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Advanced Drug Delivery Reviews 57 (2005) 883–917
Advanced DRUG DELIVERY Reviews
www.elsevier.com/locate/addr

Occludin: Structure, function and regulation

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Received 25 June 2004; accepted 4 January 2005
Available online 9 March 2005

Abstract

Epithelial and/or endothelial barriers play a critical role in animal, including human, life forms. The tight junction (TJ) is an essential component of these barriers. Occludin is a major component of the TJ. The structure of occludin, including its gene splice variants and protein essential components have been elucidated.

Phosphorylation/dephosphorylation plays a major role in regulation of occludin and TJ. Disruption of occludin regulation is an important aspect of a number of diseases. Strategies to prevent and/or reverse occludin downregulation may be an important therapeutic target.

Keywords: Occludin; Tight junction; ZO-1; Claudin; Phosphorylation; GTPases; Proteases; Cytokines; Cancer; Inflammatory diseases

Contents

Abbreviations: TJ, tight junction; ZO, zonula occludens; mAb, monoclonal antibody; BRB, blood–retinal barrier; TER, transepithelial/endothelial electrical resistance; IPTG, isopropyl-β-D-thiogalactoside; RT-PCR, reverse transcription-polymerase chain reaction; bp, base pair; TM4, fourth transmembrane domain; MAGUK, membrane-associated guanylate kinase; CTX, cortical thymocyte marker in *Xenopus*; CLMP, coxsackie- and adenovirus receptor-like membrane protein; LC, low calcium; NC, normal calcium; MW, molecular weight; LMW, low molecular weight; HMW, high molecular weight; CBDL, common bile duct ligation; BBB, blood–brain barrier; CNS, central nervous system; IFN, interferon; PKC, protein kinase C; PMA, phorbol-12-myristate-13-acetate; Ca^{2+}, calcium; MAPK, mitogen-activated protein kinase; PP2A, protein phosphatase 2A; BBB, blood–brain barrier; PLC, phospholipase C; MMP, matrix metalloproteinase; PAO, phenylarsine oxide; PV, pervanadate; PI, phosphatidylinositol; EPEC, enteropathogenic *Escherichia coli*; CK, casein kinase; PKA, protein kinase A; HDM, house dust mite; TGF, transforming growth factor; IL, interleukin; HGF, hepatocyte growth factor; EMT, epithelial–mesenchymal transition.

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0169-409X/$ - see front matter © 2005 Published by Elsevier B.V.
doi:10.1016/j.addr.2005.01.009