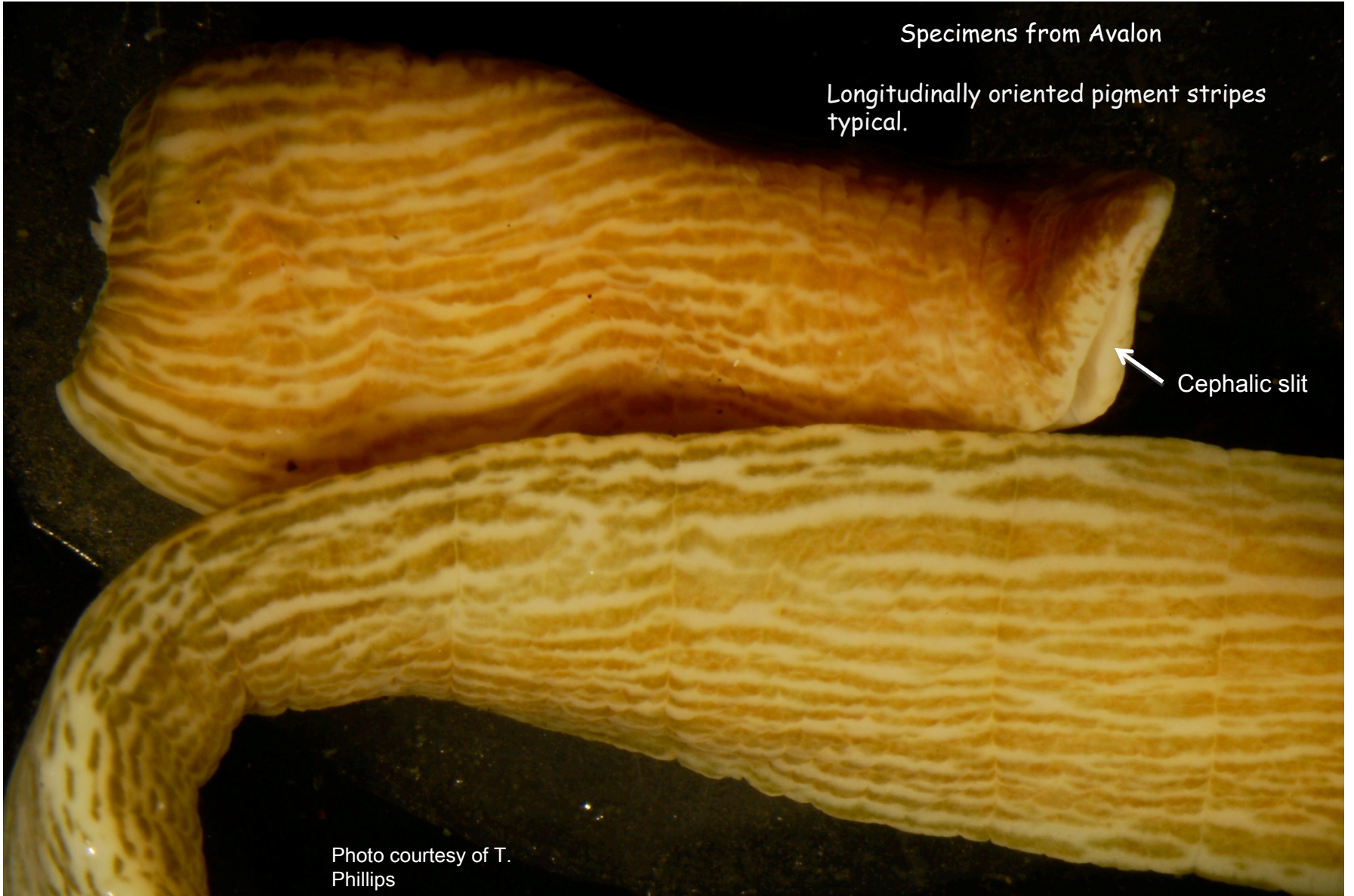
Cerebratulus lineatus

Specimens from Avalon

Longitudinally oriented pigment stripes typical.

