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Claudin 4 Monoclonal Antibody (3E2C1)

Catalog Number 32-9400

Product data sheet

Details	
Size	100 µg
Host/Isotope	Mouse / IgG1
Class	Monoclonal
Type	Antibody
Clone	3E2C1
Immunogen	Synthetic peptide corresponding to a 22 amino acid sequence derived from the C-terminal region of human Claudin-4.
Conjugate	Unconjugated
Form	Liquid
Concentration	0.5 mg/mL
Purification	Protein A
Storage buffer	PBS, pH 7.4
Contains	0.1% sodium azide
Storage Conditions	-20°C

Species Reactivity	
Species reactivity	Dog, Human, Rat
Published species	Dog, Rabbit, Rat, Pig, Non-human primate, Virus, Sheep, Fish, Human, Mouse, Not Applicable

Tested Applications	Dilution *
Immunohistochemistry (IHC)	2-3 µg/mL
Western Blot (WB)	1-3 µg/mL

Published Applications	
Miscellaneous PubMed (MISC)	See 21 publications below
Immunohistochemistry (IHC)	See 18 publications below
Immunofluorescence (IF)	See 14 publications below
Western Blot (WB)	See 42 publications below
Immunohistochemistry (Paraffin) (IHC (P))	See 30 publications below
Immunoprecipitation (IP)	See 1 publications below
Immunocytochemistry (ICC)	See 14 publications below
Immunohistochemistry (Frozen) (IHC (F))	See 7 publications below

* Suggested working dilutions are given as a guide only. It is recommended that the user titrate the product for use in their own experiment using appropriate negative and positive controls.

Product specific information

Reactivity has been confirmed with human, rat ileum homogenates, and canine MDCK cell lysates by western blotting and immunofluorescence. Reactivity has also been confirmed with formalin-fixed, paraffin-embedded (FFPE) human normal colon and colon cancer tissues by immunohistochemistry. For best results in immunohistochemistry with formalin-fixed, paraffin-embedded (FFPE) tissues, heat induced epitope retrieval (HIER) with citrate buffer, pH 6.0, is required prior to staining. This antibody reacts specifically with the ~ 22 kDa Claudin-4 protein and does not cross-react with the protein at 55 kDa.

Background/Target Information

CLAUDIN4 is an integral membrane protein belonging to the claudin family, a family of cellular adhesion molecules that are components of tight junctions. CLAUDIN4 is a component of tight junction strands and may play a role in internal organ development and function during pre- and postnatal life. The CLAUDIN4 gene is deleted in Williams-Beuren syndrome, a neurodevelopmental disorder affecting multiple systems. CLAUDIN4 is frequently overexpressed in ovarian and other epithelial cancers.

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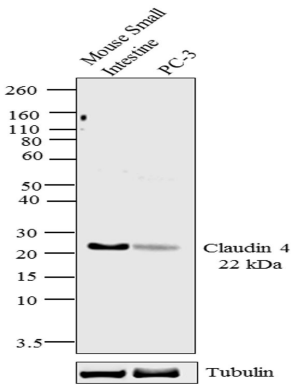
Product Images For Claudin 4 Monoclonal Antibody (3E2C1)



Claudin 4 Antibody (32-9400) in WB

Western blot analysis of Claudin-4 was performed by loading 20 µg of Mouse Small Intestine (lane1) and PC-3 (lane2) lysates using Novex® NuPAGE® 4-12 % Bis-Tris gel (Product # NP0321BOX), XCell SureLock Electrophoresis System (Product # EI0002), Novex® Sharp Pre-Stained Protein Standard (LC5800), and iBlot® Dry Blotting System (IB21001). Proteins were transferred to a nitrocellulose membrane and blocked with 5 % skim milk at 4°C overnight. Claudin-4 was detected at ~27 kDa using Claudin-4 Mouse Monoclonal Antibody (Product # 32-9400) at 1-3 µg/mL in 2.5 % skim milk for 3 hours at room temperature on a rocking platform. Goat Anti-Mouse IgG - HRP Secondary Antibody (Product # 62-6520) at 1:4000 dilution was used and chemiluminescent detection was performed using Pierce™ ECL Western Blotting Substrate (Product # 32106).

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PubMed References For Claudin 4 Monoclonal Antibody (3E2C1)

