Insect 'noses' the key to Cybernose collaboration

August 11 2006

A scanning electron micrograph of the head of Drosophila, or Fruit Fly. Scientists are studying odorant receptors in Drosophila in research on developing a cybernose. Credit: CSIRO, Entomology

A new $4 million collaboration announced today will help scientists in their efforts to produce a new generation of electronic nose, the 'cybernose'.

Researchers in the collaborative Cluster between The Australian National University, Monash University and CSIRO's Food Futures National Research Flagship are trying to understand how simple animals make sense of smells.

The microscopic nematode worm will be central to the cybernose research due to its highly sensitive molecular recognition system, allowing it to sense smell and flavour qualities in grapes.

The cybernose will involve putting sensor proteins from insects and nematodes in to an electronic nose to replace the current generation of electronic sensors that are not discriminating enough.

The cybernose may also be used in future across other sectors of the food and beverage industries and, in the long term, the cybernose technology could be developed to enhance Australia's biosecurity by detecting and intercepting pests and diseases

The Minister for Education, Science and Training, Julie Bishop, has announced the first round of Flagship Collaboration Fund Cluster funding, designed to facilitate the involvement of the wider Australian research community in addressing the critical national challenges targeted by the Flagships.

As part of the $305 million over seven years provided by the Australian Government to the National Research Flagships, $97 million was specifically allocated to further enhance collaboration between CSIRO, Australian universities and other publicly funded research agencies.

The Flagship Collaboration Fund enables the skills of the wider Australian research community to be applied to the major national challenges targeted by CSIRO's Flagship Initiative.

The University Cluster partners will receive $2.2 million from the Flagship Collaboration Fund over two and a half years. This money will be matched in-kind by ANU and Monash.

Dr Bruce Lee, Director of the Food Futures Flagship, says that the Olfactory Pattern Recognition Research Cluster is one of the first Clusters to receive funding from the Flagships Collaboration Fund and university partners.

"This is the first time that we've had a real opportunity to collaborate with CSIRO to build on basic science to generate a potentially extremely useful technology," says Cluster leader, Professor Mandyam Srinivasan from ANU.

"It is very exciting that the research will have applications in a number of industries."

Dr Coral Warr from Monash University says the collaborative cluster is an exciting opportunity.

"It is bringing together Australian olfaction researchers using very different approaches to solve a common problem - how do animals detect and discriminate odours," Dr Warr says.

She says that participation in the Flagship Cluster has enabled her to bring to Australia one of the foremost insect olfactory electrophysiologists, Dr Marien de Bruyne, thus enabling her group to study odorant receptor function in the fruit fly Drosophila in entirely new ways.

"The information we generate about how these receptors function will directly benefit CSIRO's development of olfactory biosensors," Dr Warr says.

Although the applications will be numerous, in the first instance, the group is working with the wine industry.

"The Cybernose will draw on how the brains of simple organisms such as insects and tiny nematode worms process information about smells and tell the difference between related odours," says Dr Trowell, the Flagship theme leader.

"By 2013, we aim to have, in wineries around Australia, a Cybernose that will enable the wine industry to objectively measure aroma and flavour - a more reliable measure than chewing some grapes.

"This will enable winemakers to pick grapes at the time of optimum ripeness and even to tailor the style of wine precisely and so improve its value. This has the potential to contribute $750 million annually to the industry."

Source: CSIRO Australia