
Cell-Based Detection & Receptor Activator Assay

Invention:

The University of North Carolina at Greensboro is actively seeking companies interested in commercializing a rational, cell-based method to identify novel insecticides. The invention uses a simple enzymatic assay to test for disruptors of the insect steroid receptors, a proven target for commercial insecticide known to play a key role in insect development, particularly during feeding and reproductive phases. Compounds that disrupt the normal assay activity are insecticidal candidates. The technology can be used to identify insecticides for individual insects, leading to insecticides that target pests, such as a beetle, in a field full of honey bees.

Applications:

This technology can be used for the detection of insecticides and environmentally important chemicals for organic chemical manufacturers, pesticide manufacturers, and, especially, agricultural and residential end-users. By adapting a cell assay system for individual insect species, insecticides can be identified that are species specific, highly potent, and safe. The assay can also contribute to improvements in cell-based systems in genetic engineering of plants. This invention consists of a reporter system that could be inserted into a variety of living organisms including microbes, plants, insects, and animals.

Advantages:

- Utilizes a commercially proven insecticidal mode of action, thus demonstrating the efficacy of the approach for screening novel compounds with desirable features (i.e. target specificity, potency, safety).
- Allows for screening of specific compounds that disrupt natural insect steroid hormone receptors.
- Can be targeted to specific species of insects.
- Provides a basis for rapid screening plant material for naturally produced insecticides.
- Can be tested with synthetic chemicals.
- Can identify insecticides in mixtures and extracts as well as individual compounds.
- Can be automated to increase throughput rate.
- Reduces costs for insecticide discovery by defining candidates based on an activity-based assay prior to field-testing.

Technology:

The University of North Carolina at Greensboro has a cell-based reporter gene technology that has been adapted to screening compounds for their ability to disrupt insect endocrine responses, which is a commercially viable target for insecticides. This invention detects and measures the actions of two hormones, ecdysteroids and juvenile hormone (JH) upon the activity of an insect hormone receptor which is genetically introduced into cells. It has been discovered by UNCG researchers that the normal activity induced by insect steroid hormones can be disrupted by the additional and simultaneous presence of specific classes of compounds. These compounds include a few known commercial insecticides, several suspected insect growth disruptors from plants, and numerous phytochemicals for which no insecticidal role has been reported. The assay has been modified so that receptors from economically important species, such as the Colorado potato beetle, can also be tested with the goal of identifying potent and species-specific insecticidal compounds. The compounds tested so far include several JH mimics, a chemical class that acts as an insect growth regulator by disrupting insect development and reproduction.