

## II How a Fish Hunting Snail Captures its Prey

Each *Conus* species  
has more than  
one hundred peptides  
in its venom



Prialt  
( $\omega$ -conotoxin MVIIA)  
is one of the ~100  
components of  
*Conus magus* venom



**500-700 Different *Conus* Species**

Arguably the largest genus  
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With 500-700 *Conus* species that each  
have ~100 peptides, there are over  
50,000 pharmacologically active peptides

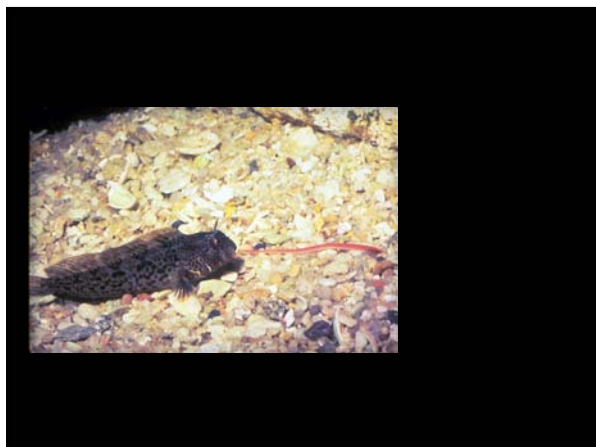
What does the cone snail do with  
100-200 different venom peptides?

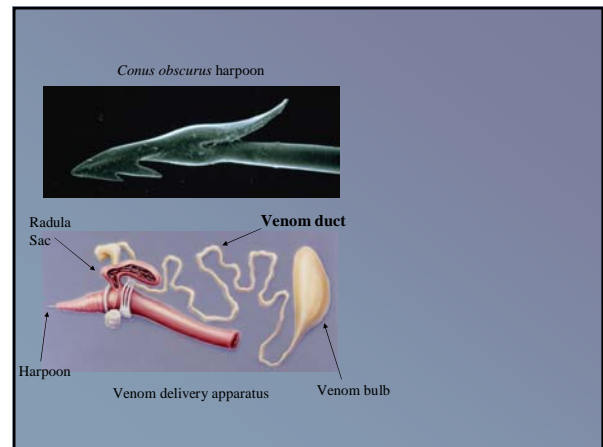
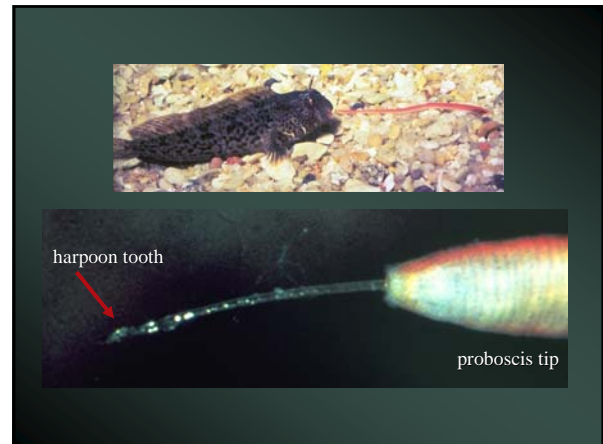
One obvious answer:

**Capture prey**



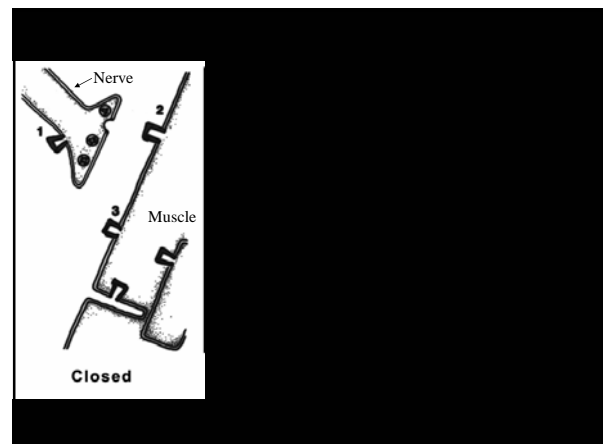
*Conus purpurascens*

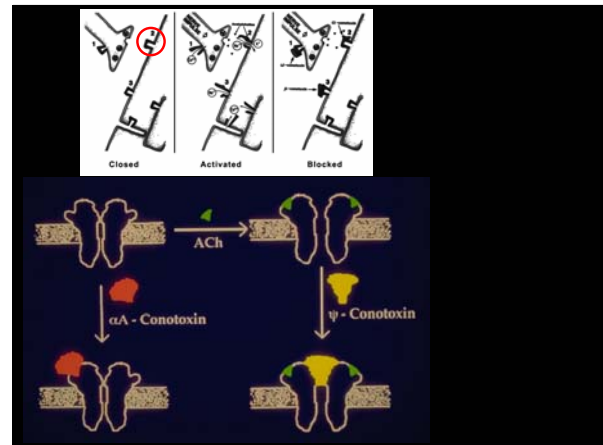
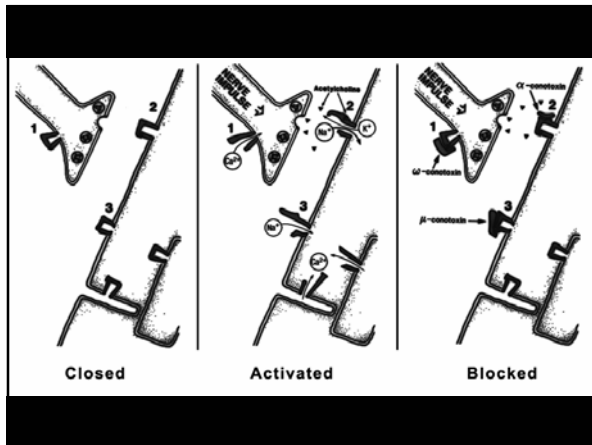
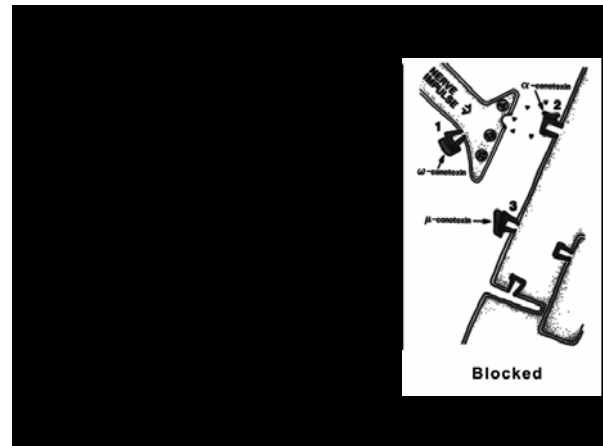
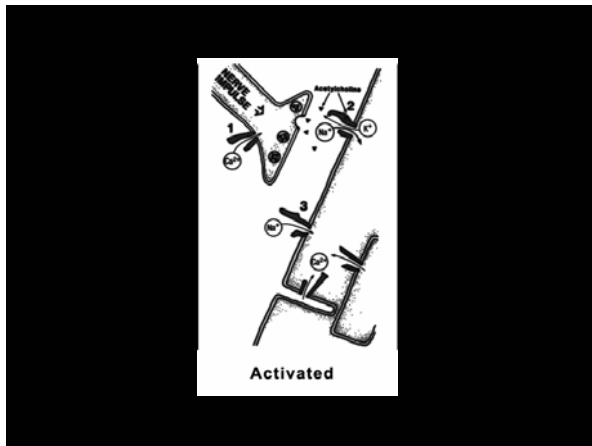




