The genetic model organism Caenorhabditis elegans as a model for neurobiology research

Created on: 16-04-2020 - Last modified on: 17-04-2020

Contact person
Isabel Beets

Organisation
Name of the organisation Katholieke Universiteit Leuven (KUL)
Department Biology
Country Belgium
Geographical Area Flemish Region

SCOPE OF THE METHOD

<table>
<thead>
<tr>
<th>The Method relates to</th>
<th>Animal health, Human health</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Method is situated in</td>
<td>Basic Research, Education and training</td>
</tr>
<tr>
<td>Type of method</td>
<td>In vivo</td>
</tr>
<tr>
<td>Used species</td>
<td>Caenorhabditis elegans</td>
</tr>
<tr>
<td>Targeted organ system or type of research</td>
<td>Neurobiology research</td>
</tr>
</tbody>
</table>

DESCRIPTION

Method keywords
brain plasticity
C. elegans
behavior
learning

**Scientific area keywords**
- neuroscience
- genetics
- molecular biology
- neuromodulation

**Method description**
The nematode *Caenorhabditis elegans* provides a powerful model system to study fundamental working mechanisms of the nervous system in a living animal. Its main advantages are its compact nervous system that has been fully mapped, its short generation time and amenability for genetic research. As a model system, *C. elegans* allows to rapidly dissect the molecular and cellular basis of neural signaling, brain plasticity and the neural circuits underlying behavior. Many of the genes and molecular machinery that are used by the nervous system to steer animal physiology and behavior are well conserved between *C. elegans* and other animals, including humans. This way, it offers several opportunities to unravel the neuronal functions of conserved genes and catalyze functional studies of these genetic pathways in other model systems. In addition, its small size and transparency makes this model ideally suited for high-throughput functional studies and translational research including drug target screening.

**Lab equipment**
*C. elegans* is a microscopic animal so most handling and observation of this animal is done using standard and confocal microscope setups. Breeding and maintenance of the animal is low in cost, and comparable to microbiology culturing.

**Method status**
Published in peer reviewed journal

**PROS, CONS & FUTURE POTENTIAL**

**Advantages**
The main advantages of *C. elegans* as a model system for neurobiology research are
its compact nervous system that has been fully mapped, its short generation time and amenability for genetic research. Thanks to these features, *C. elegans* allows to rapidly dissect the molecular and cellular basis of neural signaling, brain plasticity and the neural circuits underlying behavior. It’s small size also makes this model amenable to high-throughput screening.

**Challenges**

Due to its small size, dissections of tissues or other material are challenging. However, this is compensated by its transparency that allows to visualise most processes using fluorescent reporters *in vivo*.

**REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION**

**References**


