Answer to Photo Quiz: *Macracanthorhynchus hirudinaceus*, the Giant Thorny-Headed Worm

(See page 2289 in this issue [[doi:10.1128/JCM.00280-13](https://doi.org/10.1128/JCM.00280-13)] for photo quiz case presentation.)

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Members of the phylum Acanthocephala (thorny-headed worms) are parasites characterized by the presence of a retractable proboscis adorned with rows of hooks (1–3). Members of the phyla Cestoda and Acanthocephala are anatomically similar, since both possess a thorned cephalic structure and lack a mouth and an alimentary canal; however, the body of an acanthocephalan morphologically resembles that of the unrelated phylum Nematoda. Over 1,000 species of acanthocephalans infect invertebrates and all classes of vertebrates, but transmission to humans is rare and often without clinical significance (1). Symptomatic infections manifest as enteritis, gastritis, or peritonitis, and surgical intervention may be required, as acanthocephalans can cause ulceration and perforation of the mucosa upon attachment. Due to their rare incidence, few cases of acanthocephalan infections have been described, and therefore, only a few species are thought to infect humans: *Moniloformis moniloformis*, *Bolbosoma* spp., *Plagiorhynchus* spp., and *Macracanthorhynchus* spp. (4–6).

Acanthocephalans reproduce sexually, and females (18 to 65 cm) measure larger than males (5 to 10 cm) (2). Once anchored in the digestive tract of the definitive host, females produce ova, which are excreted in the host feces; the definitive host for *Macracanthorhynchus hirudinaceus* is swine (3). Each ovum contains a larval acanthor. Inside the appropriate intermediate host (insect or crustacean), the acanthor develops into an immature worm (cystacanth) (3). The cystacanth is infective and encysts in the tissue of the invertebrate. A human must ingest the cystacanth-infected insect to become infected. The patient in this case likely ingested a cystacanth-containing beetle/larva while mouthing objects outdoors, but it was unknown whether swine were raised in the community. One unique aspect of this case is the unusual finding of a gravid female worm, which implies that both male and female worms were present inside the child and had matured in what is conventionally thought to be an incidental host. Unfortunately, the child did not return to the clinic for follow-up care, and it is unknown whether a male worm was later passed upon treatment.

Acanthocephalans may be encountered in the clinical microbiology laboratory due to a superficial resemblance to *Ascaris*, and it is important to distinguish Acanthocephala from *Ascaris*, as the drug treatments are different (2). Microscopic examination of the ethanol revealed a thick-textured shell characteristic of *M. hirudinaceus* (see Fig. 1D in the photo quiz); however, gravid worms are not typically found in humans, so most identifications will be based on the worm morphology. In this case, the ova allowed for genus- and species-level identification, which would not have

been possible from the worm alone. The tegument that covers the body of the acanthocephalan is often folded, giving the false appearance of segmentations, which could lead to misidentification as an earthworm (3). The proposed “buccal cavity” (see Fig. 1B in the photo quiz) was actually the proboscis receptacle. This opening would not be present in an earthworm and in *Ascaris* would be much smaller and have three “lips.” A laboratory that receives a worm similar in macroscopic appearance to *Ascaris* should examine it carefully for the characteristic mouthparts of *Ascaris* and for ova. Once *Ascaris* is ruled out, an anterior resection for identification of a thorny cephalic structure should follow. While genus- and species-level identification may be very difficult, identification of the phylum Acanthocephala is of clinical utility. Laboratories should specifically report these worms to the ordering physician, since there is a documented potential for these worms to cause infectious complications in human hosts.

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