Cephalic slit

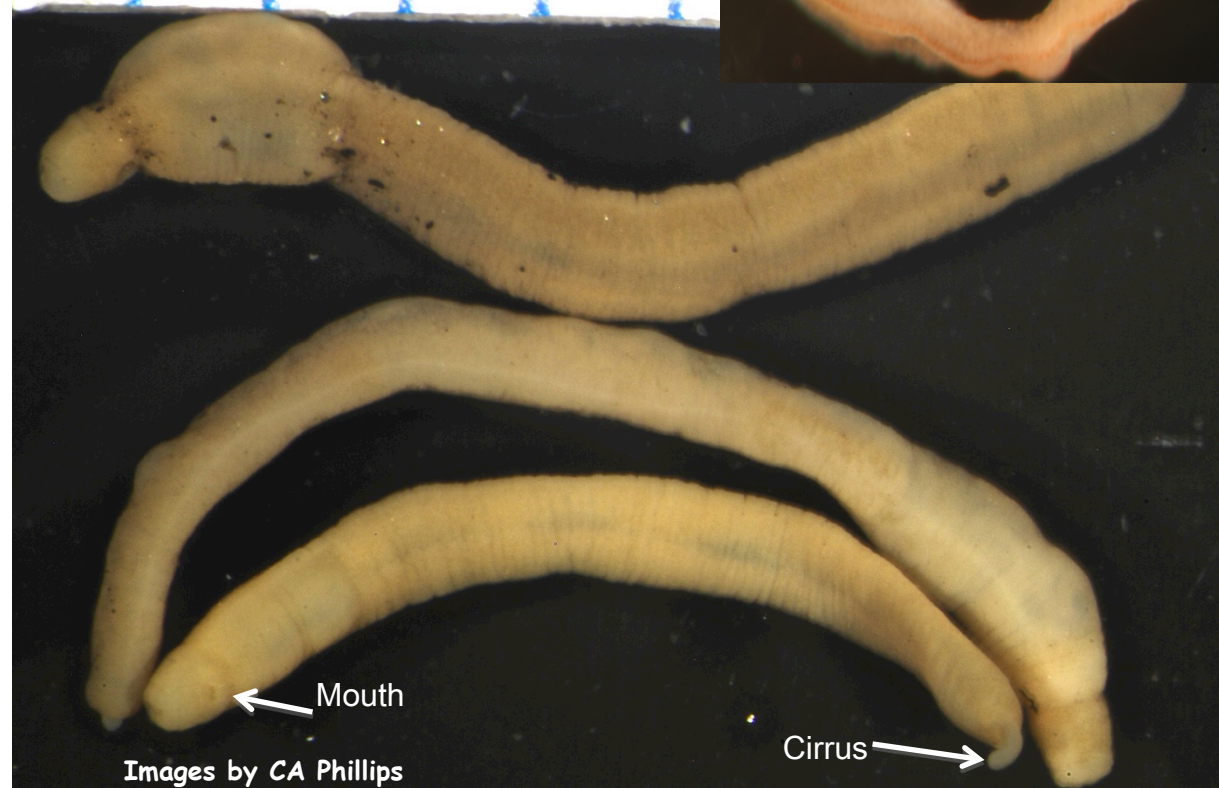
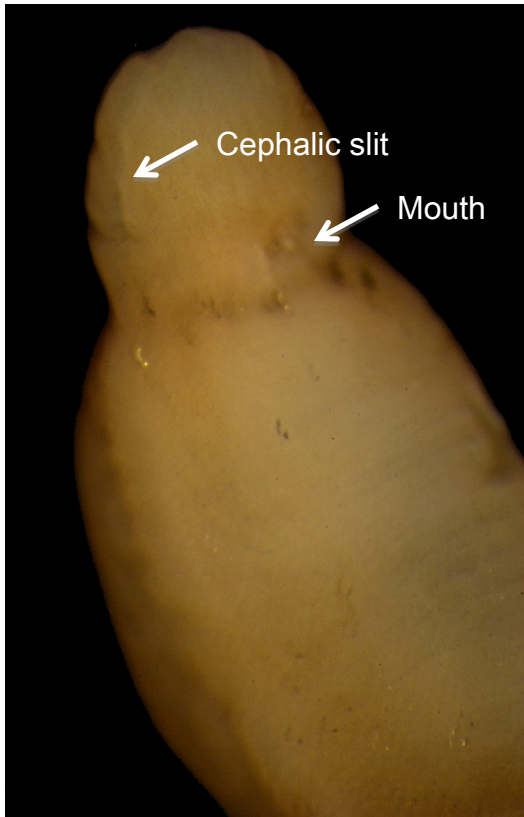
Photo courtesy of T.
Phillips



Maculaura alaskensis Cmplx

Micrura and *Maculaura* can be distinguished from *Cerebratulus* by the less robust, shorter & shallower cephalic slit and a smaller, smooth, less muscular mouth, rounded head and the absence of neurochord cells within the lateral nerve cord.

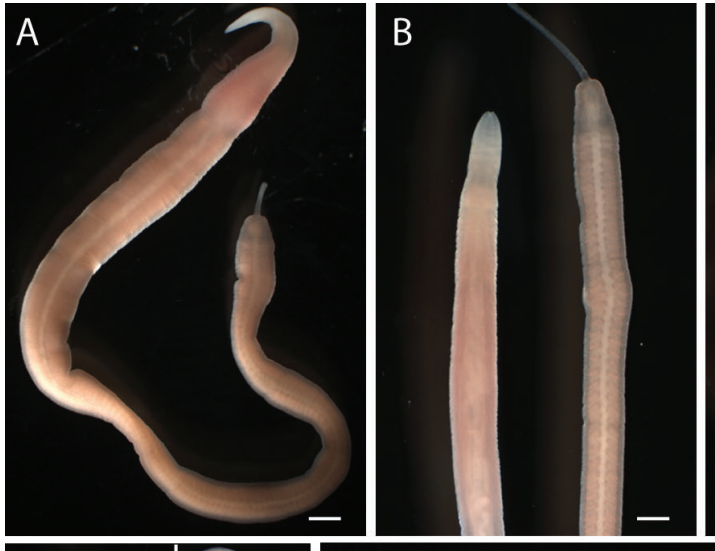
Maculaura alaskensis: Body generally uniform in width, rounded throughout or narrowed posteriorly, typically smooth but may also be wrinkled; head not set-off by difference in color; body often ochra to brownish coloration, and uniform; cephalic slit narrow, smooth. Cirrus present, often thin. (formally *Micrura alaskensis*) See Hiebert and Maslakova 2015 for discussion of this species.



