

What we're going to show you is the next animation, which illustrates how these different components are able to paralyze a fish. So here is the electrical signal coming down the nerve and you're getting the electrical signal on the muscle as you've seen previously. Now we zero in on the synapse. It is at the synapse that all of these venom components are active. So what you see is normally, calcium enters, you get vesicle fusion and the release of neurotransmitter and that opens up the receptors on the muscle end. Once the electrical signal is initiated it is spread throughout the muscle membrane by sodium channels that open up and let sodium in. So the first venom component is Omega-conotoxin that will plug these calcium channels, so in fact prialt is a type of omega-conotoxin. The second venom component are the Alpha-conotoxins that bind to the receptor on the muscle side and they're accompanied by a second venom component called the psi-conotoxin, which basically plugs the ion channel of the receptor. And so even though neurotransmitter is released it can't do anything because these two toxins essentially inhibit the receptor on the muscle side. And finally there is a fourth component, and that fourth component will plug the sodium channels on the muscle side. So that even though you get everything occurring on the nerve side, the release of neurotransmitter, the binding of neurotransmitter to the muscle side and the electrical impulse initiated, when you have this fourth component it plugs all the sodium channels and so now that electrical impulse can't spread through the membrane of the muscle. That alone is able to inhibit muscle contraction. So what you see is that the snail doesn't just take one thing to inhibit transmission of the synapse, it makes four different things and all of these different venom components act together to really do a number on the synapse. So you have four different components acting at different sides and as a result the snail is making absolutely certain that the electrical signal doesn't get from the nerve to the muscle and it is blocking not just with one toxin, but with four.