Vitreoretinal explant

Commonly used acronym: *VR explant*

Created on: 23-03-2020 - Last modified on: 24-03-2020

Contact person

Katrien Remaut

Organisation

Name of the organisation Ghent University (UGent)

Department Faculty of Pharmaceutical Sciences

Country Belgium

Geographical Area Flemish Region

SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research
Type of method	In vitro - Ex vivo
Species from which cells/tissues/organs are derived	Bovine
Type of cells/tissues/organs	Retina with vitreous attached

DESCRIPTION

Method keywords

intravitreal injection

ocular delivery

retinal delivery

nanomedicines
vitreal mobility
inner limiting membrane

Scientific area keywords

ocular delivery
nanomedicines
intravitreal stability
retinal delivery
bovine eyes

Method description

Retinal gene delivery via intravitreal injection is hampered by various physiological barriers present in the eye of which the vitreoretinal (VR) interface represents the most serious hurdle. We present a retinal explant model especially designed to study the role of this interface as a barrier for the penetration of vectors into the retina. In contrast to all existing explant models, the developed model is bovine-derived and more importantly, keeps the vitreous attached to the retina at all times to guarantee an intact VR interface. After *ex vivo* intravitreal injection into the living retinal explant, the route of fluorescent carriers across the VR interface (vitreous and inner limiting membrane) can be tracked.

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

Representative vitreous and inner limiting membrane intravitreal injections possible.

Challenges

Only viable for 1-2 days ;
No vitreal flow or clearance pathways present.

Modifications

Could be adapted to whole eye model with perfusion to mimick vitreal flows.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Karen Peynshaert, Joke Devoldere, Valérie Forster, Serge Picaud, Christian Vanhove, Stefaan C. De Smedt & Katrien Remaut (2017) Toward smart design of retinal drug carriers: a novel bovine retinal explant model to study the barrier role of the vitreoretinal interface, Drug Delivery, 24:1, 1384-1394, DOI: 10.1080/10717544.2017.1375578