21 Miscellaneous PubMed References

Species / Dilution	Summary
Human / 1:1000	32-9400 was used in western blot to test if the c-Jun N-terminal kinase pathway regulates tricellulin Journal of cellular physiology (Nov 2010; 225: 720) **"c-Jun N-terminal kinase is largely involved in the regulation of tricellular tight junctions via tricellulin in human pancreatic duct epithelial cells."** Author(s):Kojima T,Fuchimoto J,Yamaguchi H,Ito T,Takasawa A,Ninomiya T,Kikuchi S,Ogasawara N,Ohkuni T,Masaki T, Hirata K,Himi T,Sawada N PubMed Article URL:http://dx.doi.org/10.1002/jcp.22273
Human / 1:500	32-9400 was used in immunohistochemistry (paraffin) to test if the expression pattern of claudins 1, 3, and 4 as well as ZO-1 in patients with gastric cancer correlate with the clinicopathologic and prognostic variables. Human pathology (Aug 2005; 36: 886) **"Claudin expression in gastric adenocarcinomas: a tissue microarray study with prognostic correlation."** Author(s):Resnick MB,Gavilanez M,Newton E,Konkin T,Bhattacharya B,Britt DE,Sabo E,Moss SF PubMed Article URL:http://dx.doi.org/10.1016/j.humpath.2005.05.019
Human / Not Cited	32-9400 was used in western blot to study the impact of somatostatin and its receptors in the skin Experimental dermatology (Oct 2010; 19: 888) **"Somatostatin regulates tight junction function and composition in human keratinocytes."** Author(s):Vockel M,Breitenbach U,Kreienkamp HJ,Brandner JM PubMed Article URL:http://dx.doi.org/10.1111/j.1600-0625.2010.01101.x
Human / 1:25	32-9400 was used in immunohistochemistry to determine the activation profile of EGFR, PDGFRB, and PDGFRA receptors and their downstream effectors in diffuse malignant peritoneal mesothelioma specimens European journal of cancer (Oxford, England : 1990) (Oct 2010; 46: 2837) **"Receptor tyrosine kinase and downstream signalling analysis in diffuse malignant peritoneal mesothelioma."** Author(s):Perrone F,Jocollè G,Pennati M,Deraco M,Baratti D,Brich S,Orsenigo M,Tarantino E,De Marco C,Bertan C,Cabras A, Bertulli R,Pierotti MA,Zaffaroni N,Pilotti S PubMed Article URL:http://dx.doi.org/10.1016/j.ejca.2010.06.130
Human / Not Cited	32-9400 was used in immunohistochemistry (paraffin) to examine the role of Twist1 in the regulation of claudin-4 expression using human esophageal carcinoma cell lines. Biochemical and biophysical research communications (Jul 2012; 423: 454) **"Twist1 causes the transcriptional repression of claudin-4 with prognostic significance in esophageal cancer."** Author(s):Lee KW,Lee NK,Kim JH,Kang MS,Yoo HY,Kim HH,Um SH,Kim SH PubMed Article URL:http://dx.doi.org/10.1016/j.bbrc.2012.05.140
Human / Not Cited	32-9400 was used in immunohistochemistry - paraffin section to determine claudin expression profiles in Epstein-Barr virus-associated non-keratinizing nasopharyngeal carcinoma Oncology reports (Apr 2010; 23: 927) **"Claudin expression profiles in Epstein-Barr virus-associated nasopharyngeal carcinoma."** Author(s):Kojima F,Ishida M,Takikita-Suzuki M,Hotta M,Katsura K,Nagata A,Enoki Y,Kato G,Okabe H PubMed Article URL:http://dx.doi.org/null
Human / Not Cited	32-9400 was used in immunocytochemistry to investigate the assembly and disassembly of tricellular in tight junctions by altering the calcium concentration. Cell and tissue research (Jan 2013; 351: 73) **"Behavior of tricellulin during destruction and formation of tight junctions under various extracellular calcium conditions."** Author(s):Takasawa A,Kojima T,Ninomiya T,Tsujiwaki M,Murata M,Tanaka S,Sawada N PubMed Article URL:http://dx.doi.org/10.1007/s00441-012-1512-7
Human / 1:100	32-9400 was used in immunohistochemistry to examine the expression of claudins in patients with nasopharyngeal carcinoma. Human pathology (Jul 2010; 41: 944) **"Expression pattern and prognostic significance of claudins 1, 4, and 7 in nasopharyngeal carcinoma."** Author(s):Hsueh C,Chang YS,Tseng NM,Liao CT,Hsueh S,Chang JH,Wu IC,Chang KP PubMed Article URL:http://dx.doi.org/10.1016/j.humpath.2010.01.005

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	32-9400 was used in immunohistochemistry (paraffin) to examine tight junction and adherens junction proteins in normal human lung, IPF, cryptogenic organizing pneumonia, and asbestosis.
Human / 1:50	Human pathology (May 2013; 44: 895) **"Divergence of tight and adherens junction factors in alveolar epithelium in pulmonary fibrosis."** Author(s):Lappi-Blanco E,Lehtonen ST,Sormunen R,Merikallio HM,Soini Y,Kaarteenaho RL PubMed Article URL:http://dx.doi.org/10.1016/j.humpath.2012.08.016
	32-9400 was used in immunocytochemistry to study the contribution of ZO-1, -2, and -3 on collecting duct cell proliferation.
Mouse / 1:500	Cell cycle (Georgetown, Tex.) (Aug 2015; 13: 3059) **"Different effects of ZO-1, ZO-2 and ZO-3 silencing on kidney collecting duct principal cell proliferation and adhesion."** Author(s):Qiao X,Roth I,Féraille E,Hasler U PubMed Article URL:http://dx.doi.org/10.4161/15384101.2014.949091
	32-9400 was used in immunohistochemistry (paraffin) to characterize 6 cases of biliary neoplasms.
Human / 1:400	Human pathology (Nov 2009; 40: 1543) **"Intraductal oncocytic papillary neoplasm of the bile duct: clinicopathologic and immunohistochemical characteristics of 6 cases."** Author(s):Tanaka M,Fukushima N,Noda N,Shibahara J,Kokudo N,Fukayama M PubMed Article URL:http://dx.doi.org/10.1016/j.humpath.2009.03.014
	32-9400 was used in immunohistochemistry (paraffin) to study lymphoid neogenesis and tertiary lymphoid organs in pigs with leptospiral nephritis.
Mouse / 1:75	Veterinary immunology and immunopathology (Jan 2012; 145: 546) **"Development of tertiary lymphoid structures in the kidneys of pigs with chronic leptospiral nephritis."** Author(s):Pezzolato M,Maina E,Lonardi S,Bozzetta E,Grassi F,Scanziani E,Radaelli E PubMed Article URL:http://dx.doi.org/10.1016/j.vetimm.2011.12.011
	32-9400 was used in immunocytochemistry and western blot to test the involvement of mitogen-activated protein kinases in the deoxynivalenol-induced loss of barrier function
Pig / 1:100	The Journal of nutrition (Nov 2010; 140: 1956) **"Deoxynivalenol impairs porcine intestinal barrier function and decreases the protein expression of claudin-4 through a mitogen-activated protein kinase-dependent mechanism."** Author(s):Pinton P,Braicu C,Nougayrede JP,Laffitte J,Taranu I,Oswald IP PubMed Article URL:http://dx.doi.org/10.3945/jn.110.123919
	32-9400 was used in western blot to assess the changes in claudins function via PKC activation in pancreatic cancer cells.
Human / Not Cited	Cell and tissue research (Dec 2011; 346: 369) **"Protein kinase C inhibitor enhances the sensitivity of human pancreatic cancer HPAC cells to Clostridium perfringens enterotoxin via claudin-4."** Author(s):Kyuno D,Kojima T,Ito T,Yamaguchi H,Tsujiwaki M,Takasawa A,Murata M,Tanaka S,Hirata K,Sawada N PubMed Article URL:http://dx.doi.org/10.1007/s00441-011-1287-2
	32-9400 was used in immunohistochemistry (paraffin) to study the production CXCL13 by follicular dendritic cells and its utility as a marker of follicular dendritic cell sarcoma.
Human / 1:100	The Journal of pathology (Nov 2008; 216: 356) **"Identification of CXCL13 as a new marker for follicular dendritic cell sarcoma."** Author(s):Vermi W,Lonardi S,Bosisio D,Uguccioni M,Danelon G,Pileri S,Fletcher C,Sozzani S,Zorzi F,Arrigoni G,Doglioni C,Ponzoni M,Facchetti F PubMed Article URL:http://dx.doi.org/10.1002/path.2420
	32-9400 was used in western blot to develop an in vitro model of gelatinous drop-like corneal dystrophy using a new cell line deficient in tumor-associated calcium signal transducer 2.
Human / Not Cited	Transactions of the American Ophthalmological Society (Dec 2012; 110: 166) **"Establishment of a human conjunctival epithelial cell line lacking the functional TACSTD2 gene (an American Ophthalmological Society thesis)."** Author(s):Kinoshita S,Kawasaki S,Kitazawa K,Shinomiya K PubMed Article URL:http://dx.doi.org/null

