6. REFERENCE LIST

Abeliovich A, Paylor R, Chen C, Kim J J, Wehner J M and Tonegawa S (1993) PKC Gamma Mutant Mice Exhibit Mild Deficits in Spatial and Contextual Learning. *Cell* **75**: pp 1263-1271.

Aberle H, Schwartz H and Kemler R (1996) Cadherin-Catenin Complex: Protein Interactions and Their Implications for Cadherin Function. *J Cell Biochem* **61**: pp 514-523.

Alberts B., Bray D., Lewis J., Raff M., Roberts K., and Watson J.D. (1989) MolecularBiology of the Cell; pp. 794. Garland Publishing Inc. New York

Anderson JM (2001) Molecular Structure of Tight Junctions and Their Role in Epithelial Transport. *News Physiol Sci* **16**: pp 126-130.

Ando-Akatsuka Y, Saitou M, Hirase T, Kishi M, Sakakibara A, Itoh M, Yonemura S, Furuse M and Tsukita S (1996) Interspecies Diversity of the Occludin Sequence: CDNA Cloning of Human, Mouse, Dog, and Rat-Kangaroo Homologues. *J Cell Biol* **133**: pp 43-47.

Ando-Akatsuka Y, Yonemura S, Itoh M, Furuse M and Tsukita S (1999) Differential Behavior of E-Cadherin and Occludin in Their Colocalization With ZO-1 During the Establishment of Epithelial Cell Polarity. *J Cell Physiol* **179**: pp 115-125.

Antonetti DA, Barber A J, Hollinger L A, Wolpert E B and Gardner T W (1999) Vascular Endothelial Growth Factor Induces Rapid Phosphorylation of Tight Junction Proteins Occludin and Zonula Occluden 1. A Potential Mechanism for Vascular Permeability in Diabetic Retinopathy and Tumors. *J Biol Chem* **274**: pp 23463-23467.

Atsumi SS, Kokai Y, Tobioka H, Kuwahara K, Kuwabara H, Takakuwa Y, Sasaki K K, Sawada N, Mitaka T, Mochizuki Y, Imai K and Mori M (1999) Occludin Modulates Organization of Perijunctional Circumferential Actin in Rat Endothelial Cells. *Med Electron Microsc* **32**: pp 11-19.

Avila-Flores A, Rendon-Huerta E, Moreno J, Islas S, Betanzos A, Robles-Flores M and Gonzalez-Mariscal L (2001) Tight-Junction Protein Zonula Occludens 2 Is a Target of Phosphorylation by Protein Kinase C. *Biochem J* **360**: pp 295-304.

Balda MS, Gonzalez-Mariscal L, Contreras R G, Macias-Silva M, Torres-Marquez M E, Garcia-Sainz J A and Cereijido M (1991) Assembly and Sealing of Tight Junctions: Possible Participation of G-Proteins, Phospholipase C, Protein Kinase C and Calmodulin. *J Membr Biol* **122**: pp 193-202.

Balda MS, Gonzalez-Mariscal L, Matter K, Cereijido M and Anderson J M (1993) Assembly of the Tight Junction: the Role of Diacylglycerol. *J Cell Biol* **123**: pp 293-302.

Balda MS and Matter K (2000) The Tight Junction Protein ZO-1 and an Interacting Transcription Factor Regulate ErbB-2 Expression. *EMBO J* 19: pp 2024-2033.

Balda MS, Whitney J A, Flores C, Gonzalez S, Cereijido M and Matter K (1996) Functional Dissociation of Paracellular Permeability and Transepithelial Electrical Resistance and

Disruption of the Apical-Basolateral Intramembrane Diffusion Barrier by Expression of a Mutant Tight Junction Membrane Protein. *J Cell Biol* **134**: pp 1031-1049.

Baron CL and Malhotra V (2002) Role of Diacylglycerol in PKD Recruitment to the TGN and Protein Transport to the Plasma Membrane. *Science* **295**: pp 325-328.

Barry OP and Kazanietz M G (2001) Protein Kinase C Isozymes, Novel Phorbol Ester Receptors and Cancer Chemotherapy. *Curr Pharm Des* 7: pp 1725-1744.

Basuroy S, Sheth P, Kuppuswamy D, Balasubramanian S, Ray R M and Rao R K (2003) Expression of Kinase-Inactive C-Src Delays Oxidative Stress-Induced Disassembly and Accelerates Calcium-Mediated Reassembly of Tight Junctions in the Caco-2 Cell Monolayer. *J Biol Chem* **278**: pp 11916-11924.

Bauer H, Stelzhammer W, Fuchs R, Weiger T M, Danninger C, Probst G and Krizbai I A (1999) Astrocytes and Neurons Express the Tight Junction-Specific Protein Occludin in Vitro. *Exp Cell Res* **250**: pp 434-438.

Behrens J, Birchmeier W, Goodman S L and Imhof B A (1985) Dissociation of Madin-Darby Canine Kidney Epithelial Cells by the Monoclonal Antibody Anti-Arc-1: Mechanistic Aspects and Identification of the Antigen As a Component Related to Uvomorulin. *J Cell Biol* **101**: pp 1307-1315.

Betz A, Ashery U, Rickmann M, Augustin I, Neher E, Sudhof T C, Rettig J and Brose N (1998) Munc13-1 Is a Presynaptic Phorbol Ester Receptor That Enhances Neurotransmitter Release. *Neuron* 21: pp 123-136.

Borner C, Filipuzzi I, Wartmann M, Eppenberger U and Fabbro D (1989) Biosynthesis and Posttranslational Modifications of Protein Kinase C in Human Breast Cancer Cells. *J Biol Chem* **264**: pp 13902-13909.

Brose N and Rosenmund C (2002) Move Over Protein Kinase C, You'Ve Got Company: Alternative Cellular Effectors of Diacylglycerol and Phorbol Esters. *J Cell Sci* **115**: pp 4399-4411.

Chen CC, Wang J K and Chen W C (1997) TPA Induces Translocation but Not Down-Regulation of New PKC Isoform Eta in Macrophages, MDCK Cells and Astrocytes. *FEBS Lett* **412**: pp 30-34.

Chen ML, Pothoulakis C and Lamont J T (2002) Protein Kinase C Signaling Regulates ZO-1 Translocation and Increased Paracellular Flux of T84 Colonocytes Exposed to Clostridium Difficile Toxin A. *J Biol Chem* **277**: pp 4247-4254.

Chen Y, Lu Q, Schneeberger E E and Goodenough D A (2000) Restoration of Tight Junction Structure and Barrier Function by Down-Regulation of the Mitogen-Activated Protein Kinase Pathway in Ras-Transformed Madin-Darby Canine Kidney Cells. *Mol Biol Cell* 11: pp 849-862.

Chiu T and Rozengurt E (2001) PKD in Intestinal Epithelial Cells: Rapid Activation by Phorbol Esters, LPA, and Angiotensin Through PKC. *Am J Physiol Cell Physiol* **280**: pp C929-C942.

