

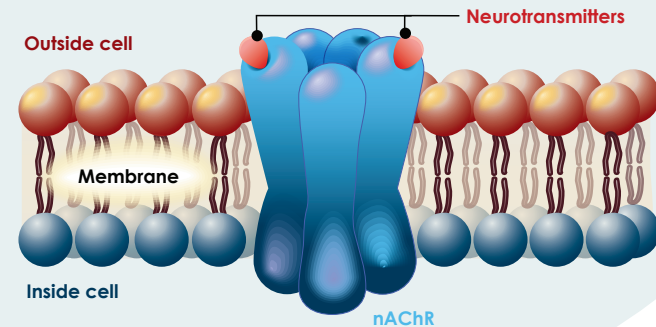
SPEAR[®] LEP
BIOINSECTICIDE
MODE OF
ACTION



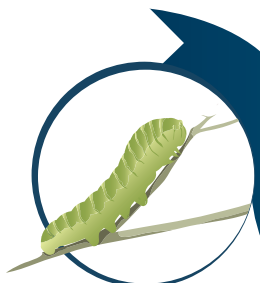
VESTARON[®]
THE POWER OF PEPTIDES™

The active ingredient in Spear® is GS-omega/kappa-HxTx-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

protein crystal
damaged gut wall

The diagram shows a cross-section of a caterpillar's gut wall. Red dots representing protein crystals are shown embedded in the gut wall. The gut wall is labeled 'damaged gut wall'.

Top view
(opening)

A top-down view of a blue protein structure with five petals. A central opening is visible. The label 'Top view' is above the structure, and '(opening)' is below it.

Spear®-Lep helps neurotransmitters to bind and open the channel

Open

A diagram showing the nAChR channel in an 'Open' state. A vertical double-headed arrow indicates the channel is open. Red spheres representing neurotransmitters are shown binding to the top of the channel. The label 'Open' is above the channel.

The open channel causes persistent depolarization of the nerve cell

Top view
(unable to close)

A top-down view of a blue protein structure with five petals. A central opening is visible. The label 'Top view' is above the structure, and '(unable to close)' is below it.

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

This causes paralysis and death of the insect