**Paralytic Toxins**  
from a single venom

CKSOGSSCSOTSYNCCRSCNOYTYRCY	ω
CKSOGTQCSRGMRDCCTSCLLYSNKCRRY	ω
ECCNPACGRHYSC	α
ECCHPACGKHFSK	α
RDCCTOOKKCKDRQCKOQRCCA	μ

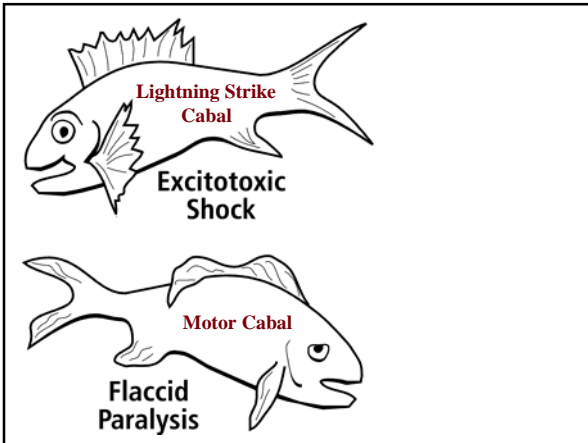
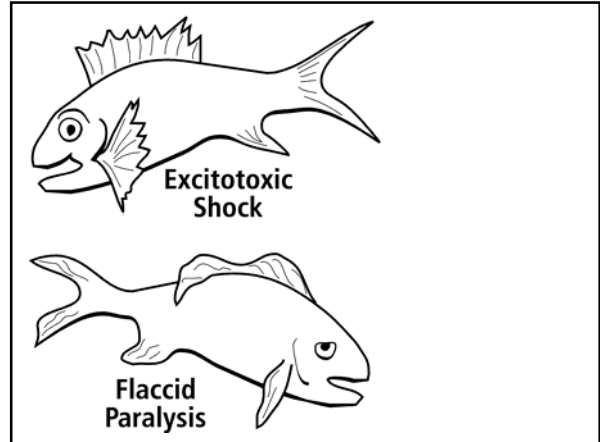
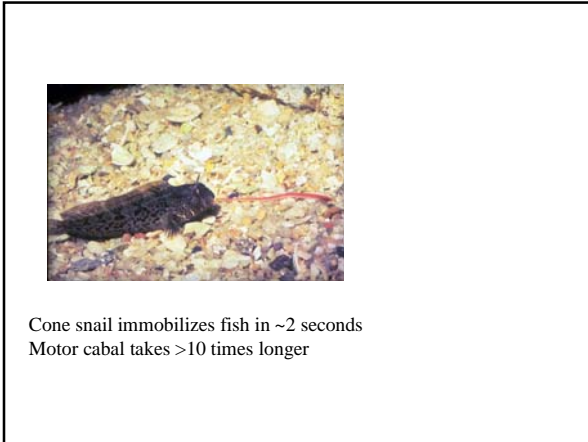




**Cabal:**  
Secret society out to overthrow existing authority

**Motor Cabal**

Presynaptic Ca Channel	(ω-Conotoxin)
Nicotinic Acetylcholine Receptor	
ACh Binding Site	(α-Conotoxin)
Ion Channel	(ψ-Conotoxin)
Muscle Na Channel	(μ-Conotoxin)



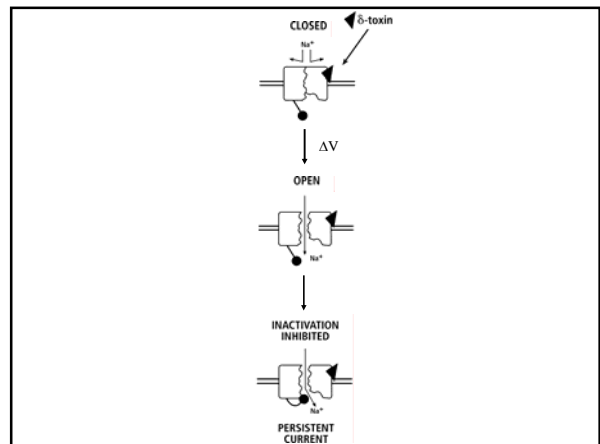
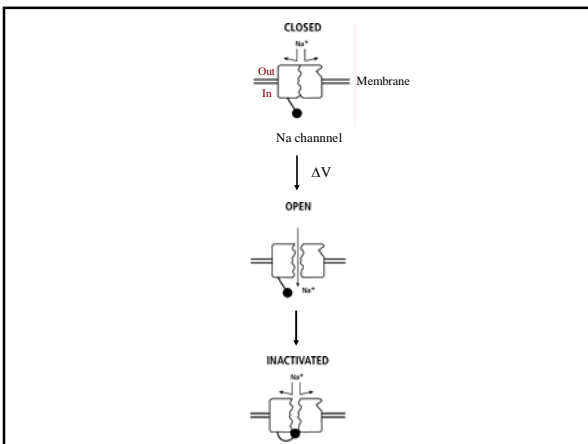
Lightning-strike cabal