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	32-9400 was used in western blot to characterize two clones from triple negative breast MDA-MB-231 cancer cells
Human / 1:375	Experimental cell research (Nov 2015; 339: 67) **"Heterogeneity between triple negative breast cancer cells due to differential activation of Wnt and PI3K/AKT pathways."** Author(s):Martínez-Revollar G,Garay E,Martin-Tapia D,Nava P,Huerta M,Lopez-Bayghen E,Meraz-Cruz N,Segovia J, González-Mariscal L PubMed Article URL:http://dx.doi.org/10.1016/j.yexcr.2015.10.006
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	Annals of surgical oncology (Jan 2011; 18: 273) **"Low expression of claudin-4 is associated with poor prognosis in esophageal squamous cell carcinoma."** Author(s):Sung CO,Han SY,Kim SH PubMed Article URL:http://dx.doi.org/10.1245/s10434-010-1289-4
Human / 1:100	32-9400 was used in immunocytochemistry and immunohistochemistry to report that tight junctions are physiological regulated by sex hormones during the menstrual cycle.
	Cell and tissue research (Nov 2013; 354: 481) **"Regulation of tight junctions by sex hormones in normal human endometrial epithelial cells and uterus cancer cell line Sawano."** Author(s):Someya M,Kojima T,Ogawa M,Ninomiya T,Nomura K,Takasawa A,Murata M,Tanaka S,Saito T,Sawada N PubMed Article URL:http://dx.doi.org/10.1007/s00441-013-1676-9
Human / Not Cited	32-9400 was used in western blot to use a novel cell-based model system to study phenotypic plasticity in triple-negative breast cancer.
	PloS one (May 2013; 7: null) **"Evidence for phenotypic plasticity in aggressive triple-negative breast cancer: human biology is recapitulated by a novel model system."** Author(s):D'Amato NC,Ostrander JH,Bowie ML,Sistrunk C,Borowsky A,Cardiff RD,Bell K,Young LJ,Simin K,Bachelder RE, Delrow J,Dawson A,Yee LD,Mrózek K,Clay TM,Osada T,Seewaldt VL PubMed Article URL:http://dx.doi.org/10.1371/journal.pone.0045684
Human / 0.5 µg/ml	32-9400 was used in western blot to test if claudin 3 plays an instigating and/or a functional role in the urothelial tight junctions.
	Bladder (Nov 2018; 2: null) **"The human urothelial tight junction: claudin 3 and the ZO-1⁺ switch."** Author(s):Smith NJ,Hinley J,Varley CL,Eardley I,Trejdosiewicz LK,Southgate J PubMed Article URL:http://dx.doi.org/10.14440/bladder.2015.33

18 Immunohistochemistry References

Species / Dilution	Summary
	32-9400 was used in immunohistochemistry to discuss the use of ex vivo organ culture systems to study viral infections
Not Applicable / Not Cited	PloS one (Dec 2011; 6: null) **"Herpes simplex virus-induced epithelial damage and susceptibility to human immunodeficiency virus type 1 infection in human cervical organ culture."** Author(s):Horbul JE,Schmechel SC,Miller BR,Rice SA,Southern PJ PubMed Article URL:http://dx.doi.org/10.1371/journal.pone.0022638
	32-9400 was used in immunohistochemistry to characterize a graft source from human salivary glands.
Human / Not Cited	Tissue engineering. Part A (May 2011; 17: 1229) **"Matrigel improves functional properties of primary human salivary gland cells."** Author(s):Maria OM,Zeitouni A,Gologan O,Tran SD PubMed Article URL:http://dx.doi.org/10.1089/ten.TEA.2010.0297
Human / Not Cited	Cancer research (May 2005; 65: 4334) **"Treatment of chemotherapy-resistant human ovarian cancer xenografts in C.B-17/SCID mice by intraperitoneal administration of Clostridium perfringens enterotoxin."** Author(s):Santin AD,Cané S,Bellone S,Palmieri M,Siegel ER,Thomas M,Roman JJ,Burnett A,Cannon MJ,Pecorelli S PubMed Article URL:http://dx.doi.org/10.1158/0008-5472.CAN-04-3472