Images by CA Phillips

Maculaura alaskensis Cmplx

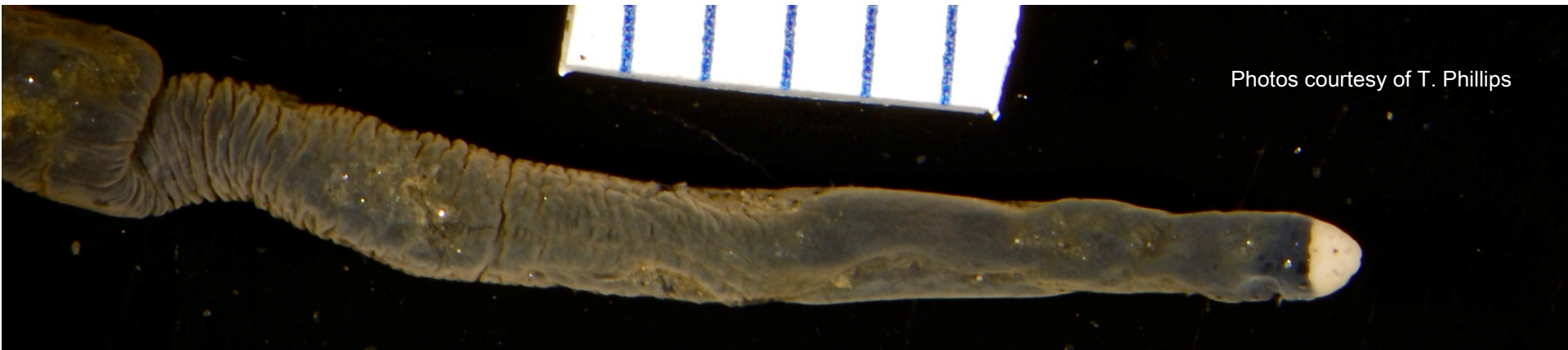
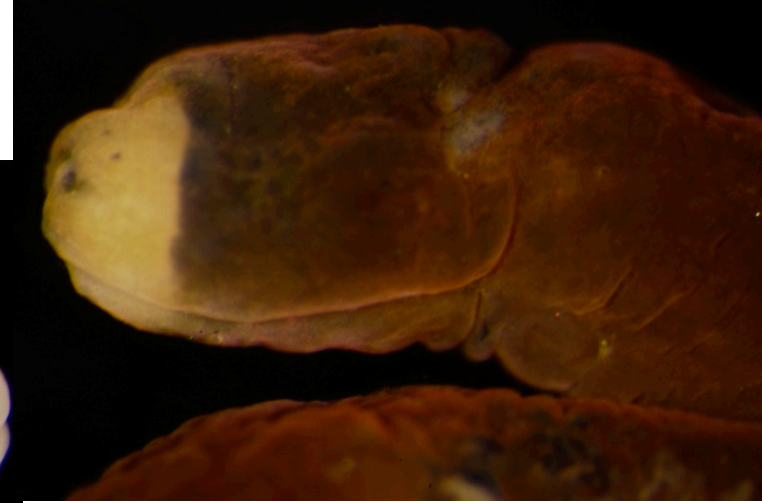
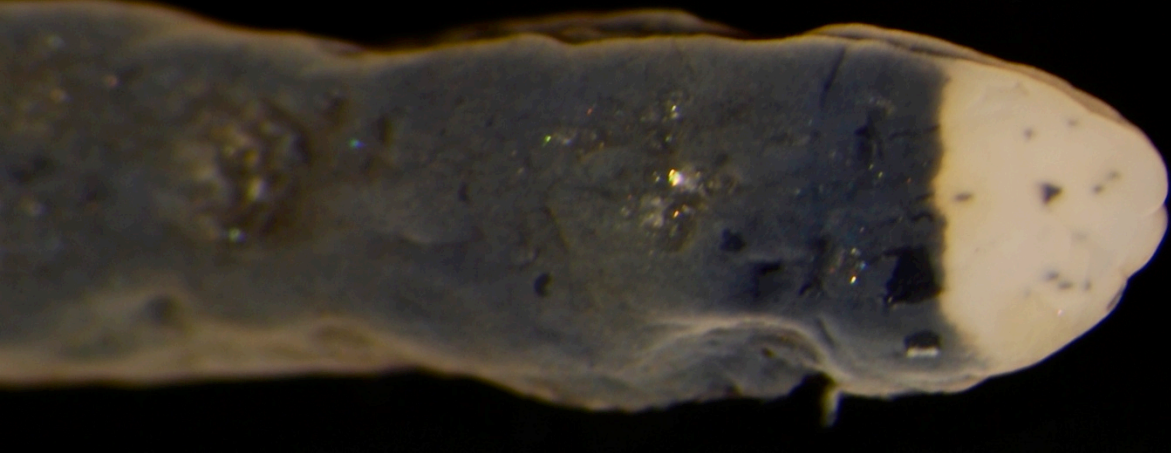
Left images from Hiebert, T. C. & Maslakova, S. 2015: TOP: A) entire body of non-type specimen; B) anterior and posterior ends of same individual as (A), relaxed in $MgCl_2$.
BOTTOM: Cross-section through intestinal region.



Micrura wilsoni

Body generally uniform in width; 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

Specimen from LACSD Station 6C, 2011.



Photos courtesy of T. Phillips

Baseodiscus delineatus

Valenciiniidae are recognized by their typical heteronemertean musculature and absence of a cephalic groove, though they are sometimes apparent as a barely visible as shallow furrow or whitish line. They are also recognized by a thickened epidermis and 2-layered proboscis.

