

# New mode of action compounds for the control of *Drosophila suzukii*

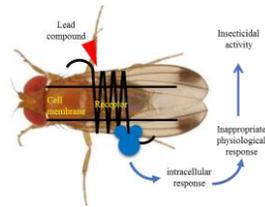
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## Introduction

### The need for new pesticides

- Heavy reliance on synthetic chemicals
- Drive towards integrated pest management
- Restricted use and/or withdrawal of active ingredients
- Resistance management

### Disrupting receptor function



The lead compound will interact with a receptor, either over stimulating or blocking its response, resulting in an inappropriate physiological response and increased mortality



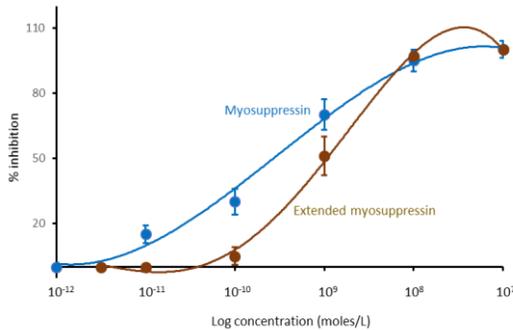
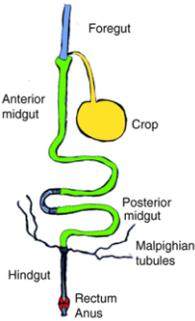
## Aims:

- To specifically target essential components of *Drosophila suzukii* physiology and behaviour (feeding, diuresis, reproduction) to reduce pest populations by disrupting hormone receptor function
- To develop receptor screening assays to identify lead compounds for pesticide discovery
- To determine receptor specificity by testing mammalian hormones and characterising non-target (honey bee) receptors

## Results and discussion

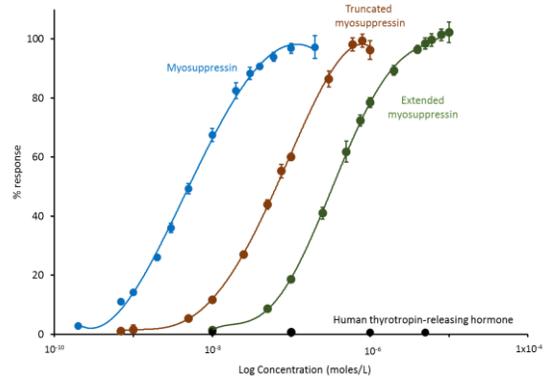
### 1. *Drosophila* myosuppressin

#### Inhibition of crop contractions



In semi-isolated gut preparations both the native myosuppressin and the extended myosuppressin analogue inhibit crop contractions. In the intact fly, this should result in feeding inhibition and ultimately mortality.

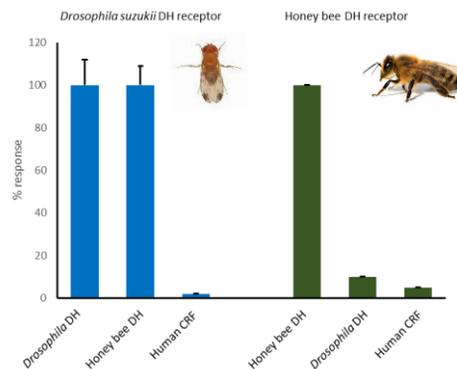
#### *Drosophila suzukii* myosuppressin receptor



The myosuppressin receptor is activated by the native hormone (blue line), but not by the human homologue (thyrotropin-releasing hormone; black circles). Myosuppressin analogues also activated the receptor, but were not as potent as the native peptide (brown and green lines)

### 2. Diuretic hormone

The diuretic hormone (DH) receptors from *D. suzukii* and the honey bee (*Apis mellifera*) are activated by their native hormones. However, although the honey bee peptide has 100% potency on the *D. suzukii* receptor, the converse is not true. Neither receptor is activated by the human homologue (corticotropin releasing factor; CRF).



## Conclusions

- The myosuppressin receptor from *Drosophila suzukii* and the diuretic hormone receptors from *D. suzukii* and the honey bee have been characterised and shown to be activated by their native ligands.
- There is limited cross-reactivity between receptors, suggesting that lead compounds could be developed to exclusively target a pest insect
- Further screening is required to identify stable and/or non-peptide analogues