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	32-9400 was used in immunohistochemistry to measure the expression of tight junction proteins in human lung squamous cell carcinomas and adenocarcinomas
Not Applicable / Not Cited	Modern pathology : an official journal of the United States and Canadian Academy of Pathology, Inc (Sep 2007; 20: 947) **"Claudin-1 and claudin-5 expression patterns differentiate lung squamous cell carcinomas from adenocarcinomas."** Author(s):Paschoud S,Bongiovanni M,Pache JC,Citi S PubMed Article URL:http://dx.doi.org/10.1038/modpathol.3800835
Rat / 1:100	32-9400 was used in immunohistochemistry and western blot to elucidate ketamine-induced ulcerative cystitis and bladder apoptosis in association with oxidative stress mediated by mitochondria and the endoplasmic reticulum.
	American journal of physiology. Renal physiology (Aug 2015; 309: F318) **"Ketamine-induced ulcerative cystitis and bladder apoptosis involve oxidative stress mediated by mitochondria and the endoplasmic reticulum."** Author(s):Liu KM,Chuang SM,Long CY,Lee YL,Wang CC,Lu MC,Lin RJ,Lu JH,Jang MY,Wu WJ,Ho WT,Juan YS PubMed Article URL:http://dx.doi.org/10.1152/ajprenal.00607.2014
Human / 1:100	32-9400 was used in immunohistochemistry to study the presence of dendritic cells expressing autoimmune regulator in peripheral lymphoid tissue in humans
	The American journal of pathology (Mar 2010; 176: 1104) **"Human peripheral lymphoid tissues contain autoimmune regulator-expressing dendritic cells."** Author(s):Poliani PL,Kisand K,Marrella V,Ravanini M,Notarangelo LD,Villa A,Peterson P,Facchetti F PubMed Article URL:http://dx.doi.org/10.2353/ajpath.2010.090956
Human / 1:100	32-9400 was used in immunohistochemistry to assess the use of Claudin 4 expression in the detection of metastatic tumor cells and in differentiating reactive and neoplastic mesothelium
	Diagnostic cytopathology (May 2011; 39: 313) **"Usefulness of Claudin 4 in the cytological diagnosis of serosal effusions."** Author(s):Lonardi S,Manera C,Marucci R,Santoro A,Lorenzi L,Facchetti F PubMed Article URL:http://dx.doi.org/10.1002/dc.21380
Human / 1:400	Laboratory investigation; a journal of technical methods and pathology (Sep 2005; 85: 1139) **"Inflammatory processes have differential effects on claudins 2, 3 and 4 in colonic epithelial cells."** Author(s):Prasad S,Mingrino R,Kaukinen K,Hayes KL,Powell RM,MacDonald TT,Collins JE PubMed Article URL:http://dx.doi.org/10.1038/labinvest.3700316
Human / Not Cited	32-9400 was used in immunohistochemistry to report the case of a 65-year-old man with a colonic adenocarcinoma and a single small liver nodule
	International journal of surgical pathology (Apr 2008; 16: 218) **"Alpha-1-antitrypsin-positive "signet-ring" bile duct adenoma in a patient with M(MALTON) mutation."** Author(s):Gambarotti M,Medicina D,Baronchelli C,Bercich L,Bonetti F,Facchetti F PubMed Article URL:http://dx.doi.org/10.1177/1066896907306968
Human / 1:50	32-9400 was used in immunohistochemistry to correlate expression of claudins with clinical outcomes of triple-negative breast cancer
	PloS one (Jul 2015; 9: null) **"A CLDN1-negative phenotype predicts poor prognosis in triple-negative breast cancer."** Author(s):Ma F,Ding X,Fan Y,Ying J,Zheng S,Lu N,Xu B PubMed Article URL:http://dx.doi.org/10.1371/journal.pone.0112765
Human / Not Cited	32-9400 was used in immunohistochemistry to measure expression of claudins in prostate adenocarcinoma and compare their expression to that of non-neoplastic epithelium and correlate expression with the Gleason score of the tumors
	Oncology reports (Jan 2008; 19: 25) **"Low claudin expression is associated with high Gleason grade in prostate adenocarcinoma."** Author(s):Väre P,Loikkanen I,Hirvikoski P,Vaarala MH,Soini Y PubMed Article URL:http://dx.doi.org/null
Not Applicable / 1:50	32-9400 was used in immunohistochemistry to determine gene expression of claudin 3 and claudin 4 in ovarian carcinomas and ovarian serous tumors
	Histology and histopathology (Nov 2007; 22: 1185) **"Expression profile of tight junction protein claudin 3 and claudin 4 in ovarian serous adenocarcinoma with prognostic correlation."** Author(s):Choi YL,Kim J,Kwon MJ,Choi JS,Kim TJ,Bae DS,Koh SS,In YH,Park YW,Kim SH,Ahn G,Shin YK PubMed Article URL:http://dx.doi.org/10.14670/HH-22.1185

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Human / 1:300	Methods in molecular biology (Clifton, N.J.) (Nov 2011; 762: 371) **"Enhanced immunohistochemical resolution of claudin proteins in glycolmethacrylate-embedded tissue biopsies."** Author(s):Collins JE,Kirk A,Campbell SK,Mason J,Wilson SJ PubMed Article URL:http://dx.doi.org/10.1007/978-1-61779-185-7_27
Not Applicable / 1:100	32-9400 was used in immunohistochemistry to determine the expression and localization of tricellulin Medical molecular morphology (Dec 2009; 42: 204) **"Expression and localization of tricellulin in human nasal epithelial cells in vivo and in vitro."** Author(s):Ohkuni T,Kojima T,Ogasawara N,Masaki T,Ninomiya T,Kikuchi S,Go M,Takano K,Himi T,Sawada N PubMed Article URL:http://dx.doi.org/10.1007/s00795-009-0470-y
Human / Not Cited	32-9400 was used in immunohistochemistry and western blot to test if impaired recognition of muramyldipeptide via NOD2 variants is associated with increased bacterial translocation and alterations in NF-kappaB activation Inflammatory bowel diseases (Aug 2010; 16: 1311) **"Association of the NOD2 genotype with bacterial translocation via altered cell-cell contacts in Crohn's disease patients."** Author(s):Kosovac K,Brenmoehl J,Holler E,Falk W,Schoelmerich J,Hausmann M,Rogler G PubMed Article URL:http://dx.doi.org/10.1002/ibd.21223
Human / Not Cited	Human pathology (Apr 2007; 38: 564) **"Loss of claudins-1 and -7 and expression of claudins-3 and -4 correlate with prognostic variables in prostatic adenocarcinomas."** Author(s):Sheehan GM,Kallakury BV,Sheehan CE,Fisher HA,Kaufman RP,Ross JS PubMed Article URL:http://dx.doi.org/10.1016/j.humpath.2006.11.007
Human / Not Cited	32-9400 was used in immunohistochemistry to demonstrate that tight junctions join medullary stromal cells of the human thymus The journal of histochemistry and cytochemistry : official journal of the Histochemistry Society (Nov 2006; 54: 1277) **"Cellular networks of human thymic medullary stromas coordinated by p53-related transcription factors."** Author(s):Ichimiya S,Kojima T PubMed Article URL:http://dx.doi.org/10.1369/jhc.6A7028.2006
Human / Not Cited	32-9400 was used in immunohistochemistry to investigate the thymus development Development (Cambridge, England) (May 2013; 140: 2015) **"Dynamics of thymus organogenesis and colonization in early human development."** Author(s):Farley AM,Morris LX,Vroegindeweij E,Depreter ML,Vaidya H,Stenhouse FH,Tomlinson SR,Anderson RA,Cupedo T,Cornelissen JJ,Blackburn CC PubMed Article URL:http://dx.doi.org/10.1242/dev.087320