B. delineatus has longitudinal pigment lines and eyes along each side of the head.



Photo courtesy of T. Phillips

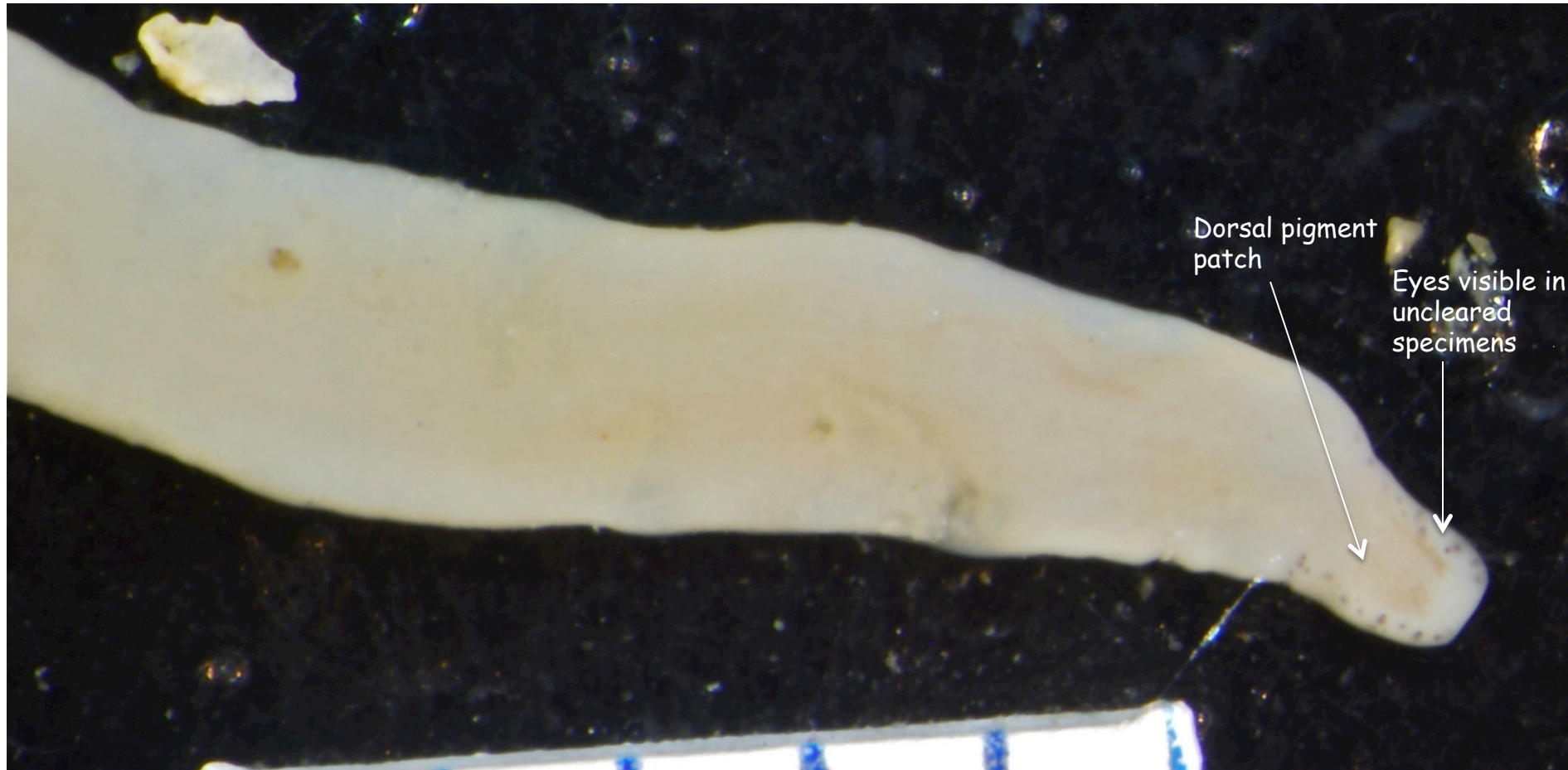


Cleared specimen showing eyes

Specimens from San Diego Bay

Baseodiscus punnetti

B. punnetti has a pigment patch on the head with multiple eyes along each side of the head.



Baseodiscus princeps

B. princeps is often thickened, yellowish, and dotted with irregularly spaced, small dark red or brown spots that sometimes coalesce to form broad patches. Six to 10 eyes visible on each side of the head upon clearing.



Photos courtesy of T. Phillips



Head



Zygeupolia rubens



Strongly tapered and wrinkled head

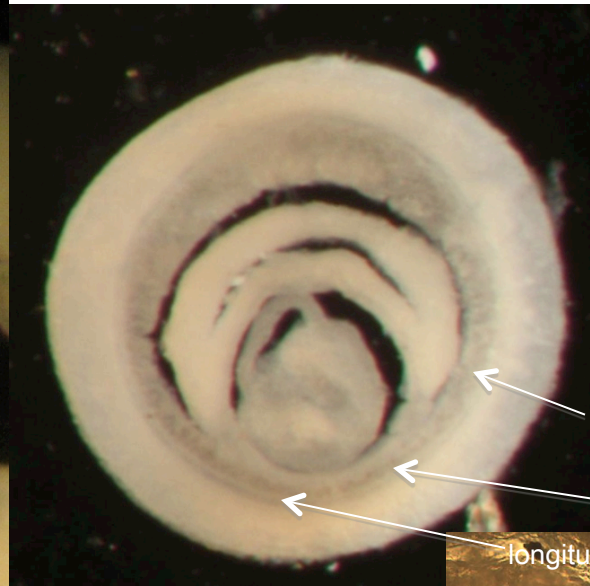
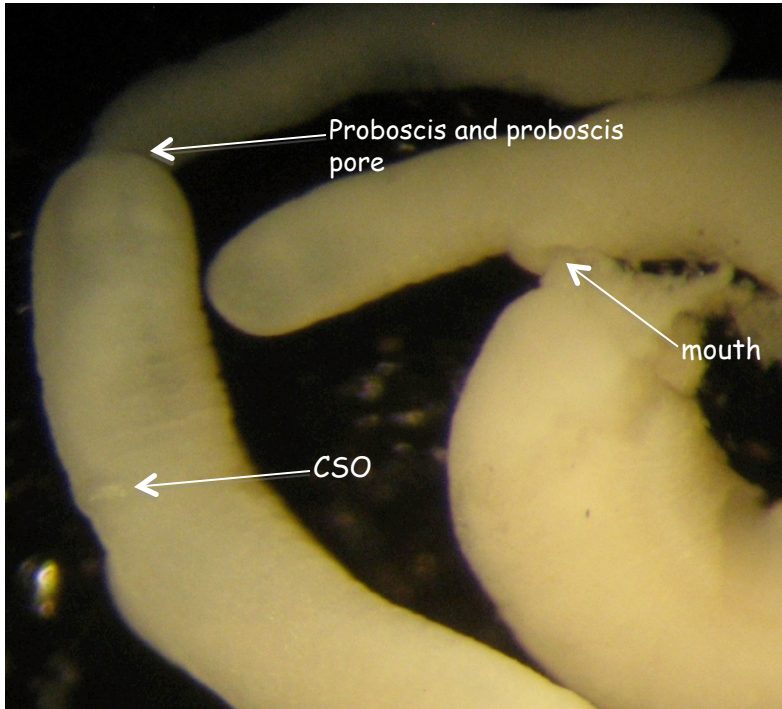
cirrus

mouth

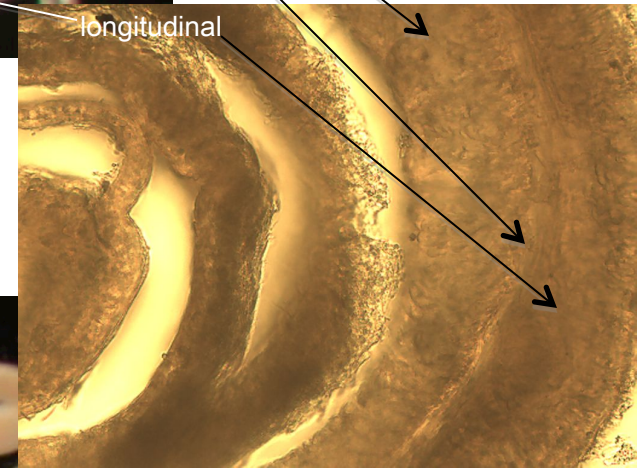
CSO

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 SD2



Musculature: Thin outer longitudinal muscle - inner circular - thicker inner longitudinal

