



Video transcript

## Why I study nemerteans

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- I want to say that it was love at first sight but I actually first heard about nemerteans in a lecture.
- I thought they were fascinating animals with a unique mode of life and a unique body plan, and at the time, their relationship with other animals was not entirely clear.
- On top of that, not very many people studied nemerteans, so I thought: "I'll take the job!"
- Nemerteans or ribbon worms are beautiful and graceful marine animals.
- I love the way they move, slowly gliding over the surface using the cilia of their epidermis.
- Some species have striking patterns and colors, others are plain but still elegant.
- There are about 1,300 described species of nemerteans in the world, but likely at least as many undescribed species.
- Most species of nemerteans are marine and benthic, a few are freshwater or terrestrial and one group is holopelagic.
- Nemerteans, as a phylum, are characterized by an eversible proboscis, which normally lies inside the fluid-filled cavity called the rhynchocoel.
- They use their proboscis to attack their prey, such as other worms.
- Toxic secretions of the proboscis epithelium paralyze the prey and then, the nemertean swallows it whole.
- This earns the nemerteans a nickname "pythons of the sea".
- Nemerteans come on a variety of shapes and sizes from a few millimeters long to several meters long.
- The blue whale may be the largest living animal on Earth, but the title of the longest living animal on Earth goes to a nemertean called *Lineus longissimus*.
- One individual collected in England in 1864 measured 55 meters, or approximately 180 feet long.
- Nemerteans are ecologically important as top predators in marine ecosystems, but very few things eat nemerteans because they secrete copious amounts of unpalatable or downright toxic mucus.
- A variety of toxins have been identified from nemerteans, including tetrodotoxin and anabasein.
- Anabasein and its derivatives have shown promise in treating conditions like schizophrenia and Alzheimer's disease.

- One group of nemerteans adapted to feed on eggs of decapod crustaceans, including some commercially imported species such as the king crab, blue crab, American lobster and Dungeness crab.
- The number of worms on a crab can reach an astonishing number of thousands of worms per individual.
- Perhaps, the most interesting thing about nemerteans is their unusual development.
- The juvenile worm develops inside the larval body from a series of isolated rudiments called imaginal discs.
- The imaginal discs grow and fuse around the larval gut.
- Once the juvenile body is complete, the larva undergoes catastrophic metamorphosis in which the juvenile erupts through the larval body and devours the larva.
- In this video you can see the juvenile worm inside the semi-transparent larval body.
- The juvenile moves around, inside the little membrane decorated with pigment spots, called the amnion.
- The worm has just ruptured the amnion, and now is trying to poke its head out, and it has to still rupture the very thin larval epidermis.
- Now the head is outside and you can see the shimmering of the cilia on the surface of the worm.
- All the while, the larva is moving around.
- Now, to successfully metamorphose, most juveniles begin to back out of the larva while swallowing the larval tissues.
- The mouth is a little ways from the anterior tip of the juvenile, and now you can see the ciliated band of the larva and the pigment spots which used to decorate the amniotic membrane disappear into the gut of the juvenile.
- Now the apical organ of the larva disappears into the mouth.
- And now you can see the remaining part of the larval body and the pigment granules being swallowed by the juvenile.
- Now it's a little worm, a little benthic worm which has just completed its first meal of its own larval body.
- So, why do I study nemerteans?
- As humans we all have different abilities and different talents. I'm good at studying nemerteans and I like nemerteans, so I feel it is my calling in life to learn about these organisms to educate and inspire others.