14 Immunofluorescence References

Species / Dilution	Summary
Fish / Not Cited	American journal of physiology. Regulatory, integrative and comparative physiology (Jan 2012; 302: R300) **"Functional characterization and localization of a gill-specific claudin isoform in Atlantic salmon."** Author(s):Engelund MB,Yu AS,Li J,Madsen SS,Færgeman NJ,Tipsmark CK PubMed Article URL:http://dx.doi.org/10.1152/ajpregu.00286.2011
Dog / Not Cited	The Journal of biological chemistry (May 2003; 278: 17350) **"Claudin-8 expression in Madin-Darby canine kidney cells augments the paracellular barrier to cation permeation."** Author(s):Yu AS,Enck AH,Lencer WI,Schneeberger EE PubMed Article URL:http://dx.doi.org/10.1074/jbc.M213286200
Dog / 1:2000	American journal of physiology. Gastrointestinal and liver physiology (Apr 2005; 288: G705) **"Cultured monolayers of the dog jejunum with the structural and functional properties resembling the normal epithelium."** Author(s):Weng XH,Beyenbach KW,Quaroni A PubMed Article URL:http://dx.doi.org/10.1152/ajpgi.00518.2003
Dog / 1:500	The Journal of biological chemistry (Feb 2005; 280: 3780) **"Extracellular signal-regulated kinases 1/2 control claudin-2 expression in Madin-Darby canine kidney strain I and II cells."** Author(s):Lipschutz JH,Li S,Arisco A,Balkovetz DF PubMed Article URL:http://dx.doi.org/10.1074/jbc.M408122200

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Rat / 2.5 µg/ml	Cell and tissue research (Jul 2007; 329: 59) **"Differences in claudin synthesis in primary cultures of acinar cells from rat salivary gland are correlated with the specific three-dimensional organization of the cells."** Author(s):Qi B,Fujita-Yoshigaki J,Michikawa H,Satoh K,Katsumata O,Sugiya H PubMed Article URL:http://dx.doi.org/10.1007/s00441-007-0389-3
Mouse / Not Cited	American journal of physiology. Cell physiology (Jun 2003; 284: C1346) **"Claudin extracellular domains determine paracellular charge selectivity and resistance but not tight junction fibril architecture."** Author(s):Colegio OR,Van Itallie C,Rahner C,Anderson JM PubMed Article URL:http://dx.doi.org/10.1152/ajpcell.00547.2002
Human / Not Cited	Journal of immunology (Baltimore, Md. : 1950) (Dec 2003; 171: 6164) **"Proinflammatory cytokines disrupt epithelial barrier function by apoptosis-independent mechanisms."** Author(s):Bruewer M,Luegering A,Kucharzik T,Parkos CA,Madara JL,Hopkins AM,Nusrat A PubMed Article URL:http://dx.doi.org/null
Dog / Not Cited	Molecular biology of the cell (Sep 2011; 22: 3192) **"Functional ESCRT machinery is required for constitutive recycling of claudin-1 and maintenance of polarity in vertebrate epithelial cells."** Author(s):Dukes JD,Fish L,Richardson JD,Blaikley E,Burns S,Caunt CJ,Chalmers AD,Whitley P PubMed Article URL:http://dx.doi.org/10.1091/mbc.E11-04-0343
Mouse / Not Cited	American journal of physiology. Renal physiology (Dec 2003; 285: F1078) **"Reversal of charge selectivity in cation or anion-selective epithelial lines by expression of different claudins."** Author(s):Van Itallie CM,Fanning AS,Anderson JM PubMed Article URL:http://dx.doi.org/10.1152/ajprenal.00116.2003
Mouse / Not Cited Rat / Not Cited Rabbit / Not Cited	American journal of physiology. Renal physiology (Aug 2004; 287: F305) **"Distribution of the tight junction proteins ZO-1, occludin, and claudin-4, -8, and -12 in bladder epithelium."** Author(s):Acharya P,Beckel J,Ruiz WG,Wang E,Rojas R,Birder L,Apodaca G PubMed Article URL:http://dx.doi.org/10.1152/ajprenal.00341.2003
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Dog / Not Cited	The Journal of biological chemistry (Jan 2004; 279: 3543) **"Epidermal growth factor receptor activation differentially regulates claudin expression and enhances transepithelial resistance in Madin-Darby canine kidney cells."** Author(s):Singh AB,Harris RC PubMed Article URL:http://dx.doi.org/10.1074/jbc.M308682200
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30 Immunohistochemistry (Paraffin) References

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Human / Not Cited	American journal of clinical pathology (Feb 2004; 121: 226) **"Claudin 4 protein expression in primary and metastatic pancreatic cancer: support for use as a therapeutic target."** Author(s):Nichols LS,Ashfaq R,Iacobuzio-Donahue CA PubMed Article URL:http://dx.doi.org/10.1309/K144-PHVD-DUPD-D401
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Not Applicable / 1:1000	International journal of cancer (May 2009; 124: 2088) **"Increased claudin-4 expression is associated with poor prognosis and high tumour grade in breast cancer."** Author(s):Lanigan F,McKiernan E,Brennan DJ,Hegarty S,Millikan RC,McBryan J,Jirstrom K,Landberg G,Martin F,Duffy MJ, Gallagher WM PubMed Article URL:http://dx.doi.org/10.1002/ijc.24159

