Mouse retinal explants

SCOPE OF THE METHOD

<table>
<thead>
<tr>
<th>The Method relates to</th>
<th>Animal health</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Method is situated in</td>
<td>Basic Research</td>
</tr>
<tr>
<td>Type of method</td>
<td>In vitro - Ex vivo</td>
</tr>
<tr>
<td>Species from which cells/tissues/organs are derived</td>
<td>Mouse (mus musculus)</td>
</tr>
<tr>
<td>Type of cells/tissues/organs</td>
<td>Retina</td>
</tr>
</tbody>
</table>

DESCRIPTION

Method keywords

Tissue explant
retina
neurite outgrowth
immunohistochemical staining
automated morphometric analysis
preserving cell-to-cell interaction

Scientific area keywords

axonal regeneration
neurodegeneration
retinal differentiation

Method description

Organotypical culture models, such as retinal explants, is an ideal alternative for in vitro retinal cell cultures and preclinical animal models, as they provide the necessary compromise between these two model systems. The major advantage of explant cultures is that cells are kept within their normal environment, thereby preserving cell-to-cell interactions, while maintaining a higher level of experimental control as in animal models. Organotypic cultures thereby provide an ideal platform for the identification and validation of novel neuroprotective or pro-regenerative substances. As retinal explants have previously been used to study various neural processes such as neurodegeneration and neurite outgrowth, they provide an ideal ex vivo system to screen promising molecules in an in vivo-like situation. This technique includes retinal explant dissection, culture, immunostaining, and automated analysis methods using ImageJ.

Lab equipment

Dissection microscope with light source;
Horizontal laminar flow;
Dissection material;
Incubator;
Confocal microscope.

Method status

Internally validated
Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages
The major advantage of explant cultures is that cells are kept within their normal environment, thereby preserving cell-to-cell interactions. They provide an ideal \textit{ex vivo} system to screen promising molecules.

**Challenges**

No time-lapse experiments no objective distinction can be made between glial and neuronal processes, which may result in a false representation of neurite outgrowth.

**Modifications**

Transgenic animals, that express a fluorescent protein in RGC axons, such as the thy1-YFP mice might allow for time-lapse experiments.

**Future & Other applications**

In diabetic retinopathy, the retinal explants will be used to test compounds known to be involved in developing perivascular membranes.

Ideal technique for screening potential regenerative molecules, both in mouse and zebrafish models.

**REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION**

**References**


**Associated documents**

Protocol P3 retinal explants.pdf