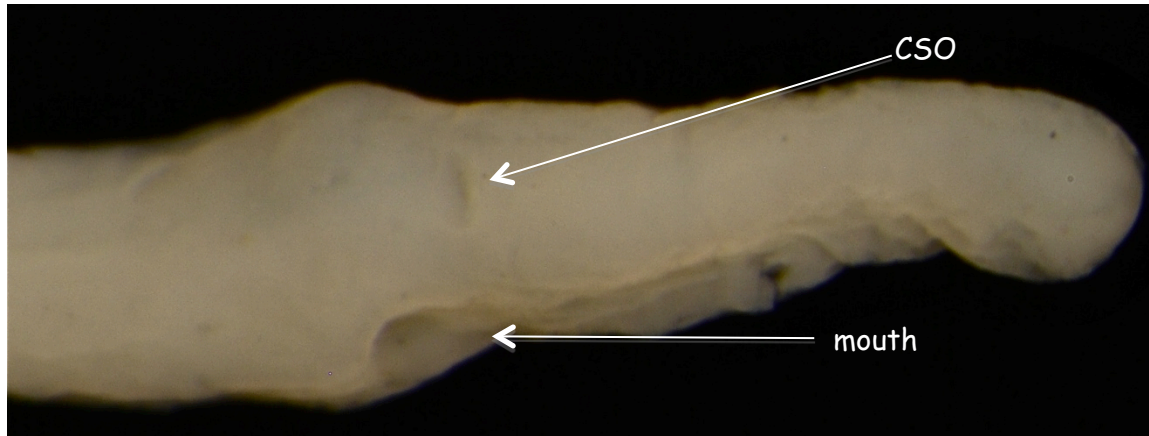


Smooth bodied heteronemertean without cephalic groove or furrow; CSO is distinctly C-shaped and often glistening; mouth often puckered or protruded; head more narrow than body but gently rounded. Cirrus absent in couple complete specimens. Most specimens represented by anterior fragments only. Most common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

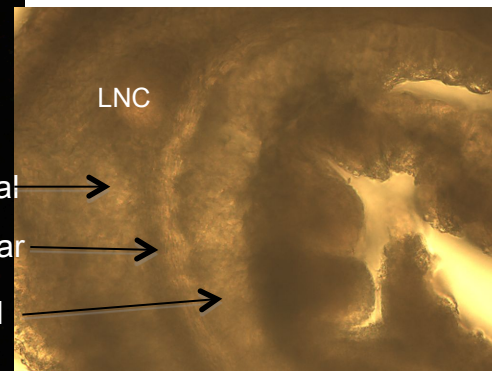
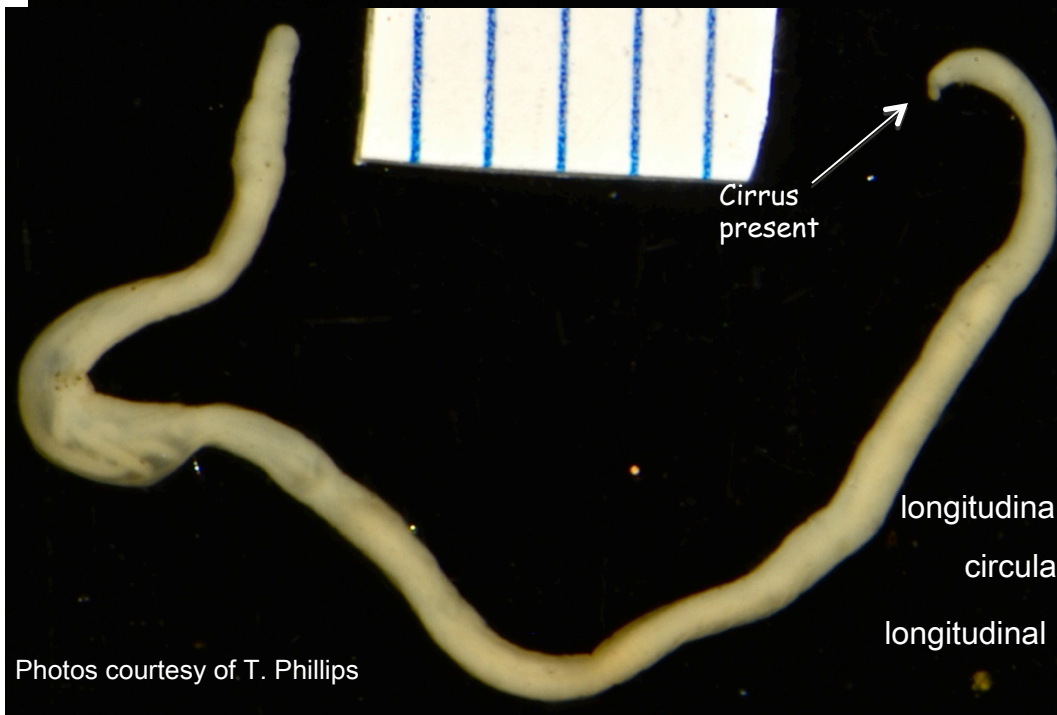