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	32-9400 was used in immunohistochemistry - paraffin section to measure claudins 1, 3, 4, 5, and 7 expression in developing human lung tissues during gestation
Human / Not Cited	Respiratory research (May 2010; 11: null) **"Divergent expression of claudin -1, -3, -4, -5 and -7 in developing human lung."** Author(s):Kaarteenaho R,Merikallio H,Lehtonen S,Harju T,Soini Y PubMed Article URL:http://dx.doi.org/10.1186/1465-9921-11-59
	32-9400 was used in immunohistochemistry - paraffin section to identify predictors for lymph node metastasis in patients with early colorectal cancer
Human / 1:200	Cancer (Feb 2008; 112: 924) **"Histopathologic determinants of regional lymph node metastasis in early colorectal cancer."** Author(s):Ishikawa Y,Akishima-Fukasawa Y,Ito K,Akasaka Y,Yokoo T,Ishii T PubMed Article URL:http://dx.doi.org/10.1002/cncr.23248
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Human / Not Cited	Molecular human reproduction (Sep 2002; 8: 871) **"Changes in gene expression during the early to mid-luteal (receptive phase) transition in human endometrium detected by high-density microarray screening."** Author(s):Carson DD,Lagow E,Thathiah A,Al-Shami R,Farach-Carson MC,Vernon M,Yuan L,Fritz MA,Lessey B PubMed Article URL:http://dx.doi.org/null
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Human / 10 ug/ml	Gut (May 2014; 63: 711) **"Nrf2 deficiency impairs the barrier function of mouse oesophageal epithelium."** Author(s):Chen H,Hu Y,Fang Y,Djukic Z,Yamamoto M,Shaheen NJ,Orlando RC,Chen X PubMed Article URL:http://dx.doi.org/10.1136/gutjnl-2012-303731
	32-9400 was used in immunohistochemistry - paraffin section to observe the expression of claudins in mesothelioma and metastatic pleural adenocarcinoma
Not Applicable / 1:50	Journal of clinical pathology (Mar 2006; 59: 250) **"Claudins in differential diagnosis between mesothelioma and metastatic adenocarcinoma of the pleura."** Author(s):Soini Y,Kinnula V,Kahlos K,Pääkkö P PubMed Article URL:http://dx.doi.org/10.1136/jcp.2005.028589
	32-9400 was used in immunohistochemistry - paraffin section to evaluate the effect of three different fixation methods on pathology samples
Not Applicable / 1:100	Diagnostic molecular pathology : the American journal of surgical pathology, part B (Dec 2004; 13: 234) **"Effect of formalin, acetone, and RNAlater fixatives on tissue preservation and different size amplicons by real-time PCR from paraffin-embedded tissue."** Author(s):Páska C,Bögi K,Szilák L,Tokés A,Szabó E,Sziller I,Rigó J,Sobel G,Szabó I,Kaposi-Novák P,Kiss A,Schaff Z PubMed Article URL:http://dx.doi.org/null
	32-9400 was used in immunohistochemistry - paraffin section and western blot to examine tight junction and adherence junction protein expression in the colorectal epithelium of dogs with inflammatory colorectal polyps
Dog / 1.2 µg/ml	The Journal of veterinary medical science (Mar 2017; 79: 456) **"Expression of apical junction complex proteins in colorectal mucosa of miniature dachshunds with inflammatory colorectal polyps."** Author(s):Yokoyama N,Ohta H,Kagawa Y,Leela-Arporn R,Dermlim A,Nisa K,Morita T,Osuga T,Sasaki N,Morishita K, Nakamura K,Takiguchi M PubMed Article URL:http://dx.doi.org/10.1292/jvms.16-0479
	32-9400 was used in immunohistochemistry - paraffin section to determine the expression of several different claudins in rectal well-differentiated endocrine neoplasms
Not Applicable / 1:100	Oncology reports (Jan 2009; 21: 113) **"Claudin expression in rectal well-differentiated endocrine neoplasms (carcinoid tumors)."** Author(s):Ishida M,Kushima R,Okabe H PubMed Article URL:http://dx.doi.org/null

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Not Applicable / Not Cited	Modern pathology : an official journal of the United States and Canadian Academy of Pathology, Inc (Mar 2006; 19: 460) **"Claudin-4 differentiates biliary tract cancers from hepatocellular carcinomas."** Author(s):Lódi C,Szabó E,Holczbauer A,Batmunkh E,Szíjártó A,Kupcsulik P,Kovalszky I,Paku S,Illyés G,Kiss A,Schaff Z PubMed Article URL:http://dx.doi.org/10.1038/modpathol.3800549
	32-9400 was used in immunohistochemistry - paraffin section to investigate the pattern of expression and prognostic value of claudin-1, claudin-4, occludin, and ZO-1 in a cohort of TNM stage II colon cancer
Not Applicable / 1:500	Modern pathology : an official journal of the United States and Canadian Academy of Pathology, Inc (Apr 2005; 18: 511) **"Claudin-1 is a strong prognostic indicator in stage II colonic cancer: a tissue microarray study."** Author(s):Resnick MB,Konkin T,Routhier J,Sabo E,Pricolo VE PubMed Article URL:http://dx.doi.org/10.1038/modpathol.3800301
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Not Applicable / 1:100	International journal of molecular medicine (Aug 2007; 20: 139) **"Decreased expression of claudin-1 correlates with recurrence status in breast cancer."** Author(s):Morohashi S,Kusumi T,Sato F,Odagiri H,Chiba H,Yoshihara S,Hakamada K,Sasaki M,Kijima H PubMed Article URL:http://dx.doi.org/null
	32-9400 was used in immunohistochemistry - paraffin section to measure expression of occludin and claudin-1, -4, and -7 in thyroid neoplasms
Human / Not Cited	Modern pathology : an official journal of the United States and Canadian Academy of Pathology, Inc (Jan 2008; 21: 22) **"Tight junctions in thyroid carcinogenesis: diverse expression of claudin-1, claudin-4, claudin-7 and occludin in thyroid neoplasms."** Author(s):Tzelepi VN,Tsamandas AC,Vlotinou HD,Vagianos CE,Scopa CD PubMed Article URL:http://dx.doi.org/10.1038/modpathol.3800959
	32-9400 was used in immunohistochemistry - paraffin section to measure and compare claudin 2, 3, 4, and 5 expression in patients with Paget's disease with those of other neoplastic skin lesions
Human / Not Cited	Human pathology (Dec 2004; 35: 1531) **"Claudins 2, 3, 4, and 5 in Paget's disease and breast carcinoma."** Author(s):Soini Y PubMed Article URL:http://dx.doi.org/null
	32-9400 was used in immunohistochemistry - paraffin section to define the localization of CD81, scavenger receptor class B member I, and Claudin-1 in HCV entry of hepatocytes
Not Applicable / 10 µg/ml	Hepatology (Baltimore, Md.) (Feb 2008; 47: 418) **"Hepatitis C virus receptor expression in normal and diseased liver tissue."** Author(s):Reynolds GM,Harris HJ,Jennings A,Hu K,Grove J,Lalor PF,Adams DH,Balfe P,Hübscher SG,McKeating JA PubMed Article URL:http://dx.doi.org/10.1002/hep.22028
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Human / 1:100	Human pathology (Sep 2015; 46: 1257) **"Expression of adhesion molecules and epithelial-mesenchymal transition factors in medullary carcinoma of the colorectum."** Author(s):Takahashi S,Kohashi K,Yamamoto H,Hirahashi M,Kumagai R,Takizawa N,Nakamura K,Maehara Y,Tanaka M,Takayanagi R,Oda Y PubMed Article URL:http://dx.doi.org/10.1016/j.humpath.2015.05.023
	32-9400 was used in immunohistochemistry - paraffin section to study three clinical cases of follicular dendritic cell sarcoma
Human / Not Cited	Human pathology (Feb 2012; 43: 209) **"Folliculocentric B-cell-rich follicular dendritic cells sarcoma: a hitherto unreported morphological variant mimicking lymphoproliferative disorders."** Author(s):Lorenzi L,Lonardi S,Petrilli G,Tanda F,Bella M,Laurino L,Rossi G,Facchetti F PubMed Article URL:http://dx.doi.org/10.1016/j.humpath.2011.02.029