Citi S (1992) Protein Kinase Inhibitors Prevent Junction Dissociation Induced by Low Extracellular Calcium in MDCK Epithelial Cells. *J Cell Biol* **117**: pp 169-178.

Citi S and Denisenko N (1995) Phosphorylation of the Tight Junction Protein Cingulin and the Effects of Protein Kinase Inhibitors and Activators in MDCK Epithelial Cells. *J Cell Sci* **108 (Pt 8)**: pp 2917-2926.

Clapham DE and Neer E J (1993) New Roles for G-Protein Beta Gamma-Dimers in Transmembrane Signalling. *Nature* **365**: pp 403-406.

Clarke H, Marano C W, Peralta S A and Mullin J M (2000a) Modification of Tight Junction Function by Protein Kinase C Isoforms. *Adv Drug Deliv Rev* **41**: pp 283-301.

Clarke H, Soler A P and Mullin J M (2000b) Protein Kinase C Activation Leads to Dephosphorylation of Occludin and Tight Junction Permeability Increase in LLC-PK1 Epithelial Cell Sheets. *J Cell Sci* **113** (**Pt 18**): pp 3187-3196.

Claude P (1978) Morphological Factors Influencing Transepithelial Permeability: a Model for the Resistance of the Zonula Occludens. *J Membr Biol* **39**: pp 219-232.

Colegio OR, Van Itallie C, Rahner C and Anderson J M (2003) Claudin Extracellular Domains Determine Paracellular Charge Selectivity and Resistance but Not Tight Junction Fibril Architecture. *Am J Physiol Cell Physiol* **284**: pp C1346-C1354.

Cordenonsi M, D'Atri F, Hammar E, Parry D A, Kendrick-Jones J, Shore D and Citi S (1999a) Cingulin Contains Globular and Coiled-Coil Domains and Interacts With ZO-1, ZO-2, ZO-3, and Myosin. *J Cell Biol* **147**: pp 1569-1582.

Cordenonsi M, Mazzon E, De Rigo L, Baraldo S, Meggio F and Citi S (1997) Occludin Dephosphorylation in Early Development of Xenopus Laevis. *J Cell Sci* **110** (**Pt 24**): pp 3131-3139.

Cordenonsi M, Turco F, D'Atri F, Hammar E, Martinucci G, Meggio F and Citi S (1999b) Xenopus Laevis Occludin. Identification of in Vitro Phosphorylation Sites by Protein Kinase CK2 and Association With Cingulin. *Eur J Biochem* **264**: pp 374-384.

De Vos R and Desmet V J (1978) Morphologic Changes of the Junctional Complex of the Hepatocytes in Rat Liver After Bile Duct Ligation. *Br J Exp Pathol* **59**: pp 220-227.

Dodane V and Kachar B (1996) Identification of Isoforms of G Proteins and PKC That Colocalize With Tight Junctions. *J Membr Biol* **149**: pp 199-209.

Dower NA, Stang S L, Bottorff D A, Ebinu J O, Dickie P, Ostergaard H L and Stone J C (2000) RasGRP Is Essential for Mouse Thymocyte Differentiation and TCR Signaling. *Nat Immunol* 1: pp 317-321.

Dragsten PR, Blumenthal R and Handler J S (1981) Membrane Asymmetry in Epithelia: Is the Tight Junction a Barrier to Diffusion in the Plasma Membrane? *Nature* **294**: pp 718-722.

Ebnet K, Suzuki A, Horikoshi Y, Hirose T, Meyer Zu Brickwedde M K, Ohno S and Vestweber D (2001) The Cell Polarity Protein ASIP/PAR-3 Directly Associates With Junctional Adhesion Molecule (JAM). *EMBO J* **20**: pp 3738-3748.

Eichholtz T, de Bont D B, de Widt J, Liskamp R M and Ploegh H L (1993) A Myristoylated Pseudosubstrate Peptide, a Novel Protein Kinase C Inhibitor. *J Biol Chem* **268**: pp 1982-1986.

Exton JH (1997) Cell Signalling Through Guanine-Nucleotide-Binding Regulatory Proteins (G Proteins) and Phospholipases. *Eur J Biochem* **243**: pp 10-20.

Fanning AS, Jameson B J, Jesaitis L A and Anderson J M (1998) The Tight Junction Protein ZO-1 Establishes a Link Between the Transmembrane Protein Occludin and the Actin Cytoskeleton. *J Biol Chem* **273**: pp 29745-29753.

Fanning AS, Ma T Y and Anderson J M (2002) Isolation and Functional Characterization of the Actin Binding Region in the Tight Junction Protein ZO-1. *FASEB J* **16**: pp 1835-1837.

Farquhar MG and PALADE G E (1963) Junctional Complexes in Various Epithelia. *J Cell Biol* **17**: pp 375-412.

Farshori P and Kachar B (1999) Redistribution and Phosphorylation of Occludin During Opening and Resealing of Tight Junctions in Cultured Epithelial Cells. *J Membr Biol* **170**: pp 147-156.

Fasano A, Baudry B, Pumplin D W, Wasserman S S, Tall B D, Ketley J M and Kaper J B (1991) Vibrio Cholerae Produces a Second Enterotoxin, Which Affects Intestinal Tight Junctions. *Proc Natl Acad Sci U S A* **88**: pp 5242-5246.

Ferro T, Neumann P, Gertzberg N, Clements R and Johnson A (2000) Protein Kinase C-Alpha Mediates Endothelial Barrier Dysfunction Induced by TNF-Alpha. *Am J Physiol Lung Cell Mol Physiol* **278**: pp L1107-L1117.

Fleming TP, Hay M, Javed Q and Citi S (1993) Localisation of Tight Junction Protein Cingulin Is Temporally and Spatially Regulated During Early Mouse Development. *Development* **117**: pp 1135-1144.

Fleming TP, McConnell J, Johnson M H and Stevenson B R (1989) Development of Tight Junctions De Novo in the Mouse Early Embryo: Control of Assembly of the Tight Junction-Specific Protein, ZO-1. *J Cell Biol* **108**: pp 1407-1418.

Furuse M, Fujita K, Hiiragi T, Fujimoto K and Tsukita S (1998a) Claudin-1 and -2: Novel Integral Membrane Proteins Localizing at Tight Junctions With No Sequence Similarity to Occludin. *J Cell Biol* **141**: pp 1539-1550.

Furuse M, Furuse K, Sasaki H and Tsukita S (2001) Conversion of Zonulae Occludentes From Tight to Leaky Strand Type by Introducing Claudin-2 into Madin-Darby Canine Kidney I Cells. *J Cell Biol* **153**: pp 263-272.

Furuse M, Hata M, Furuse K, Yoshida Y, Haratake A, Sugitani Y, Noda T, Kubo A and Tsukita S (2002) Claudin-Based Tight Junctions Are Crucial for the Mammalian Epidermal Barrier: a Lesson From Claudin-1-Deficient Mice. *J Cell Biol* **156**: pp 1099-1111.

