



# BIOINSECTICIDE MODE OF ACTION

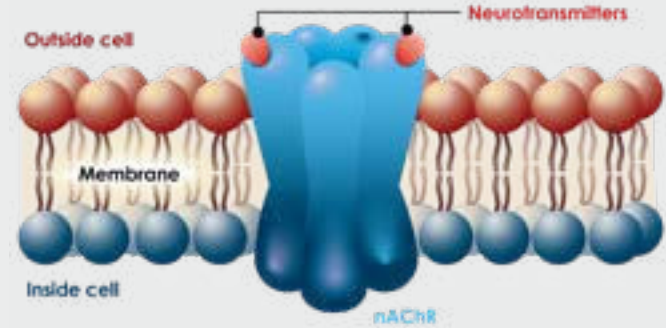


Peptide —  
**emPOWERed**  
Technology

**SPEAR<sup>®</sup> → LEP**

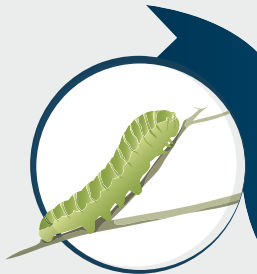
A SOLUTION BY **VESTARON<sup>™</sup>**  
THE POWER OF PEPTIDES

The active ingredient in Spear® is GS-omega/kappa-Hctx-Hv1a. Spear products are the first peptide-based insecticides, and the first bioinsecticides that affect a specific neuromuscular target. Spear delivers an entirely new mode of action for crop protection (IRAC group 32), which means no cross resistance to any other active ingredient, and a novel tool for insecticide resistance management. Because of its biological origins, Spear is lethal to insect and mite pests, but non-toxic to bees, fish, and mammals.

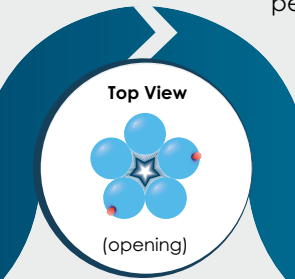
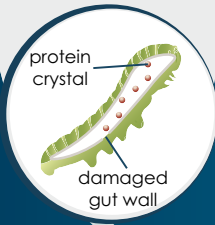


Nicotinic acetylcholine receptors (nAChR) are channels found in the nerves of insects that respond to neurotransmitters. These receptors are essential for transducing certain electrical signals such as the muscle contraction.

Btk crystal proteins damage the gut cells allowing Spear-Lep's active ingredient to access the nervous system

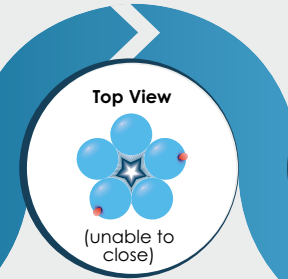
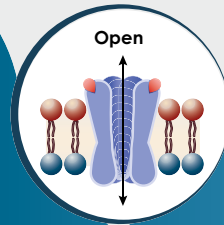


Caterpillar ingests plant tissue treated with Spear-Lep and a low dose of Btk



Spear-Lep helps neurotransmitters to bind and open the channel

The open channel causes persistent depolarization of the nerve cell



The affected cells are unable to reset and transmit new electrical signals

This causes paralysis and death of the insect

