VENOMTECH®
Drug Discovery Solutions™

# Insecticide Targeted Venom Discovery Arrays

Insect pests can reduce global crop yields by 10-14% annually and damage 9-20% of stored food crops. Several of these species are resistant to available insecticides. Many venomous animals have evolved to kill invertebrate prey, thus it is logical to consider their venoms as potential bioinsecticides. Venoms are a complex mixture of peptides, small molecules and proteins, that affect molecular targets such as ion channels, GPCRs and kinases, often with exquisite potency and selectivity. This is possibly because they have been developed through millions of years of evolution, rather than a few hundred years of drug discovery. Isolated peptides from the venom of spiders or other venomous insectivorous animals, such as centipedes and scorpions, may have the potential to serve as bioinsecticides.

## Maximize your potential to discover novel epigenetic agents with T-VDA*insect*

- Construction
  - ✓ Venom from 12 species; 2D HPLC fractionation
  - ✓ Echo® qualified 384 plates; 1-5 peptides / well; 3 replicates per plate
- Delivery lead time
  - ✓ 8 to 10 weeks; plates shipped at ambient temperature
- Follow-up Services
  - ✓ Hit ID, SAR and bulk resupply for pharmacology components

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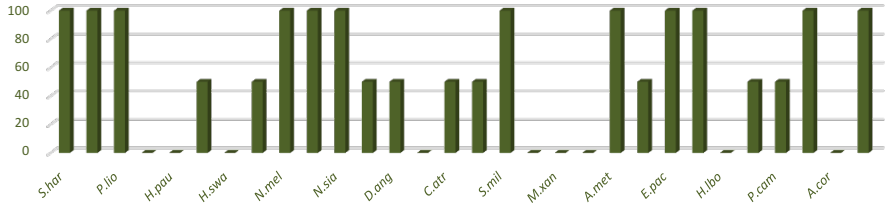
## Venomtech® study to demonstrate insecticidal activity of crude venom preparations

The Venomtech Venom Diversity set was used in a Diptera larvae toxicity assay, modified from Ruiz et al. 2010 (Toxicon **55**(4): 805-810) to determine which venoms have the most potential as novel insecticides. A 10ul venom dose was delivered with a 26G needle on a p10 pipette into the right ventral area of the posterior half of *Calliphora vomitoria*. Six replicates for each dose were housed in the same well, and six dose conditions housed per plate. These larvae are negatively phototoxic, so when exposed to light, they immediately begin to move. After each plate was complete, a visual inspection under full fluorescent lighting, was undertaken as the T=0 reading of immediate activity. Activity was scored as active or not, further counts of activity were taken at 1, 2 and 4 hours post dose.

Results

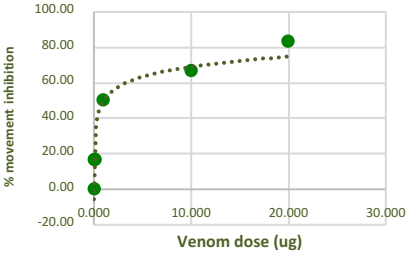
- At t = 0hr nine venoms had demonstrated toxicity in all larvae dosed, this had increased to 12 by t = 1hr (Figure 1) and 13 by t = 4hrs
- *Parabuthus liosoma* and *Naja nigricollis* venom both elicited dose-dependent inhibition of larvae movement in the range tested. Other actives were binary.

Figure 1 – Percentage lethality of the venom diversity set.

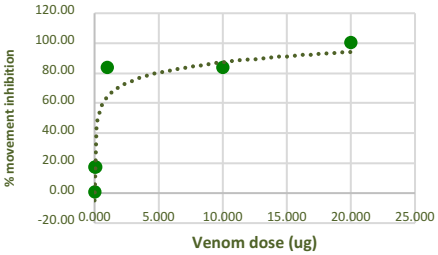



- Figure 2 - Active venoms were then tested in dose response mode (n=6).

2a - *Parabuthus liosoma* venom effect on *Calliphora* larvae




2b - *Naja nigricollis* venom effect on *Calliphora* larvae




- **Summary -** The venom diversity set is an effective tool for finding novel insecticide activity, the 12 venoms active at one hour will be fractionated and form the new Targeted-Venom Discovery Array for insecticides (T-VDA$^{insect}$).

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