Furuse M, Hirase T, Itoh M, Nagafuchi A, Yonemura S, Tsukita S and Tsukita S (1993) Occludin: a Novel Integral Membrane Protein Localizing at Tight Junctions. *J Cell Biol* **123**: pp 1777-1788.

Furuse M, Itoh M, Hirase T, Nagafuchi A, Yonemura S, Tsukita S and Tsukita S (1994) Direct Association of Occludin With ZO-1 and Its Possible Involvement in the Localization of Occludin at Tight Junctions. *J Cell Biol* **127**: pp 1617-1626.

Furuse M, Sasaki H, Fujimoto K and Tsukita S (1998b) A Single Gene Product, Claudin-1 or -2, Reconstitutes Tight Junction Strands and Recruits Occludin in Fibroblasts. *J Cell Biol* **143**: pp 391-401.

Glaunsinger BA, Weiss R S, Lee S S and Javier R (2001) Link of the Unique Oncogenic Properties of Adenovirus Type 9 E4-ORF1 to a Select Interaction With the Candidate Tumor Suppressor Protein ZO-2. *EMBO J* **20**: pp 5578-5586.

Goekjian PG and Jirousek M R (2001) Protein Kinase C Inhibitors As Novel Anticancer Drugs. *Expert Opin Investig Drugs* **10**: pp 2117-2140.

Gonzalez-Mariscal L, Betanzos A, Nava P and Jaramillo B E (2003) Tight Junction Proteins. *Prog Biophys Mol Biol* **81**: pp 1-44.

Gonzalez-Mariscal L, Chavez d R and Cereijido M (1985) Tight Junction Formation in Cultured Epithelial Cells (MDCK). *J Membr Biol* **86**: pp 113-125.

Gonzalez-Mariscal L, Contreras R G, Bolivar J J, Ponce A, Chavez d R and Cereijido M (1990) Role of Calcium in Tight Junction Formation Between Epithelial Cells. *Am J Physiol* **259**: pp C978-C986.

Gottardi CJ, Arpin M, Fanning A S and Louvard D (1996) The Junction-Associated Protein, Zonula Occludens-1, Localizes to the Nucleus Before the Maturation and During the Remodeling of Cell-Cell Contacts. *Proc Natl Acad Sci U S A* **93**: pp 10779-10784.

Gschwendt M, Dieterich S, Rennecke J, Kittstein W, Mueller H J and Johannes F J (1996) Inhibition of Protein Kinase C Mu by Various Inhibitors. Differentiation From Protein Kinase c Isoenzymes. *FEBS Lett* **392**: pp 77-80.

Gschwendt M, Muller H J, Kielbassa K, Zang R, Kittstein W, Rincke G and Marks F (1994) Rottlerin, a Novel Protein Kinase Inhibitor. *Biochem Biophys Res Commun* **199**: pp 93-98.

Gumbiner B, Lowenkopf T and Apatira D (1991) Identification of a 160-KDa Polypeptide That Binds to the Tight Junction Protein ZO-1. *Proc Natl Acad Sci U S A* **88**: pp 3460-3464.

Gumbiner B and Simons K (1986) A Functional Assay for Proteins Involved in Establishing an Epithelial Occluding Barrier: Identification of a Uvomorulin-Like Polypeptide. *J Cell Biol* **102**: pp 457-468.

Gumbiner B, Stevenson B and Grimaldi A (1988) The Role of the Cell Adhesion Molecule Uvomorulin in the Formation and Maintenance of the Epithelial Junctional Complex. *J Cell Biol* **107**: pp 1575-1587.

Gumbiner BM and McCrea P D (1993) Catenins As Mediators of the Cytoplasmic Functions of Cadherins. *J Cell Sci Suppl* **17**: pp 155-158.

Hamazaki Y, Itoh M, Sasaki H, Furuse M and Tsukita S (2002) Multi-PDZ Domain Protein 1 (MUPP1) Is Concentrated at Tight Junctions Through Its Possible Interaction With Claudin-1 and Junctional Adhesion Molecule. *J Biol Chem* **277**: pp 455-461.

Harrington EO, Brunelle J L, Shannon C J, Kim E S, Mennella K and Rounds S (2003) Role of Protein Kinase C Isoforms in Rat Epididymal Microvascular Endothelial Barrier Function. *Am J Respir Cell Mol Biol* **28**: pp 626-636.

Haskins J, Gu L, Wittchen E S, Hibbard J and Stevenson B R (1998) ZO-3, a Novel Member of the MAGUK Protein Family Found at the Tight Junction, Interacts With ZO-1 and Occludin. *J Cell Biol* **141**: pp 199-208.

Hirase T, Staddon J M, Saitou M, Ando-Akatsuka Y, Itoh M, Furuse M, Fujimoto K, Tsukita S and Rubin L L (1997) Occludin As a Possible Determinant of Tight Junction Permeability in Endothelial Cells. *J Cell Sci* **110** (**Pt 14**): pp 1603-1613.

Hodge CW, Mehmert K K, Kelley S P, McMahon T, Haywood A, Olive M F, Wang D, Sanchez-Perez A M and Messing R O (1999) Supersensitivity to Allosteric GABA(A) Receptor Modulators and Alcohol in Mice Lacking PKCepsilon. *Nat Neurosci* 2: pp 997-1002.

Hofmann I, Schnolzer M, Kaufmann I and Franke W W (2002) Symplekin, a Constitutive Protein of Karyo- and Cytoplasmic Particles Involved in MRNA Biogenesis in Xenopus Laevis Oocytes. *Mol Biol Cell* **13**: pp 1665-1676.

Hollander D (1988) Crohn's Disease--a Permeability Disorder of the Tight Junction? *Gut* **29**: pp 1621-1624.

Huang AJ, Furie MB, Nicholson SC, Fischbarg J, Liebovitch LS and Silverstein SC (1988) Effects of Human Neutrophil Chemotaxis Across Human Endothelial Cell Monolayers on the Permeability of These Monolayers to Ions and Macromolecules. *J Cell Physiol* **135**: pp 355-366.

Huang AJ, Manning JE, Bandak TM, Ratau MC, Hanser KR and Silverstein SC (1993) Endothelial Cell Cytosolic Free Calcium Regulates Neutrophil Migration Across Monolayers of Endothelial Cells. *J Cell Biol* **120**: pp 1371-1380.

Huber D, Balda M S and Matter K (2000) Occludin Modulates Transepithelial Migration of Neutrophils. *J Biol Chem* **275**: pp 5773-5778.

Imamura Y, Itoh M, Maeno Y, Tsukita S and Nagafuchi A (1999) Functional Domains of Alpha-Catenin Required for the Strong State of Cadherin-Based Cell Adhesion. *J Cell Biol* **144**: pp 1311-1322.