Heteronemertea sp Hyp1

Specimens from Santa Monica Bay, CLA-EMD Monitoring

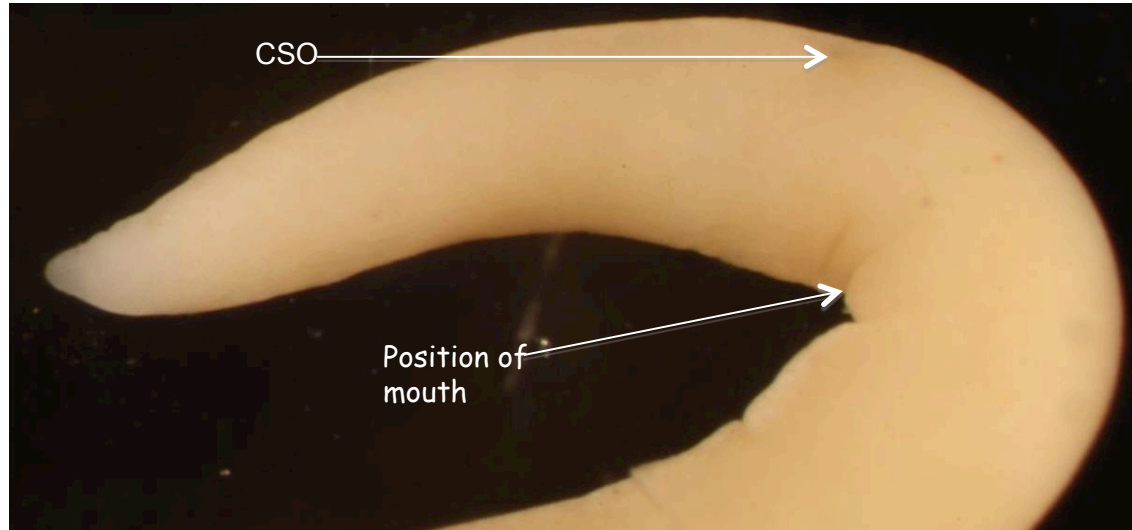


- Elongate, white heteronemertean with cephalic groove absent;
- Head fairly broad, not tapering, anteriorly blunt;
- CSO prominent, and located just anterior to mouth or along anterior margin of mouth;
- Body fairly uniform, round, not dorso-ventrally flattened in abdominal region;
- Cirrus present;
- Typical heteronemertean musculature.
- Distinguished from other heteronemerteans by the above combination of characters including the absence of distinct coloration and cephalic slit, presence of elongate/oval CSO anterior to mouth, blunt head, cirrus, and a relatively thick middle circular musculature for the width of the species.
- Differs from closely related Heteronemertea sp SD1 by presence of cirrus and thicker outer longitudinal muscle layer.



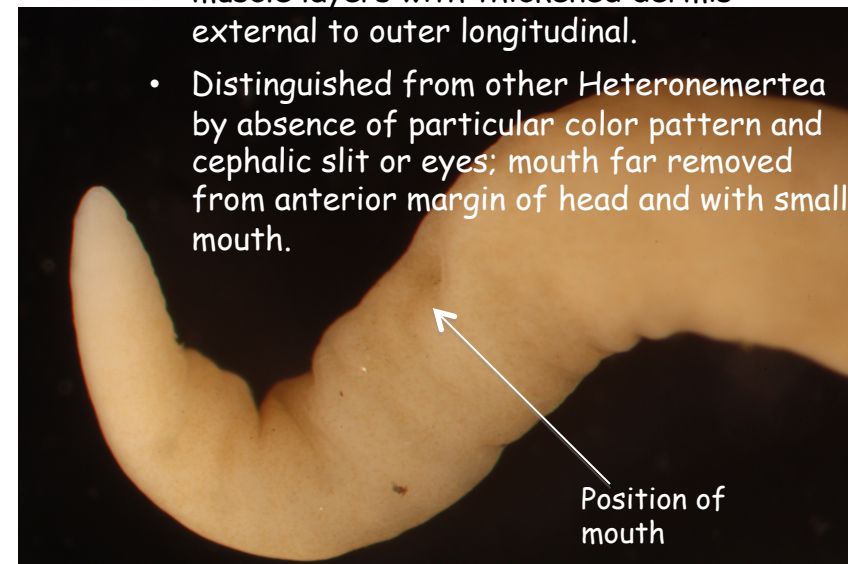
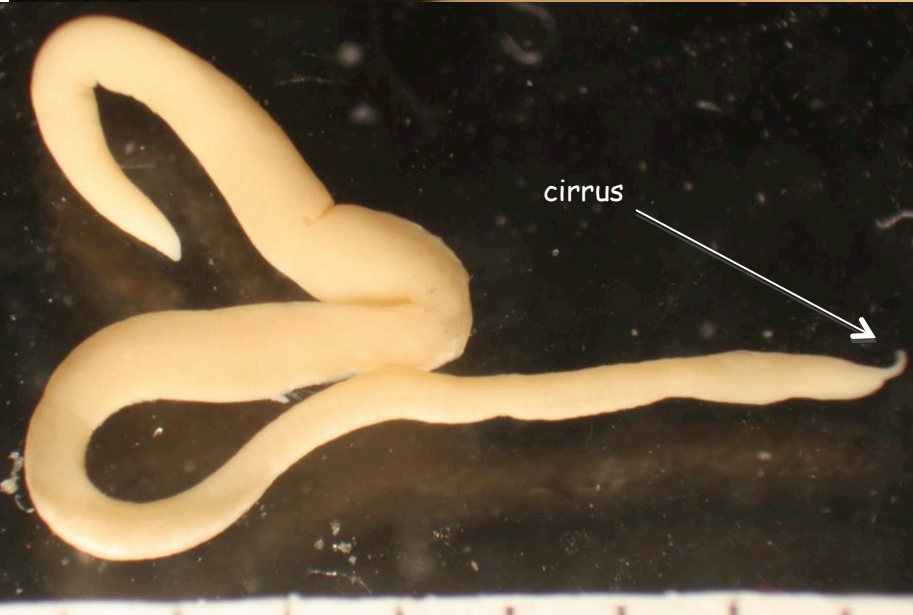
Heteronemertea sp Hyp2

Specimens from Bight'13 Station 9376, North Channel Islands, 110 m
SMB A3, 6 July 2016



- Elongate, slightly beige colored, smooth heteronemertean without cephalic groove or any hint of a furrow
- Cerebral Sense Organ (CSO) is apparent a distinct pit within a slightly thinned area
- Mouth seemingly far removed from tip of strongly tapered head
- Cirrus present
- Body not uniform: head strongly tapered, anterior half of body (esophageal region) broader than posterior region.
- The entire animal generally rounded, not distinctly flattened, without tapered lateral margins. Musculature consists of well developed inner and outer longitudinal muscle layers with thickened dermis external to outer longitudinal.

