In vitro reverse pharmacology for characterising ligand-receptor interactions

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

The Method relates to	Animal health, Human health
The Method is situated in	Basic Research, Translational - Applied Research
Type of method	In vitro - Ex vivo
Species from which cells/tissues/organs are derived	Mammalian cell lines for heterologous expression
Type of cells/tissues/organs	Mammalian cell lines for heterologous expression

DESCRIPTION

Method keywords

reverse pharmacology
GPCR deorphanization
ligand-receptor screening
cell culture

Scientific area keywords

pharmacology
neurobiology
signal transduction
GPCR signaling

Method description

Reverse pharmacology is a high-throughput *in vitro* method to characterise ligand-receptor interactions. In this method, a receptor of interest is expressed in a heterologous

cell line and used as a hook to fish out its ligand(s) from a library of synthetic compounds. Receptor activation is measured by monitoring secondary messengers, such as the release of calcium from intracellular storage sites, using fluorescent or bioluminescent indicators. The method can be used for high-throughput screening of ligand-receptor interactions and for in depth follow-up studies characterising the potency, affinity and downstream signalling pathways of ligand-receptor couples.

Lab equipment

This method requires an automated liquid handling system that can simultaneously detect fluorescence and/or bioluminescent signals, e.g. a FLIPR system. It also requires standard facilities for cell culture.

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

The main advantage of reverse pharmacology is its amenability for high-throughput screening, providing the ability to perform large-scale screens of ligand-receptor interactions. In addition, no prior knowledge on downstream signalling pathways is required to monitor receptor activation.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Caers, J. et al. Molecular characterization of a short neuropeptide F signaling system in the tsetse fly, Glossina morsitans morsitans. Gen Comp Endocrinol 235, 142–149 (2016).
Caers, J. et al. Characterization and pharmacological analysis of two adipokinetic hormone receptor variants of the tsetse fly, Glossina morsitans morsitans. Insect Biochem. Mol. Biol. 70, 73–84 (2016).
Caers, J. et al. Characterization of G protein-coupled receptors by a fluorescence-based calcium mobilization assay. J Vis Exp e51516–e51516 (2014). doi:10.3791/51516
Beets, I. et al. Vasopressin/oxytocin-related signaling regulates gustatory associative learning in C. elegans. Science 338, 543–545 (2012).

Coordinated by

Financed by