Islas S, Vega J, Ponce L and Gonzalez-Mariscal L (2002) Nuclear Localization of the Tight Junction Protein ZO-2 in Epithelial Cells. *Exp Cell Res* **274**: pp 138-148.

Itoh M, Morita K and Tsukita S (1999) Characterization of ZO-2 As a MAGUK Family Member Associated With Tight As Well As Adherens Junctions With a Binding Affinity to Occludin and Alpha Catenin. *J Biol Chem* **274**: pp 5981-5986.

Itoh M, Nagafuchi A, Moroi S and Tsukita S (1997) Involvement of ZO-1 in Cadherin-Based Cell Adhesion Through Its Direct Binding to Alpha Catenin and Actin Filaments. *J Cell Biol* **138**: pp 181-192.

Itoh M, Nagafuchi A, Yonemura S, Kitani-Yasuda T, Tsukita S and Tsukita S (1993) The 220-KD Protein Colocalizing With Cadherins in Non-Epithelial Cells Is Identical to ZO-1, a Tight Junction-Associated Protein in Epithelial Cells: CDNA Cloning and Immunoelectron Microscopy. *J Cell Biol* **121**: pp 491-502.

Itoh M, Sasaki H, Furuse M, Ozaki H, Kita T and Tsukita S (2001) Junctional Adhesion Molecule (JAM) Binds to PAR-3: a Possible Mechanism for the Recruitment of PAR-3 to Tight Junctions. *J Cell Biol* **154**: pp 491-497.

Izumi Y, Hirose T, Tamai Y, Hirai S, Nagashima Y, Fujimoto T, Tabuse Y, Kemphues K J and Ohno S (1998) An Atypical PKC Directly Associates and Colocalizes at the Epithelial Tight Junction With ASIP, a Mammalian Homologue of Caenorhabditis Elegans Polarity Protein PAR-3. *J Cell Biol* **143**: pp 95-106.

Joberty G, Petersen C, Gao L and Macara I G (2000) The Cell-Polarity Protein Par6 Links Par3 and Atypical Protein Kinase C to Cdc42. *Nat Cell Biol* **2**: pp 531-539.

Johannes FJ, Prestle J, Eis S, Oberhagemann P and Pfizenmaier K (1994) PKCu Is a Novel, Atypical Member of the Protein Kinase C Family. *J Biol Chem* **269**: pp 6140-6148.

Jones DR, Sanjuan M A, Stone J C and Merida I (2002) Expression of a Catalytically Inactive Form of Diacylglycerol Kinase Alpha Induces Sustained Signaling Through RasGRP. *FASEB J* **16**: pp 595-597.

Kaibuchi K, Fukumoto Y, Oku N, Takai Y, Arai K and Muramatsu M (1989) Molecular Genetic Analysis of the Regulatory and Catalytic Domains of Protein Kinase C. *J Biol Chem* **264**: pp 13489-13496.

Kale G, Naren A P, Sheth P and Rao R K (2003) Tyrosine Phosphorylation of Occludin Attenuates Its Interactions With ZO-1, ZO-2, and ZO-3. *Biochem Biophys Res Commun* **302**: pp 324-329.

Kamberov E, Makarova O, Roh M, Liu A, Karnak D, Straight S and Margolis B (2000) Molecular Cloning and Characterization of Pals, Proteins Associated With MLin-7. *J Biol Chem* **275**: pp 11425-11431.

Kempski O (2001) Cerebral Edema. Semin Nephrol 21: pp 303-307.

Keon BH, Schafer S, Kuhn C, Grund C and Franke W W (1996) Symplekin, a Novel Type of Tight Junction Plaque Protein. *J Cell Biol* **134**: pp 1003-1018.

Kim E, Niethammer M, Rothschild A, Jan Y N and Sheng M (1995) Clustering of Shaker-Type K+ Channels by Interaction With a Family of Membrane-Associated Guanylate Kinases. *Nature* **378**: pp 85-88.

Kojima T, Sawada N, Chiba H, Kokai Y, Yamamoto M, Urban M, Lee G H, Hertzberg E L, Mochizuki Y and Spray D C (1999) Induction of Tight Junctions in Human Connexin 32 (HCx32)-Transfected Mouse Hepatocytes: Connexin 32 Interacts With Occludin. *Biochem Biophys Res Commun* **266**: pp 222-229.

Kroschewski R, Hall A and Mellman I (1999) Cdc42 Controls Secretory and Endocytic Transport to the Basolateral Plasma Membrane of MDCK Cells. *Nat Cell Biol* 1: pp 8-13.

Lacaz-Vieira F, Jaeger M M, Farshori P and Kachar B (1999) Small Synthetic Peptides Homologous to Segments of the First External Loop of Occludin Impair Tight Junction Resealing. *J Membr Biol* **168**: pp 289-297.

Lackner MR, Nurrish S J and Kaplan J M (1999) Facilitation of Synaptic Transmission by EGL-30 Gqalpha and EGL-8 PLCbeta: DAG Binding to UNC-13 Is Required to Stimulate Acetylcholine Release. *Neuron* **24**: pp 335-346.

Leitges M, Gimborn K, Elis W, Kalesnikoff J, Hughes M R, Krystal G and Huber M (2002) Protein Kinase C-Delta Is a Negative Regulator of Antigen-Induced Mast Cell Degranulation. *Mol Cell Biol* **22**: pp 3970-3980.

Leitges M, Mayr M, Braun U, Mayr U, Li C, Pfister G, Ghaffari-Tabrizi N, Baier G, Hu Y and Xu Q (2001a) Exacerbated Vein Graft Arteriosclerosis in Protein Kinase Cdelta-Null Mice. *J Clin Invest* **108**: pp 1505-1512.

Leitges M, Sanz L, Martin P, Duran A, Braun U, Garcia J F, Camacho F, Diaz-Meco M T, Rennert P D and Moscat J (2001b) Targeted Disruption of the ZetaPKC Gene Results in the Impairment of the NF-KappaB Pathway. *Mol Cell* **8**: pp 771-780.

Leitges M, Schmedt C, Guinamard R, Davoust J, Schaal S, Stabel S and Tarakhovsky A (1996) Immunodeficiency in Protein Kinase Cbeta-Deficient Mice. *Science* **273**: pp 788-791.

Li D and Mrsny R J (2000) Oncogenic Raf-1 Disrupts Epithelial Tight Junctions Via Downregulation of Occludin. *J Cell Biol* **148**: pp 791-800.

Lin D, Edwards A S, Fawcett J P, Mbamalu G, Scott J D and Pawson T (2000) A Mammalian PAR-3-PAR-6 Complex Implicated in Cdc42/Rac1 and APKC Signalling and Cell Polarity. *Nat Cell Biol* **2**: pp 540-547.

Liu WS and Heckman C A (1998) The Sevenfold Way of PKC Regulation. *Cell Signal* **10**: pp 529-542.