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	32-9400 was used in immunohistochemistry - paraffin section to elucidate the relationship between deltaNp63 and barrier function
Human / Not Cited	Biochemical and biophysical research communications (Dec 2014; 455: 205) **"Tight junction protein claudin-4 is modulated via Np63 in human keratinocytes."** Author(s):Kubo T,Sugimoto K,Kojima T,Sawada N,Sato N,Ichimiya S PubMed Article URL:http://dx.doi.org/10.1016/j.bbrc.2014.10.148

1 Immunoprecipitation References

Species / Dilution	Summary
Human / Not Cited	The Journal of biological chemistry (Jul 2005; 280: 26233) **"Phosphorylation of claudin-3 at threonine 192 by cAMP-dependent protein kinase regulates tight junction barrier function in ovarian cancer cells."** Author(s):D'Souza T,Agarwal R,Morin PJ PubMed Article URL:http://dx.doi.org/10.1074/jbc.M502003200

14 Immunocytochemistry References

Species / Dilution	Summary
Not Applicable / Not Cited	32-9400 was used in immunocytochemistry and western blot to examine the effects of deoxynivalenol on the intestinal epithelium
	Toxicology and applied pharmacology (May 2009; 237: 41) **"The food contaminant deoxynivalenol, decreases intestinal barrier permeability and reduces claudin expression."** Author(s):Pinton P,Nougayrède JP,Del Rio JC,Moreno C,Marin DE,Ferrier L,Bracarense AP,Kolf-Clauw M,Oswald IP PubMed Article URL:http://dx.doi.org/10.1016/j.taap.2009.03.003
Dog / Not Cited	32-9400 was used in immunocytochemistry to investigate the effect of ouabain on cilia development in epithelial cells
	Proceedings of the National Academy of Sciences of the United States of America (Dec 2011; 108: 20591) **"Ouabain modulates ciliogenesis in epithelial cells."** Author(s):Larre I,Castillo A,Flores-Maldonado C,Contreras RG,Galvan I,Muñoz-Estrada J,Cereijido M PubMed Article URL:http://dx.doi.org/10.1073/pnas.1102617108
Not Applicable / Not Cited	32-9400 was used in immunocytochemistry to study the formation of fluid-filled hemicysts called domes by epithelial cells
	The Journal of biological chemistry (Jun 2005; 280: 24181) **"Differentiation of epithelial Na+ channel function. An in vitro model."** Author(s):Shlyonsky V,Goolaerts A,Van Beneden R,Sariban-Sohraby S PubMed Article URL:http://dx.doi.org/10.1074/jbc.M413823200
Human / Not Cited	32-9400 was used in immunocytochemistry to examine the responses to Clostridium perfringens enterotoxin via claudin-4 in normal human pancreatic duct epithelial cells.
	Cellular and molecular biology letters (Sep 2011; 16: 385) **"Effects of Clostridium perfringens enterotoxin via claudin-4 on normal human pancreatic duct epithelial cells and cancer cells."** Author(s):Yamaguchi H,Kojima T,Ito T,Kyuno D,Kimura Y,Imamura M,Hirata K,Sawada N PubMed Article URL:http://dx.doi.org/10.2478/s11658-011-0014-z
Human / Not Cited	32-9400 was used in immunocytochemistry and western blot to develop and characterize a model for Hailey-Hailey disease using normal keratinocytes.
	Experimental dermatology (Aug 2012; 21: 586) **"Hailey-Hailey disease and tight junctions: Claudins 1 and 4 are regulated by ATP2C1 gene encoding Ca(2+) /Mn(2+) ATPase SPCA1 in cultured keratinocytes."** Author(s):Raiko L,Siljamäki E,Mahoney MG,Putaala H,Suominen E,Peltonen J,Peltonen S PubMed Article URL:http://dx.doi.org/10.1111/j.1600-0625.2012.01520.x
Not Applicable / 1:100	32-9400 was used in immunocytochemistry to characterize a permanent porcine intestinal epithelial cell line to use as an in vitro infection model
	Histochemistry and cell biology (Mar 2006; 125: 293) **"Characterization of a porcine intestinal epithelial cell line for in vitro studies of microbial pathogenesis in swine."** Author(s):Schierack P,Nordhoff M,Pollmann M,Weyrauch KD,Amasheh S,Lodemann U,Jores J,Tachu B,Kleta S,Blikslager A,Tedin K,Wieler LH PubMed Article URL:http://dx.doi.org/10.1007/s00418-005-0067-z

