Document details

Back to results | 1 of 1

Export Download Print E-mail Save to PDF Add to List More...

Full Text View at Publisher

Biochimica et Biophysica Acta - Molecular and Cell Biology of Lipids
Volume 1863, Issue 9, September 2018, Pages 1132-1141

Oleoyl-lysophosphatidylinositol enhances glucagon-like peptide-1 secretion from enteroendocrine L-cells through GPR119 (Article)

Arifin, S.A.[a,b], Paternoster, S.[c], Carlessi, R.[d], Casari, I.[c], Ekberg, J.H.[e], Maffucci, T.[a], Newsholme, P.[d], Rosenkilde, M.M.[e], Falasca, M.[a,c]

[a]Centre for Cell Biology and Cutaneous Research, Blizard Institute, Barts and The London School of Medicine and Dentistry, Queen Mary University of London, London, United Kingdom
[b]Department of Basic Medical Science for Nursing, Kulliyyah of Nursing, IIUM, Bandar Indera Mahkota, Kuantan, Pahang, Malaysia
[c]Metabolic Signalling Group, School of Pharmacy and Biomedical Sciences, Curtin Health Innovation Research Institute, Curtin University, Perth, Western Australia, Australia

View additional affiliations

Abstract

View references (45)

The gastrointestinal tract is increasingly viewed as critical in controlling glucose metabolism, because of its role in secreting multiple glucoregulatory hormones, such as glucagon like peptide-1 (GLP-1). Here we investigate the molecular pathways behind the GLP-1- and insulin-secreting capabilities of a novel GPR119 agonist, Oleoyl-lysophosphatidylinositol (Oleoyl-LPI). Oleoyl-LPI is the only LPI species able to potently stimulate the release of GLP-1 in vitro, from murine and human L-cells, and ex-vivo from murine colonic primary cell preparations. Here we show that Oleoyl-LPI mediates GLP-1 secretion through GPR119 as this activity is ablated in cells lacking GPR119 and in colonic primary cell preparation from GPR119$^{-/-}$ mice. Similarly, Oleoyl-LPI-mediated insulin secretion is impaired in islets isolated from GPR119$^{-/-}$ mice. On the other hand, GLP-1 secretion is not impaired in cells lacking GPR55 in vitro or in colonic primary cell preparation from GPR55$^{-/-}$ mice. We therefore conclude that GPR119 is the Oleoyl-LPI receptor, upstream of ERK1/2 and cAMP/PKA/CREB pathways, where primarily ERK1/2 is required for GLP-1 secretion, while CREB activation appears dispensable. © 2018

Author keywords

Glucagon-like peptide-1 (GLP-1) | GPR119 | GPR55 | L-cells | Lysophosphatidylinositol (LPI) | Mixed colonic preparation

Funding details

Funding number	Funding sponsor	Acronym	Funding opportunities
	Ministry of Higher Education, Malaysia	MOHE	
	Faculty of Health Sciences, Queen's University		
	Diabetes Australia		

Funding text

The authors acknowledge the infrastructure and staff support provided by the School of Biomedical Sciences and CHIRI, Faculty of Health Sciences Curtin University. Work in the Falasca lab is supported by Diabetes Australia. S.A.A. received a full SLAI scholarship from Ministry of Higher Learning, Malaysia. S.P. is supported by the Curtin University

organized the literature and figures and performed statistical analyses. TM reviewed/edited the manuscript and provided intellectual contribution to the study. J.H.E., P.N. and M.M.R. reviewed/edited the manuscript. R.C. contributed to discussion and reviewed/edited manuscript. I.C. performed experiments and contributed to discussion. M.F. conceived the project, led and supervised the study, performed experiments and wrote ... View All

ISSN: 13881981
CODEN: BBMLF
Source Type: Journal
Original language: English
DOI: 10.1016/j.bbalip.2018.06.007
Document Type: Article
Publisher: Elsevier B.V.

References (45)

View in search results format >

All | Export | Print | E-mail | Save to PDF | Create bibliography

1 Meier, J.J., Nauck, M.A.

Incretin-based therapies: where will we be 50 years from now?

(2015) *Diabetologia*, 58 (8), pp. 1745-1750. Cited 24 times.
link.springer.de/link/service/journals/00125/index.htm
doi: 10.1007/s00125-015-3608-6

View at Publisher

2 Badole, S.L., Bagul, P.P., Mahamuni, S.P., Khose, R.D., Joshi, A.C., Jangam, G.B., Ghule, A.E., (...), Coutinho, E.C.

Oral L-glutamine increases active GLP-1 (7-36) amide secretion and improves glycemic control in stretpozotocin-nicotinamide induced diabetic rats

(2013) *Chemico-Biological Interactions*, 203 (2), pp. 530-541. Cited 12 times.
doi: 10.1016/j.cbi.2013.02.006

View at Publisher

3 Clemmensen, C., Smajilovic, S., Smith, E.P., Woods, S.C., Bräuner-Osborne, H., Seeley, R.J., D'Alessio, D.A., (...), Ryan, K.K.

Oral L-arginine stimulates GLP-1 secretion to improve glucose tolerance in male mice

(2013) *Endocrinology*, 154 (11), pp. 3978-3983. Cited 22 times.
http://endo.endojournals.org/content/154/11/3978.full.pdf+html
doi: 10.1210/en.2013-1529

View at Publisher

4 Hansen, K.B., Rosenkilde, M.M., Knop, F.K., Wellner, N., Diep, T.A., Rehfeld, J.F., Andersen, U.B., (...), Hansen, H.S.

2-Oleoyl glycerol is a GPR119 agonist and signals GLP-1 release in humans

(2011) *Journal of Clinical Endocrinology and Metabolism*, 96 (9), pp. E1409-E1417. Cited 122 times.
http://jcem.endojournals.org/content/96/9/E1409.full.pdf+html
doi: 10.1210/jc.2011-0647

View at Publisher

5 Overton, H.A., Fyfe, M.C.T., Reynet, C.

GPR119, a novel G protein-coupled receptor target for the treatment of type 2 diabetes and obesity

(2008) *British Journal of Pharmacology*, 153 (SUPPL. 1), pp. S76-S81. Cited 142 times.
doi: 10.1038/sj.bjp.0707529

View at Publisher