Madara JL and Trier J S (1980) Structural Abnormalities of Jejunal Epithelial Cell Membranes in Celiac Sprue. *Lab Invest* **43**: pp 254-261.

Maeda Y, Beznoussenko G V, Van Lint J, Mironov A A and Malhotra V (2001) Recruitment of Protein Kinase D to the Trans-Golgi Network Via the First Cysteine-Rich Domain. *EMBO J* **20**: pp 5982-5990.

Martin P, Duran A, Minguet S, Gaspar M L, Diaz-Meco M T, Rennert P, Leitges M and Moscat J (2002) Role of Zeta PKC in B-Cell Signaling and Function. *EMBO J* 21: pp 4049-4057.

Martin TA and Jiang W G (2001) Tight Junctions and Their Role in Cancer Metastasis. *Histol Histopathol* **16**: pp 1183-1195.

Martin-Padura I, Lostaglio S, Schneemann M, Williams L, Romano M, Fruscella P, Panzeri C, Stoppacciaro A, Ruco L, Villa A, Simmons D and Dejana E (1998) Junctional Adhesion Molecule, a Novel Member of the Immunoglobulin Superfamily That Distributes at Intercellular Junctions and Modulates Monocyte Transmigration. *J Cell Biol* **142**: pp 117-127.

Martinez-Palomo A, Meza I, Beaty G and Cereijido M (1980) Experimental Modulation of Occluding Junctions in a Cultured Transporting Epithelium. *J Cell Biol* **87**: pp 736-745.

Martiny-Baron G, Kazanietz M G, Mischak H, Blumberg P M, Kochs G, Hug H, Marme D and Schachtele C (1993) Selective Inhibition of Protein Kinase C Isozymes by the Indolocarbazole Go 6976. *J Biol Chem* **268**: pp 9194-9197.

Matthews S, Iglesias T, Cantrell D and Rozengurt E (1999) Dynamic Re-Distribution of Protein Kinase D (PKD) As Revealed by a GFP-PKD Fusion Protein: Dissociation From PKD Activation. *FEBS Lett* **457**: pp 515-521.

McCarthy KM, Skare I B, Stankewich M C, Furuse M, Tsukita S, Rogers R A, Lynch R D and Schneeberger E E (1996) Occludin Is a Functional Component of the Tight Junction. *J Cell Sci* **109 (Pt 9)**: pp 2287-2298.

Mecklenbrauker I, Saijo K, Zheng N Y, Leitges M and Tarakhovsky A (2002) Protein Kinase Cdelta Controls Self-Antigen-Induced B-Cell Tolerance. *Nature* **416**: pp 860-865.

Mellor H and Parker P J (1998) The Extended Protein Kinase C Superfamily. *Biochem J* **332 (Pt 2)**: pp 281-292.

Miller KG, Emerson M D and Rand J B (1999) Goalpha and Diacylglycerol Kinase Negatively Regulate the Gqalpha Pathway in C. Elegans. *Neuron* **24**: pp 323-333.

Minami T, Abid M R, Zhang J, King G, Kodama T and Aird W C (2003) Thrombin Stimulation of Vascular Adhesion Molecule-1 in Endothelial Cells Is Mediated by Protein Kinase C (PKC)-Delta-NF-Kappa B and PKC-Zeta-GATA Signaling Pathways. *J Biol Chem* **278**: pp 6976-6984.

Mitic LL, Schneeberger E E, Fanning A S and Anderson J M (1999) Connexin-Occludin Chimeras Containing the ZO-Binding Domain of Occludin Localize at MDCK Tight Junctions and NRK Cell Contacts. *J Cell Biol* **146**: pp 683-693.

Mori M, Sawada N, Kokai Y and Satoh M (1999) Role of Tight Junctions in the Occurrence of Cancer Invasion and Metastasis. *Med Electron Microsc* **32**: pp 193-198.

Morita K, Furuse M, Fujimoto K and Tsukita S (1999) Claudin Multigene Family Encoding Four-Transmembrane Domain Protein Components of Tight Junction Strands. *Proc Natl Acad Sci USA* **96**: pp 511-516.

Moroi S, Saitou M, Fujimoto K, Sakakibara A, Furuse M, Yoshida O and Tsukita S (1998) Occludin Is Concentrated at Tight Junctions of Mouse/Rat but Not Human/Guinea Pig Sertoli Cells in Testes. *Am J Physiol* **274**: pp C1708-C1717.

Mullin JM, Kampherstein J A, Laughlin K V, Clarkin C E, Miller R D, Szallasi Z, Kachar B, Soler A P and Rosson D (1998) Overexpression of Protein Kinase C-Delta Increases Tight Junction Permeability in LLC-PK1 Epithelia. *Am J Physiol* **275**: pp C544-C554.

Mullin JM, Laughlin K V, Ginanni N, Marano C W, Clarke H M and Peralta S A (2000) Increased Tight Junction Permeability Can Result From Protein Kinase C Activation/Translocation and Act As a Tumor Promotional Event in Epithelial Cancers. *Ann N Y Acad Sci* **915**: pp 231-236.

Muresan Z, Paul D L and Goodenough D A (2000) Occludin 1B, a Variant of the Tight Junction Protein Occludin. *Mol Biol Cell* 11: pp 627-634.

Newton AC (1995) Protein Kinase C: Structure, Function, and Regulation. *J Biol Chem* **270**: pp 28495-28498.

Newton AC (1997) Regulation of Protein Kinase C. Curr Opin Cell Biol 9: pp 161-167.

Newton AC (2001) Protein Kinase C: Structural and Spatial Regulation by Phosphorylation, Cofactors, and Macromolecular Interactions. *Chem Rev* **101**: pp 2353-2364.

Nieset JE, Redfield A R, Jin F, Knudsen K A, Johnson K R and Wheelock M J (1997) Characterization of the Interactions of Alpha-Catenin With Alpha-Actinin and Beta-Catenin/Plakoglobin. *J Cell Sci* **110** (**Pt 8**): pp 1013-1022.

Nigam SK and Brenner B M (1992) Toward an Understanding of Epithelial Morphogenesis in Health and Disease. *Curr Opin Nephrol Hypertens* 1: pp 187-191.

Nishikawa K, Toker A, Johannes F J, Songyang Z and Cantley L C (1997) Determination of the Specific Substrate Sequence Motifs of Protein Kinase C Isozymes. *J Biol Chem* **272**: pp 952-960.

Nishizuka Y (1995) Protein Kinase C and Lipid Signaling for Sustained Cellular Responses. *FASEB J* **9**: pp 484-496.

Nitta T, Hata M, Gotoh S, Seo Y, Sasaki H, Hashimoto N, Furuse M and Tsukita S (2003) Size-Selective Loosening of the Blood-Brain Barrier in Claudin-5-Deficient Mice. *J Cell Biol* **161**: pp 653-660.

