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| Investigating a potential role for chemosensory proteins in insecticide resistance  **Angeliki Tsouri** 1,2#, **Grigoriοs Dosis** 2, **Kerkyra Pandi** 2, **Anastassios Vassiliadis** 1,2and **Vassilis Douris** 1,2\*  1 Biomedical Research Institute/Foundation for Research and Technology  2 Department of Biological Applications and Technology, University of Ioannina  # Presenting author: Angeliki Tsouri, email: <ang.tsouri@uoi,gr>  \* Corresponding author: Vassilis Douris, email: <vdouris@uoi.gr> |

abstract

Crop protection and the prevention of insect-borne diseases heavily depend on chemical insecticides to control insect populations. The development of insecticide resistance poses a major challenge hampering control efforts. Complex insecticide formulations are required that include synergists, i.e. non-toxic compounds that suppress resistance and enable lower doses and longer timeframes of insecticidal compound use. Our research aims to investigate novel mechanisms that lead to resistant phenotypes, including the action of chemosensory proteins (CSPs), a unique arthropod protein family whose members have a strong affinity for aromatic compounds including most insecticide groups and are implicated in a novel resistance mechanism1,2.

Using a fluorescence-based competitive assay we can assess the potential inhibition of binding; this allows us to determine whether the protein can specifically bind insecticides. In this study we functionally expressed several candidate CSPs from the cotton bollworm Helicoverpa armigera in a baculovirus/ insect cell expression system and validated their potential for insecticide binding against a panel of insecticides with well-characterized modes of action. We demonstrate that there are changes in the fluorescence signal, indicative of binding of certain proteins in the presence of Amitraz, Abamectin, and Pyrimphos methyl, as well as pyrethroids like λ-Cyhalothrin and Permethrin. These findings will enable us to establish a high-throughput assay system to further investigate the potential role of CSPs in insecticide resistance and lay the groundwork towards in vivo bioassays using a transgenic Drosophila melanogaster system.

**REFERENCES**

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