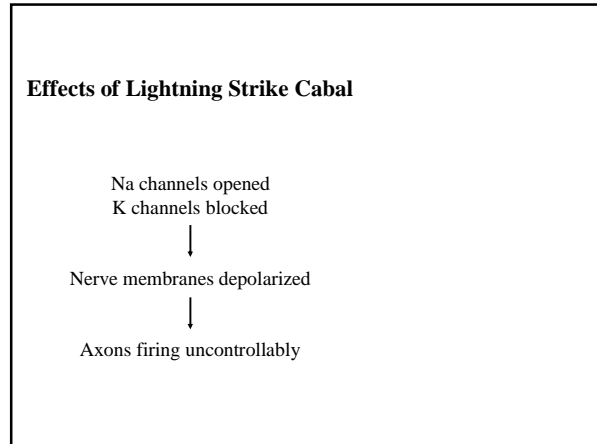
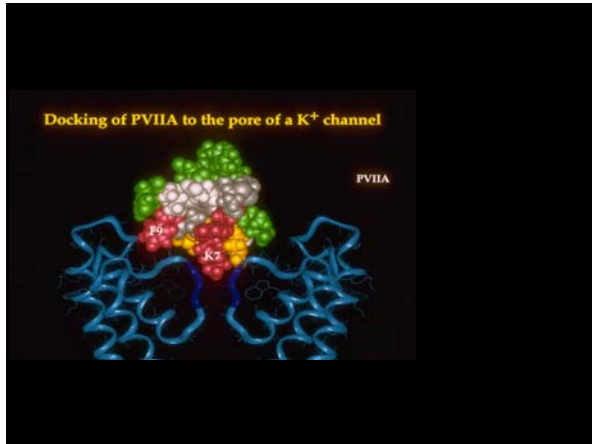
$\delta$ -Conotoxin - INCREASES Na channel conductance  
 $\kappa$ -Conotoxin - Blocks K channels  
 Others - ?

$\kappa$ -PVIIA CR IONQKCFQHLDDCCSRKCNRFNKCV

$\delta$ -PVIA EACYAOGTFCGIKOGLCCSEFCLPGVCFG

(K. J. Shon, M. Grilley, H. Terlau)





**Prey Capture**

<p>1</p> <p><b>Excitotoxic Shock</b></p> <p>Very rapid, fish stunned</p> <p><u>Lightning-strike cabal</u></p> <p><math>\delta</math>-Conotoxin - <b>INCREASES Na channel conductance</b></p> <p><math>\kappa</math>-Conotoxin - <b>Blocks K channels</b></p> <p>Others - ?</p> <p><u>Motor cabal</u></p> <p><math>\omega</math>-Conotoxin - Blocks Ca channels</p> <p><math>\alpha</math>-Conotoxin - Competitive nicotinic receptor inhibitor</p> <p><math>\psi</math>-Conotoxin - Nicotinic receptor channel blocker?</p> <p><math>\mu</math>-Conotoxin - <b>BLOCKS Na channel conductance</b></p>	<p>2</p> <p><b>Neuromuscular Block</b></p> <p>Irreversible paralysis</p>
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