Noren NK, Niessen C M, Gumbiner B M and Burridge K (2001) Cadherin Engagement Regulates Rho Family GTPases. *J Biol Chem* **276**: pp 33305-33308.

Nunbhakdi-Craig V, Machleidt T, Ogris E, Bellotto D, White C L, III and Sontag E (2002) Protein Phosphatase 2A Associates With and Regulates Atypical PKC and the Epithelial Tight Junction Complex. *J Cell Biol* **158**: pp 967-978.

Nurrish S, Segalat L and Kaplan J M (1999) Serotonin Inhibition of Synaptic Transmission: Galpha(0) Decreases the Abundance of UNC-13 at Release Sites. *Neuron* **24**: pp 231-242.

Nusrat A, Chen J A, Foley C S, Liang T W, Tom J, Cromwell M, Quan C and Mrsny R J (2000a) The Coiled-Coil Domain of Occludin Can Act to Organize Structural and Functional Elements of the Epithelial Tight Junction. *J Biol Chem* **275**: pp 29816-29822.

Nusrat A, Parkos C A, Verkade P, Foley C S, Liang T W, Innis-Whitehouse W, Eastburn K K and Madara J L (2000b) Tight Junctions Are Membrane Microdomains. *J Cell Sci* **113** (**Pt 10**): pp 1771-1781.

Obata T, Yaffe M B, Leparc G G, Piro E T, Maegawa H, Kashiwagi A, Kikkawa R and Cantley L C (2000) Peptide and Protein Library Screening Defines Optimal Substrate Motifs for AKT/PKB. *J Biol Chem* **275**: pp 36108-36115.

Ohno S (2001) Intercellular Junctions and Cellular Polarity: the PAR-APKC Complex, a Conserved Core Cassette Playing Fundamental Roles in Cell Polarity. *Curr Opin Cell Biol* **13**: pp 641-648.

Ohsugi M, Larue L, Schwarz H and Kemler R (1997) Cell-Junctional and Cytoskeletal Organization in Mouse Blastocysts Lacking E-Cadherin. *Dev Biol* **185**: pp 261-271.

Ojakian GK (1981) Tumor Promoter-Induced Changes in the Permeability of Epithelial Cell Tight Junctions. *Cell* **23**: pp 95-103.

Osada S, Mizuno K, Saido T C, Suzuki K, Kuroki T and Ohno S (1992) A New Member of the Protein Kinase C Family, NPKC Theta, Predominantly Expressed in Skeletal Muscle. *Mol Cell Biol* **12**: pp 3930-3938.

Posalaky Z, Posalaky I, McGinley D and Meyer R A (1989) The Gastric Mucosal Barrier: Tight Junction Structure in Gastritis and Ulcer Biopsies. *Virchows Arch A Pathol Anat Histopathol* **414**: pp 217-222.

Powell DW (1981) Barrier Function of Epithelia. Am J Physiol 241: pp G275-G288.

Qin J and Chait B T (1997) Identification and Characterization of Posttranslational Modifications of Proteins by MALDI Ion Trap Mass Spectrometry. *Anal Chem* **69**: pp 4002-4009.

Reichert M, Muller T and Hunziker W (2000) The PDZ Domains of Zonula Occludens-1 Induce an Epithelial to Mesenchymal Transition of Madin-Darby Canine Kidney I Cells. Evidence for a Role of Beta-Catenin/Tcf/Lef Signaling. *J Biol Chem* **275**: pp 9492-9500.

Reuss L, Segal Y and Altenberg G (1991) Regulation of Ion Transport Across Gallbladder Epithelium. *Annu Rev Physiol* **53**: pp 361-373.

Rey O, Sinnett-Smith J, Zhukova E and Rozengurt E (2001) Regulated Nucleocytoplasmic Transport of Protein Kinase D in Response to G Protein-Coupled Receptor Activation. *J Biol Chem* **276**: pp 49228-49235.

Rhee JS, Betz A, Pyott S, Reim K, Varoqueaux F, Augustin I, Hesse D, Sudhof T C, Takahashi M, Rosenmund C and Brose N (2002) Beta Phorbol Ester- and Diacylglycerol-Induced Augmentation of Transmitter Release Is Mediated by Munc13s and Not by PKCs. *Cell* **108**: pp 121-133.

Rhee SG and Choi K D (1992) Regulation of Inositol Phospholipid-Specific Phospholipase C Isozymes. *J Biol Chem* **267**: pp 12393-12396.

Rimm DL, Koslov E R, Kebriaei P, Cianci C D and Morrow J S (1995) Alpha 1(E)-Catenin Is an Actin-Binding and -Bundling Protein Mediating the Attachment of F-Actin to the Membrane Adhesion Complex. *Proc Natl Acad Sci U S A* **92**: pp 8813-8817.

Rodriguez-Boulan E and Nelson W J (1989) Morphogenesis of the Polarized Epithelial Cell Phenotype. *Science* **245**: pp 718-725.

Roh MH, Fan S, Liu C J and Margolis B (2003) The Crumbs3-Pals1 Complex Participates in the Establishment of Polarity in Mammalian Epithelial Cells. *J Cell Sci* **116**: pp 2895-2906.

Rosson D, O'Brien T G, Kampherstein J A, Szallasi Z, Bogi K, Blumberg P M and Mullin J M (1997) Protein Kinase C-Alpha Activity Modulates Transepithelial Permeability and Cell Junctions in the LLC-PK1 Epithelial Cell Line. *J Biol Chem* **272**: pp 14950-14953.

Rykx A, De Kimpe L, Mikhalap S, Vantus T, Seufferlein T, Vandenheede J R and Van Lint J (2003) Protein Kinase D: a Family Affair. *FEBS Lett* **546**: pp 81-86.

Saitou M, Ando-Akatsuka Y, Itoh M, Furuse M, Inazawa J, Fujimoto K and Tsukita S (1997) Mammalian Occludin in Epithelial Cells: Its Expression and Subcellular Distribution. *Eur J Cell Biol* **73**: pp 222-231.

Saitou M, Fujimoto K, Doi Y, Itoh M, Fujimoto T, Furuse M, Takano H, Noda T and Tsukita S (1998) Occludin-Deficient Embryonic Stem Cells Can Differentiate into Polarized Epithelial Cells Bearing Tight Junctions. *J Cell Biol* **141**: pp 397-408.

Saitou M, Furuse M, Sasaki H, Schulzke J D, Fromm M, Takano H, Noda T and Tsukita S (2000) Complex Phenotype of Mice Lacking Occludin, a Component of Tight Junction Strands. *Mol Biol Cell* 11: pp 4131-4142.

Sakakibara A, Furuse M, Saitou M, Ando-Akatsuka Y and Tsukita S (1997) Possible Involvement of Phosphorylation of Occludin in Tight Junction Formation. *J Cell Biol* **137**: pp 1393-1401.

