

Video transcript

How to study live nemerteans

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- Systematics of nemerteans is based on a combination of characters of external appearance, internal anatomy as well as DNA sequence data.
- Characters of external anatomy such as body shape, color, presence or absence of eyes and various kinds of cephalic slits and furrows, and stylet armature are very important for species identification.
- These characters must be studied in live material because they are not easily discernible in preserved specimens.
- In a separate video I demonstrate how to dissect the proboscis to examine the stylets.
- In this video, I will demonstrate how to study live nemerteans and point out some of the important features for species identification.
- To study a live nemertean you will need a dissecting microscope, your worm in a petri dish with some seawater, a pipette, a pair of forceps and some magnesium chloride to relax the worm.
- It is best to first examine the worm without relaxing it because the overall body shape and any characteristic movements change after relaxation.
- Note how the worm moves, how it glides across the surface, how it turns its head from side to side, whether it can twist its head, whether it can contract while shortening and widening or by coiling its body and whether if it may be able to swim by undulating its body.
- In this sequence there are two different species of worms in the same bowl, one suddenly begins to swim, while the other is resting quietly.
- Note the difference in the overall size and proportions of the body between these two species.
- Here you can see a close-up view of the head, and note the characteristic movement of the head as if the worm is trying to burrow in the sediment, where this worm normally lives.
- Also note the difference in color between the overall body and the margins of the body which are much paler.

- This is a close-up of the head of the other species in the same bowl. Note the difference shape of the head, as well as the color of these 2 individuals. Also, the different way that this worm glides.
- Note the presence or absence of eyes and various cephalic slits and furrows, because sometimes these features are easy to see in worms that are gliding before they are relaxed.
- After you have examined the worm in its original state, you will want to relax it using magnesium chloride isotonic with seawater.
- To relax the worm begin by adding magnesium chloride slowly, a little bit at a time. If you add too much at once the worm might react with violent muscular contractions, fragmenting into small pieces.
- It might take as little half an hour or as long as several hours to completely relax the worm.
- Note if there is a difference in color between dorsal and ventral sides.
- You'll want to note the presence or absence of eyes, their number and arrangement.
- Some worms may have pink cerebral ganglia.
- You will also want to note the position of the proboscis pore and the mouth as well as the presence of longitudinal cephalic slits.
- Some worms might have a small caudal cirrus at the posterior end.
- Note whether there are multiple cephalic furrows, some of them may be "V" shaped. Some species may have secondary cephalic furrows.
- Note the difference in arrangements of the furrows between the dorsal and ventral side of the same worm.
- Some species may have colorless blood while others have red blood.
- You will also want to note whether the worm is reproductive, and, if possible, examine the eggs and sperm under the compound microscope.
- It is important to take good notes, photographs and, if you are able to, make sketches of live material.