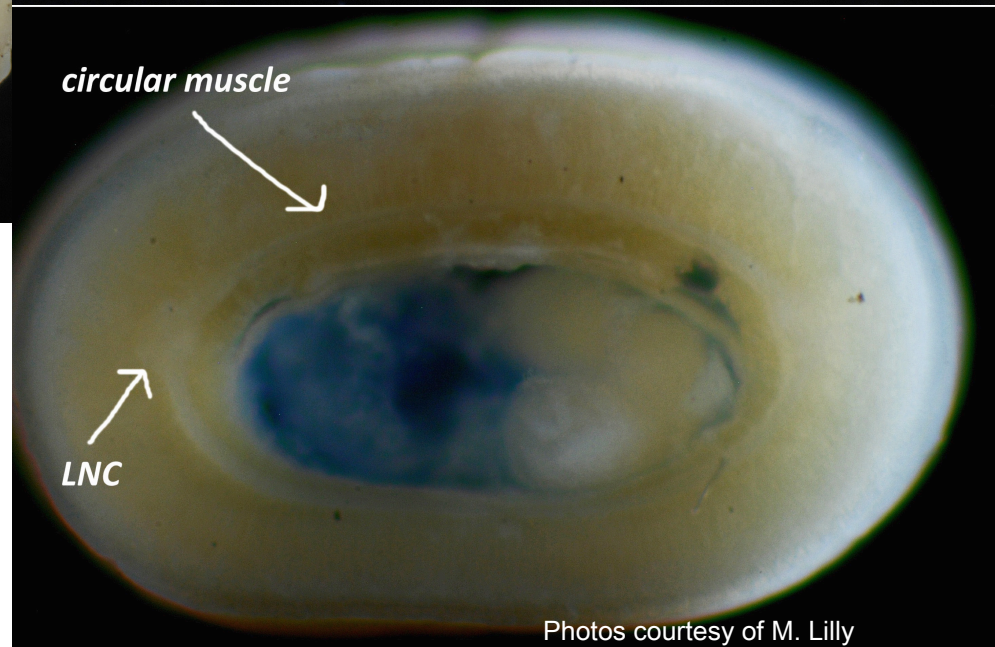
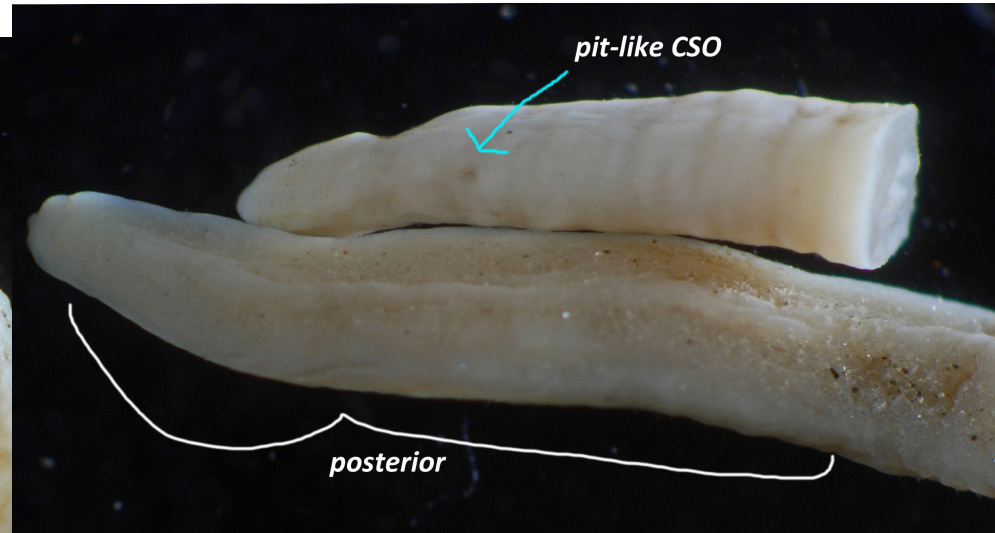
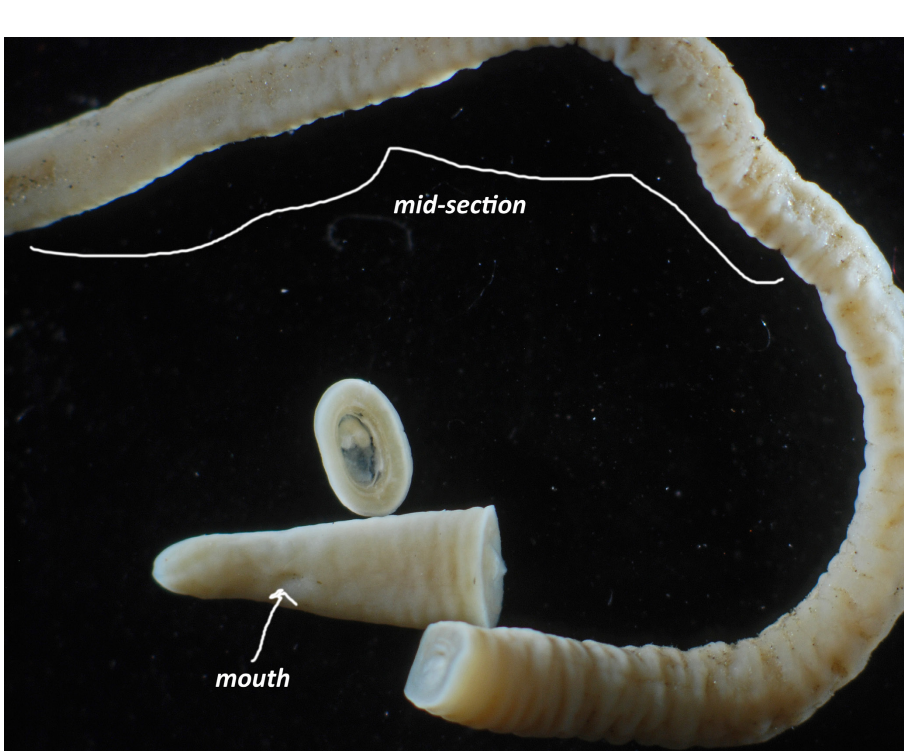
- Distinguished from other Heteronemertea by absence of particular color pattern and cephalic slit or eyes; mouth far removed from anterior margin of head and with small mouth.