Sheth B, Fesenko I, Collins J E, Moran B, Wild A E, Anderson J M and Fleming T P (1997) Tight Junction Assembly During Mouse Blastocyst Formation Is Regulated by Late Expression of ZO-1 Alpha+ Isoform. *Development* **124**: pp 2027-2037.

Sheth B, Fontaine J J, Ponza E, McCallum A, Page A, Citi S, Louvard D, Zahraoui A and Fleming T P (2000a) Differentiation of the Epithelial Apical Junctional Complex During Mouse Preimplantation Development: a Role for Rab13 in the Early Maturation of the Tight Junction. *Mech Dev* 97: pp 93-104.

Sheth B, Moran B, Anderson J M and Fleming T P (2000b) Post-Translational Control of Occludin Membrane Assembly in Mouse Trophectoderm: a Mechanism to Regulate Timing of Tight Junction Biogenesis and Blastocyst Formation. *Development* **127**: pp 831-840.

Siflinger-Birnboim A and Johnson A (2003) Protein Kinase C Modulates Pulmonary Endothelial Permeability: a Paradigm for Acute Lung Injury. *Am J Physiol Lung Cell Mol Physiol* **284**: pp L435-L451.

Simon DB, Lu Y, Choate K A, Velazquez H, Al Sabban E, Praga M, Casari G, Bettinelli A, Colussi G, Rodriguez-Soriano J, McCredie D, Milford D, Sanjad S and Lifton R P (1999) Paracellin-1, a Renal Tight Junction Protein Required for Paracellular Mg2+ Resorption. *Science* **285**: pp 103-106.

Songyang Z and Cantley L C (1998) The Use of Peptide Library for the Determination of Kinase Peptide Substrates. *Methods Mol Biol* **87**: pp 87-98.

Songyang Z, Lu K P, Kwon Y T, Tsai L H, Filhol O, Cochet C, Brickey D A, Soderling T R, Bartleson C, Graves D J, DeMaggio A J, Hoekstra M F, Blenis J, Hunter T and Cantley L C (1996) A Structural Basis for Substrate Specificities of Protein Ser/Thr Kinases: Primary Sequence Preference of Casein Kinases I and II, NIMA, Phosphorylase Kinase, Calmodulin-Dependent Kinase II, CDK5, and Erk1. *Mol Cell Biol* 16: pp 6486-6493.

Staehelin LA (1973) Further Observations on the Fine Structure of Freeze-Cleaved Tight Junctions. *J Cell Sci* **13**: pp 763-786.

Stevenson BR, Anderson J M and Bullivant S (1988a) The Epithelial Tight Junction: Structure, Function and Preliminary Biochemical Characterization. *Mol Cell Biochem* **83**: pp 129-145.

Stevenson BR, Anderson J M, Goodenough D A and Mooseker M S (1988b) Tight Junction Structure and ZO-1 Content Are Identical in Two Strains of Madin-Darby Canine Kidney Cells Which Differ in Transepithelial Resistance. *J Cell Biol* **107**: pp 2401-2408.

Stevenson BR and Goodenough D A (1984) Zonulae Occludentes in Junctional Complex-Enriched Fractions From Mouse Liver: Preliminary Morphological and Biochemical Characterization. *J Cell Biol* **98**: pp 1209-1221.

Stevenson BR, Siliciano J D, Mooseker M S and Goodenough D A (1986) Identification of ZO-1: a High Molecular Weight Polypeptide Associated With the Tight Junction (Zonula Occludens) in a Variety of Epithelia. *J Cell Biol* **103**: pp 755-766.

Stuart RO and Nigam S K (1995a) Development of the Tubular Nephron. *Semin Nephrol* **15**: pp 315-326.

Stuart RO and Nigam S K (1995b) Regulated Assembly of Tight Junctions by Protein Kinase C. *Proc Natl Acad Sci U S A* **92**: pp 6072-6076.

Su TT, Guo B, Kawakami Y, Sommer K, Chae K, Humphries L A, Kato R M, Kang S, Patrone L, Wall R, Teitell M, Leitges M, Kawakami T and Rawlings D J (2002) PKC-Beta Controls I Kappa B Kinase Lipid Raft Recruitment and Activation in Response to BCR Signaling. *Nat Immunol* **3**: pp 780-786.

Sun Z, Arendt C W, Ellmeier W, Schaeffer E M, Sunshine M J, Gandhi L, Annes J, Petrzilka D, Kupfer A, Schwartzberg P L and Littman D R (2000) PKC-Theta Is Required for TCR-Induced NF-KappaB Activation in Mature but Not Immature T Lymphocytes. *Nature* **404**: pp 402-407.

Suzuki A, Ishiyama C, Hashiba K, Shimizu M, Ebnet K and Ohno S (2002) APKC Kinase Activity Is Required for the Asymmetric Differentiation of the Premature Junctional Complex During Epithelial Cell Polarization. *J Cell Sci* **115**: pp 3565-3573.

Suzuki A, Yamanaka T, Hirose T, Manabe N, Mizuno K, Shimizu M, Akimoto K, Izumi Y, Ohnishi T and Ohno S (2001) Atypical Protein Kinase C Is Involved in the Evolutionarily Conserved Par Protein Complex and Plays a Critical Role in Establishing Epithelia-Specific Junctional Structures. *J Cell Biol* **152**: pp 1183-1196.

Swannie HC and Kaye S B (2002) Protein Kinase C Inhibitors. *Curr Oncol Rep* **4**: pp 37-46.

Swift JG, Mukherjee T M and Rowland R (1983) Intercellular Junctions in Hepatocellular Carcinoma. *J Submicrosc Cytol* **15**: pp 799-810.

Takagaki Y and Manley J L (2000) Complex Protein Interactions Within the Human Polyadenylation Machinery Identify a Novel Component. *Mol Cell Biol* **20**: pp 1515-1525.

Tan M, Xu X, Ohba M, Ogawa W and Cui M Z (2003) Thrombin Rapidly Induces Protein Kinase D Phosphorylation, and Protein Kinase C Delta Mediates the Activation. *J Biol Chem* **278**: pp 2824-2828.

Toker A (1998) Signaling Through Protein Kinase C. Front Biosci 3: pp D1134-D1147.

Toullec D, Pianetti P, Coste H, Bellevergue P, Grand-Perret T, Ajakane M, Baudet V, Boissin P, Boursier E, Loriolle F and . (1991) The Bisindolylmaleimide GF 109203X Is a Potent and Selective Inhibitor of Protein Kinase C. *J Biol Chem* **266**: pp 15771-15781.

Traweger A, Fuchs R, Krizbai I A, Weiger T M, Bauer H C and Bauer H (2003) The Tight Junction Protein ZO-2 Localizes to the Nucleus and Interacts With the Heterogeneous Nuclear Ribonucleoprotein Scaffold Attachment Factor-B. *J Biol Chem* **278**: pp 2692-2700.

Tsukamoto T and Nigam S K (1999) Role of Tyrosine Phosphorylation in the Reassembly of Occludin and Other Tight Junction Proteins. *Am J Physiol* **276**: pp F737-F750.

