Molecular imaging of gustatory signalling in *C. elegans*

Dekkers M, Jansen G
Dept of Cell Biology and Genetics, Erasmus MC, Rotterdam

The nematode *C. elegans* provides an excellent model system to study the molecular and cellular mechanisms that govern behaviour. Behavioural assays done in our lab have identified many proteins that are involved in the detection of salts and the plasticity of this response. A number of cells that play specific roles in these processes have been identified using expression data, cell specific ablation and rescue experiments.
In a parallel approach we are also using genetically encoded reporter constructs to image the response of single cells upon stimulation. This allows us to study the individual roles of these cells in the observed behavioural response.
The primary way to do this is to use the Cameleon construct (Miyawaki et al., 1999), which uses Fluorescence Resonance Energy Transfer (FRET) to visualise changes in the calcium levels in the cytosol. Preliminary results show that we can image calcium transients in one of the aversive neurons using a range of hyperosmotic stimuli.
We are also testing a construct that is a measure for PIP2 hydrolysis in the membrane (van der Wal et al., 2001) and a pH sensitive derivate of GFP, pHluorin (Miesenböck et al., 1998), as a reporter for vesicle release in the synaptic cleft.
We drive expression of these imaging constructs with cell-specific promoters in cells that have been shown to be involved in sensory signalling. This allows us to study the intracellular and intercellular signalling pathway in more detail.
Together with the data from behavioural assays, this will provide insight into the gustatory signalling pathways in *C. elegans*.

Martijn Dekkers, Dept of Cell Biology & Genetics, ErasmusMC, PO Box 1738, 3000 DR Rotterdam, t 010-4087165, e-mail m.dekkers@erasmusmc.nl

Neuroscience 1