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	32-9400 was used in immunocytochemistry to develop a universal interface system composed of protein G and 6xHis-tag and use it to identify a pancreatic cancer biomarker.
Human / Not Cited	ACS nano (Sep 2013; 7: 8167) **"Think modular: a simple apoferritin-based platform for the multifaceted detection of pancreatic cancer."** Author(s):Hwang MP,Lee JW,Lee KE,Lee KH PubMed Article URL:http://dx.doi.org/10.1021/nn403465a
	32-9400 was used in immunocytochemistry and western blot to suggest that aPKC regulates tight junction formation through the phosphorylation of claudin-4
Not Applicable / Not Cited	Experimental cell research (Nov 2008; 314: 3326) **"Phosphorylation of claudin-4 is required for tight junction formation in a human keratinocyte cell line."** Author(s):Aono S,Hirai Y PubMed Article URL:http://dx.doi.org/10.1016/j.yexcr.2008.08.012
	32-9400 was used in immunocytochemistry, immunohistochemistry - paraffin section, and western blot to investigate the expression and regulation of tight junction proteins in human urothelium
Human / Not Cited	Journal of cellular physiology (Aug 2006; 208: 407) **"PPARgamma-regulated tight junction development during human urothelial cytodifferentiation."** Author(s):Varley CL,Garthwaite MA,Cross W,Hinley J,Trejdosiewicz LK,Southgate J PubMed Article URL:http://dx.doi.org/10.1002/jcp.20676
	32-9400 was used in immunocytochemistry to investigate the role of TRPV4 in a corneal epithelial cell model
Rabbit / 1:50	Journal of cellular physiology (Jul 2017; 232: 1794) **"TRPV4 Regulates Tight Junctions and Affects Differentiation in a Cell Culture Model of the Corneal Epithelium."** Author(s):Martínez-Rendón J,Sánchez-Guzmán E,Rueda A,González J,Gulias-Cañizo R,Aquino-Jarquín G,Castro-Muñozledo F,García-Villegas R PubMed Article URL:http://dx.doi.org/10.1002/jcp.25698
	32-9400 was used in immunocytochemistry to examine iron-associated toxicity in intestinal epithelial cells
Not Applicable / Not Cited	Toxicology in vitro : an international journal published in association with BIBRA (Dec 2009; 23: 1510) **"Mechanisms of defence from Fe(II) toxicity in human intestinal Caco-2 cells."** Author(s):Natoli M,Felsani A,Ferruzza S,Sambuy Y,Canali R,Scarino ML PubMed Article URL:http://dx.doi.org/10.1016/j.tiv.2009.06.016
	32-9400 was used in immunocytochemistry to establish canine mammary tissue derived cell lines and study claudin expression
Dog / 1:200	International journal of molecular sciences (Sep 2016; 17: null) **"Longitudinal Claudin Gene Expression Analyses in Canine Mammary Tissues and Thereof Derived Primary Cultures and Cell Lines."** Author(s):Hammer SC,Becker A,Rateitschak K,Mohr A,Lüder Ripoli F,Hennecke S,Junginger J,Hewicker-Trautwein M,Brenig B,Ngezahayo A,Nolte I,Murua Escobar H PubMed Article URL:http://dx.doi.org/10.3390/ijms17101655
	32-9400 was used in immunocytochemistry to demonstrate that epidermal equivalents of filaggrin null keratinocytes do not have impaired skin barrier function
Human / 1:700	The Journal of allergy and clinical immunology (Jun 2017; 139: 1979) **"Epidermal equivalents of filaggrin null keratinocytes do not show impaired skin barrier function."** Author(s):Niehues H,Schalkwijk J,van Vlijmen-Willems IMJJ,Rodijk-Olthuis D,van Rossum MM,Wladykowski E,Brandner JM,van den Bogaard EHJ,Zeeuwen PLJM PubMed Article URL:http://dx.doi.org/10.1016/j.jaci.2016.09.016
	32-9400 was used in immunocytochemistry and western blot to investigate the effect of ouabain on endocytosis and degradation of tight junction proteins.
Dog / Not Cited	Experimental cell research (Jan 2014; 320: 108) **"Ouabain induces endocytosis and degradation of tight junction proteins through ERK1/2-dependent pathways."** Author(s):Rincon-Heredia R,Flores-Benitez D,Flores-Maldonado C,Bonilla-Delgado J,García-Hernández V,Verdejo-Torres O,Castillo AM,Larré I,Poot-Hernández AC,Franco M,Gariglio P,Reyes JL,Contreras RG PubMed Article URL:http://dx.doi.org/10.1016/j.yexcr.2013.10.008

7 Immunohistochemistry (Frozen) References

Species / Dilution	Summary

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	32-9400 was used in immunohistochemistry - frozen section to examine tight junction protein expression in venous leg ulcers
Not Applicable / 1:100	Clinical and experimental dermatology (Dec 2009; 34: e949) **"Expression of tight-junction proteins in the inflamed and clinically uninvolved skin in patients with venous leg ulcers."** Author(s):Zorko MS,Veranic P,Leskovec NK,Pavlovi MD,Lunder T PubMed Article URL:http://dx.doi.org/10.1111/j.1365-2230.2009.03591.x
	32-9400 was used in immunohistochemistry - frozen section to study M cells in the epithelial barrier of the human adenoid
Mouse / Not Cited	Journal of molecular histology (Jun 2008; 39: 265) **"Expression of tight junction proteins in epithelium including Ck20-positive M-like cells of human adenoids in vivo and in vitro."** Author(s):Takano K,Kojima T,Ogasawara N,Go M,Kikuchi S,Ninomiya T,Kurose M,Koizumi J,Kamekura R,Murata M,Tanaka S,Chiba H,Himi T,Sawada N PubMed Article URL:http://dx.doi.org/10.1007/s10735-008-9162-5
	32-9400 was used in immunohistochemistry - frozen section to review structural proteins of epidermal tight junctions
Not Applicable / Not Cited	The British journal of dermatology (Mar 2007; 156: 466) **"Tight junction components occludin, ZO-1, and claudin-1, -4 and -5 in active and healing psoriasis."** Author(s):Peltonen S,Riehokainen J,Pummi K,Peltonen J PubMed Article URL:http://dx.doi.org/10.1111/j.1365-2133.2006.07642.x
	32-9400 was used in immunohistochemistry - frozen section to study the expression of adherens junction and tight junction components in human peripheral nerve endoneurium
Not Applicable / 1:100	The journal of histochemistry and cytochemistry : official journal of the Histochemistry Society (Jun 2009; 57: 523) **"Tight junction proteins in human Schwann cell autotypic junctions."** Author(s):Alanne MH,Pummi K,Heape AM,Grènman R,Peltonen J,Peltonen S PubMed Article URL:http://dx.doi.org/10.1369/jhc.2009.951681
	32-9400 was used in immunohistochemistry - frozen section to examine the expression and function of tight junctions in the epithelium of human palatine tonsils from patients with tonsillar hypertrophy or recurrent tonsillitis
Not Applicable / 1:100	The journal of histochemistry and cytochemistry : official journal of the Histochemistry Society (Dec 2004; 52: 1627) **"Expression and function of tight junctions in the crypt epithelium of human palatine tonsils."** Author(s):Go M,Kojima T,Takano K,Murata M,Ichimiya S,Tsubota H,Himi T,Sawada N PubMed Article URL:http://dx.doi.org/10.1369/jhc.4A6339.2004
	32-9400 was used in immunohistochemistry - frozen section to compare tricellulin expression in normal and cirrhotic liver with that of primary hepatic neoplasms
Human / 1:100	Pathology oncology research : POR (Oct 2014; 20: 755) **"Tricellulin expression and its prognostic significance in primary liver carcinomas."** Author(s):Somorácz A,Korompay A,Törzsök P,Patonai A,Erdélyi-Belle B,Lotz G,Schaff Z,Kiss A PubMed Article URL:http://dx.doi.org/10.1007/s12253-014-9758-x
	32-9400 was used in immunohistochemistry - frozen section and western blot to examine the cellular distributions of tight junction components during early pregnancy and under various hormonal regimens
Not Applicable / 5 µg/ml	Acta histochemica (Mar 2010; 112: 42) **"Ovarian hormones control the changing expression of claudins and occludin in rat uterine epithelial cells during early pregnancy."** Author(s):Nicholson MD,Lindsay LA,Murphy CR PubMed Article URL:http://dx.doi.org/10.1016/j.acthis.2008.07.003

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