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Identification of a G protein-coupled receptor (GPR4) for lysophosphatidylcholine in vascular endothelial cells and development of an antibody recognizing GPR4

Technology Reference

R205

Keywords

Diagnostic Tool
Research Tool
Drug Discovery

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Associate Professor in the Department of Pharmacology has been working in the field of vascular endothelial cell biology for the past 20 years, with a particular interest in inflammatory injury. Endothelial dysfunction is a hallmark of inflammation, characterized by a pro-coagulant surface, high adhesion for leukocytes and leaky barrier. Endothelial cell dysfunction is increasingly recognized as a critical determinant of a variety of cardiovascular, pulmonary and neurological diseases.

PATENT

US Patent Pending Publication
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AREAS OF APPLICATION

- Will advance the study of this receptor in vascular-related diseases such as atherosclerosis in stroke, cardiovascular diseases, and diabetes.
- Will advance the study of other inflammatory diseases that are associated with elevated levels of LPC like: endometriosis, ovarian cancer, asthma, rhinitis and Systemic Lupus Erythematosus.
- Will lead to potential therapeutic and/or pharmacologic design of drugs targeting vascular inflammation.

ADVANTAGES

- Preparation of immunizing antigen and polyclonal and monoclonal antibody production can be performed as described or by using other suitable techniques.
- Several suitable methods of producing or isolating antibodies that bind GPR4, including human or artificial antibodies, can be used and references are provided.
- Antibodies and portions thereof can be joined together chemically by conventional techniques, or can be prepared as a contiguous protein using genetic engineering techniques, references are provided.
- Humanized immunoglobulin's can be produced using synthetic and/or recombinant nucleic acids to prepare genes encoding the desired human chain, references are provided.

THE TECHNOLOGY

This novel invention identifies the expression and upregulation of a receptor for lysophosphatidylcholine (LPC) in human vascular endothelium. The identification of this G protein-coupled receptor (GPR4) was made by reverse transcriptase polymerase chain reaction and competition binding studies, the work is published in American Journal of Physiology, 285:H1786-H1789, 2003. We developed peptide antibodies against the human GPR4 gene sequence to study protein expression and function of this receptor in vascular endothelium. The synthesized peptides were conjugated and used for immunization in rabbits and positive immunoreactivity of the antisera was confirmed by ELISA. COS7 cells were transfected with pEGFP-N1-3HA-GPR4 to overexpress GPR4, and affinity-purified anti-GPR4 Ab confirmed GPR4 protein overexpression by immunofluorescence and Western blot analysis. The anti-GPR4 Ab also detected the expected MW band ~40 kD in human microvascular endothelial cells.

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