Zygeupolia rubens

(=Heteronemertea sp ?Hyp2)

Specimens from CSD, B8 (1), July 2016

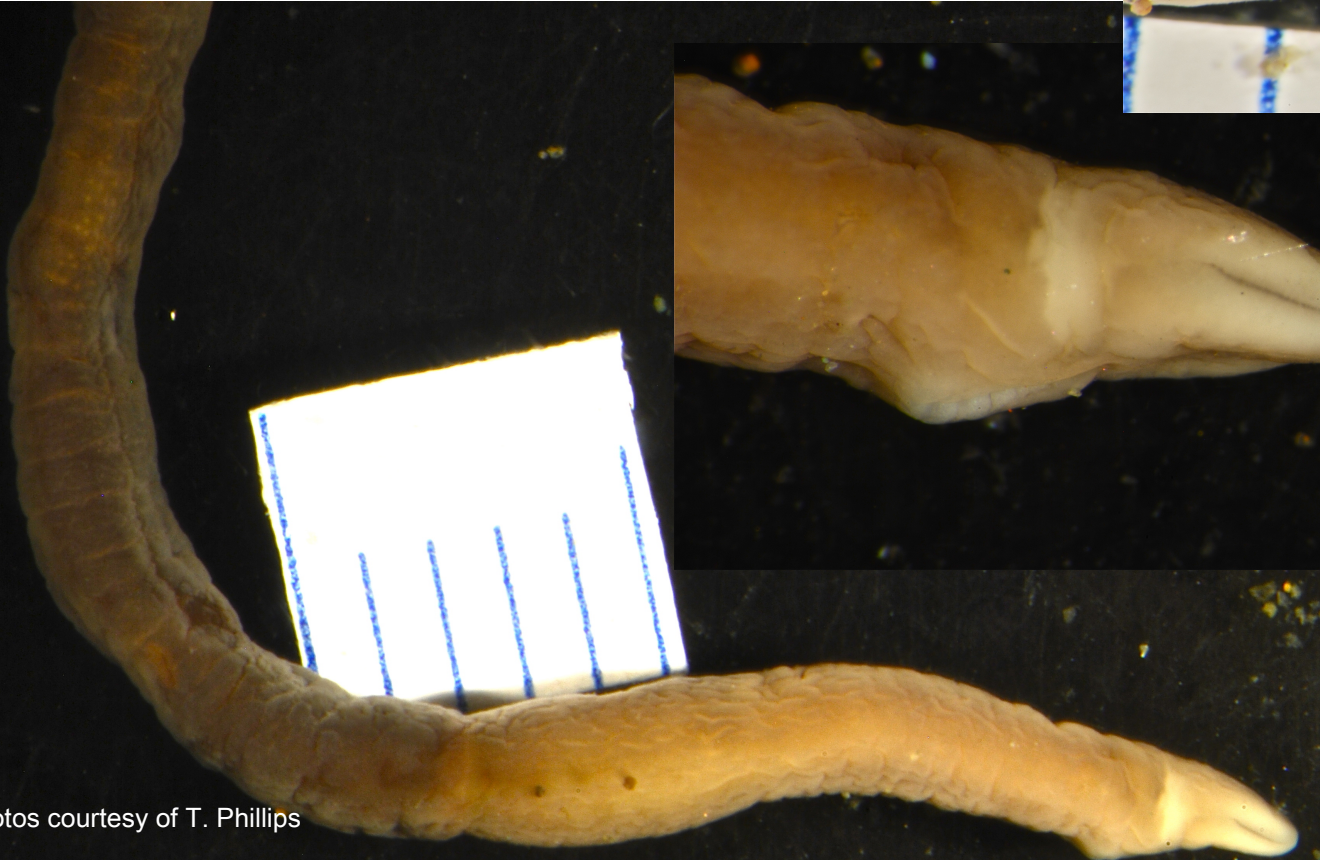


Photos courtesy of M. Lilly

Lineidae sp AV1 Phillips 2013

(=?Lineidae sp SD1 Lilly 2015)

- Elongate, slightly beige colored, smooth or wrinkled lineid
- Head tapered, anteriorly rounded
- Cephalic slit present
- Mouth large, wrinkled
- Cirrus (?)
- Coloration: body ground color olive/yellow/beige; tip of head often white, continuing along cephalic slits; white transverse line starting near posterior margin of cephalic slits and encompassing the mouth ventrally



Lineidae sp SD1 Lilly 2015

(=?Lineidae sp AV1 Phillips 2013)

- Elongate, slightly beige colored, smooth or wrinkled lineid
- Head tapered, anteriorly rounded
- Cephalic slit present, shallow
- Mouth small, often surrounded by white area
- Cirrus present(?) as small knob
- Coloration: body ground color olive/yellow/beige; tip of head often white, continuing along cephalic slits; white transverse line starting near posterior margin of cephalic slits and encompassing the mouth ventrally



Specimens that cannot be identified with confidence

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.