Tsukita S and Furuse M (2000) Pores in the Wall: Claudins Constitute Tight Junction Strands Containing Aqueous Pores. *J Cell Biol* **149**: pp 13-16.

Tsukita S, Furuse M and Itoh M (2001) Multifunctional Strands in Tight Junctions. *Nat Rev Mol Cell Biol* **2**: pp 285-293.

Tsukita S, Itoh M, Nagafuchi A, Yonemura S and Tsukita S (1993) Submembranous Junctional Plaque Proteins Include Potential Tumor Suppressor Molecules. *J Cell Biol* **123**: pp 1049-1053.

Turner JR (2000) 'Putting the Squeeze' on the Tight Junction: Understanding Cytoskeletal Regulation. *Semin Cell Dev Biol* **11**: pp 301-308.

Valverde AM, Sinnett-Smith J, Van Lint J and Rozengurt E (1994) Molecular Cloning and Characterization of Protein Kinase D: a Target for Diacylglycerol and Phorbol Esters With a Distinctive Catalytic Domain. *Proc Natl Acad Sci U S A* **91**: pp 8572-8576.

Van Itallie CM and Anderson J M (1997) Occludin Confers Adhesiveness When Expressed in Fibroblasts. *J Cell Sci* **110** (**Pt 9**): pp 1113-1121.

Van Lint J, Rykx A, Maeda Y, Vantus T, Sturany S, Malhotra V, Vandenheede J R and Seufferlein T (2002) Protein Kinase D: an Intracellular Traffic Regulator on the Move. *Trends Cell Biol* **12**: pp 193-200.

Vega-Salas DE, Salas P J and Rodriguez-Boulan E (1987) Modulation of the Expression of an Apical Plasma Membrane Protein of Madin-Darby Canine Kidney Epithelial Cells: Cell-Cell Interactions Control the Appearance of a Novel Intracellular Storage Compartment. *J Cell Biol* **104**: pp 1249-1259.

Villalba M, Kasibhatla S, Genestier L, Mahboubi A, Green D R and Altman A (1999) Protein Kinase Ctheta Cooperates With Calcineurin to Induce Fas Ligand Expression During Activation-Induced T Cell Death. *J Immunol* **163**: pp 5813-5819.

Wang W, Dentler W L and Borchardt R T (2001) VEGF Increases BMEC Monolayer Permeability by Affecting Occludin Expression and Tight Junction Assembly. *Am J Physiol Heart Circ Physiol* **280**: pp H434-H440.

Wang YK, Liao P C, Allison J, Gage D A, Andrews P C, Lubman D M, Hanash S M and Strahler J R (1993) Phorbol 12-Myristate 13-Acetate-Induced Phosphorylation of Op18 in Jurkat T Cells. Identification of Phosphorylation Sites by Matrix-Assisted Laser Desorption Ionization Mass Spectrometry. *J Biol Chem* **268**: pp 14269-14277.

Watabe M, Nagafuchi A, Tsukita S and Takeichi M (1994) Induction of Polarized Cell-Cell Association and Retardation of Growth by Activation of the E-Cadherin-Catenin Adhesion System in a Dispersed Carcinoma Line. *J Cell Biol* **127**: pp 247-256.

Watabe-Uchida M, Uchida N, Imamura Y, Nagafuchi A, Fujimoto K, Uemura T, Vermeulen S, van Roy F, Adamson E D and Takeichi M (1998) Alpha-Catenin-Vinculin Interaction Functions to Organize the Apical Junctional Complex in Epithelial Cells. *J Cell Biol* **142**: pp 847-857.

Way KJ, Chou E and King G L (2000) Identification of PKC-Isoform-Specific Biological Actions Using Pharmacological Approaches. *Trends Pharmacol Sci* **21**: pp 181-187.

Weiss EE, Kroemker M, Rudiger A H, Jockusch B M and Rudiger M (1998) Vinculin Is Part of the Cadherin-Catenin Junctional Complex: Complex Formation Between Alpha-Catenin and Vinculin. *J Cell Biol* **141**: pp 755-764.

Wilcox ER, Burton Q L, Naz S, Riazuddin S, Smith T N, Ploplis B, Belyantseva I, Ben Yosef T, Liburd N A, Morell R J, Kachar B, Wu D K, Griffith A J, Riazuddin S and Friedman T B (2001) Mutations in the Gene Encoding Tight Junction Claudin-14 Cause Autosomal Recessive Deafness DFNB29. *Cell* **104**: pp 165-172.

Willott E, Balda M S, Fanning A S, Jameson B, Van Itallie C and Anderson J M (1993) The Tight Junction Protein ZO-1 Is Homologous to the Drosophila Discs-Large Tumor Suppressor Protein of Septate Junctions. *Proc Natl Acad Sci U S A* **90**: pp 7834-7838.

Wittchen ES, Haskins J and Stevenson B R (1999) Protein Interactions at the Tight Junction. Actin Has Multiple Binding Partners, and ZO-1 Forms Independent Complexes With ZO-2 and ZO-3. *J Biol Chem* **274**: pp 35179-35185.

Wong V (1997) Phosphorylation of Occludin Correlates With Occludin Localization and Function at the Tight Junction. *Am J Physiol* **273**: pp C1859-C1867.

Yin X, Jedrzejewski P T and Jiang J X (2000) Casein Kinase II Phosphorylates Lens Connexin 45.6 and Is Involved in Its Degradation. *J Biol Chem* **275**: pp 6850-6856.

Yip TT and Hutchens T W (1992) Mapping and Sequence-Specific Identification of Phosphopeptides in Unfractionated Protein Digest Mixtures by Matrix-Assisted Laser Desorption/Ionization Time-of-Flight Mass Spectrometry. *FEBS Lett* **308**: pp 149-153.

Yonemura S, Itoh M, Nagafuchi A and Tsukita S (1995) Cell-to-Cell Adherens Junction Formation and Actin Filament Organization: Similarities and Differences Between Non-Polarized Fibroblasts and Polarized Epithelial Cells. *J Cell Sci* **108** (**Pt** 1): pp 127-142.

Yoo J, Nichols A, Mammen J, Calvo I, Song J C, Worrell R T, Matlin K and Matthews J B (2003) Bryostatin-1 Enhances Barrier Function in T84 Epithelia Through PKC-Dependent Regulation of Tight Junction Proteins. *Am J Physiol Cell Physiol* **285**: pp C300-C309.

Zeisel SH (1993) Choline Phospholipids: Signal Transduction and Carcinogenesis. *FASEB J* 7: pp 551-557.

Zugaza JL, Sinnett-Smith J, Van Lint J and Rozengurt E (1996) Protein Kinase D (PKD) Activation in Intact Cells Through a Protein Kinase C-Dependent Signal Transduction Pathway. *EMBO J* **15**: pp 6220-6230.