

## Literatur

- Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P (2002):** Molecular Biology of the Cell. 4<sup>th</sup> ed., Published by Garland Publishing, New York.
- Ausubel FM, Brent R, Kingston RE, Moore DD, Seidmann JG, Smith JA, Struhl K (2002):** Current Protocols in Molecular Biology, Volume 1+2. 5<sup>th</sup> ed., Published by John Wiley and Sons, Inc.
- Barnett TR, Drake L, Pickle W, 2nd (1993):** Human biliary glycoprotein gene: characterization of a family of novel alternatively spliced RNAs and their expressed proteins. *Mol Cell Biol* 13:1273-82.
- Barnett TR, Kretschmer A, Austen DA, Goebel SJ, Hart JT, Elting JJ, Kamarck ME (1989):** Carcinoembryonic antigens: alternative splicing accounts for the multiple mRNAs that code for novel members of the carcinoembryonic antigen family. *J Cell Biol* 108:267-76.
- Beauchemin N, Draber P, Dveksler G, Gold P, Gray-Owen S, Grunert F, Hammarström S, Holmes KV, Karlsson A, Kuroki M, Lin SH, Lucka L, Najjar SM, Neumaier M, Öbrink B, Shively JE, Skubitz KM, Stanners CP, Thomas P, Thompson JA, Virji M, von Kleist S, Wagener C, Watt S, Zimmermann W (1999):** Redefined nomenclature for members of the carcinoembryonic antigen family. *Exp Cell Res* 252:243-9.
- Beauchemin N, Kunath T, Robitaille J, Chow B, Turbide C, Daniels E, Veillette A (1997):** Association of biliary glycoprotein with protein tyrosine phosphatase SHP-1 in malignant colon epithelial cells. *Oncogene* 14:783-90.
- Becker A, Gossrau R, Hoffmann C, Reutter W (1989):** Localization of a putative cell adhesion molecule (gp110) in Wistar and Fischer rat tissues. *Histochemistry* 93:55-61.
- Becker A, Neumeier R, Heidrich C, Loch N, Hartel S, Reutter W (1986):** Cell surface glycoproteins of hepatocytes and hepatoma cells identified by monoclonal antibodies. *Biol Chem Hoppe Seyler* 367:681-8.
- Bellanger JM, Astier C, Sardet C, Ohta Y, Stossel TP, Debant A (2000):** The Rac1- and RhoG-specific GEF domain of Trio targets filamin to remodel cytoskeletal actin. *Nat Cell Biol* 2:888-92.
- Bishop AL, Hall A (2000):** Rho GTPases and their effector proteins. *Biochem J* 348:241-55.
- Blomberg LA, Wu SM, Dirami G, Dym M, Chou JY, Chan WY (1997):** Characterization and cellular localization of PSG in rat testis. *Mol Cell Biochem* 177:229-37.
- Bork P, Holm L, Sander C (1994):** The immunoglobulin fold. Structural classification, sequence patterns and common core. *J Mol Biol* 242:309-20.
- Brümmer J, Ebrahimnejad A, Flayeh R, Schumacher U, Loning T, Bamberger AM, Wagener C (2001):** cis Interaction of the cell adhesion molecule CEACAM1 with integrin beta(3). *Am J Pathol* 159:537-46.
- Brümmer J, Neumaier M, Gopfert C, Wagener C (1995):** Association of pp60c-src with biliary glycoprotein (CD66a), an adhesion molecule of the carcinoembryonic antigen family downregulated in colorectal carcinomas. *Oncogene* 11:1649-55.

- Budt M, Cichocka I, Reutter W, Lucka L (2002a):** Clustering-induced signaling of CEACAM1 in PC12 cells. *Biol Chem* 383:803-12.
- Budt M, Michely B, Müller MM, Reutter W, Lucka L (2002b):** Secreted CEACAM1 splice variants in rat cell lines and in vivo in rat serum. *Biochem Biophys Res Commun* 292:749-55.
- Busch C, Hanssen TA, Wagener C, B OB (2002):** Down-regulation of CEACAM1 in human prostate cancer: correlation with loss of cell polarity, increased proliferation rate, and Gleason grade 3 to 4 transition. *Hum Pathol* 33:290-8.
- Calderwood DA, Huttenlocher A, Kiosses WB, Rose DM, Woodside DG, Schwartz MA, Ginsberg MH (2001):** Increased filamin binding to beta-integrin cytoplasmic domains inhibits cell migration. *Nat Cell Biol* 3:1060-8.
- Camonis JH, White MA (2005):** Ral GTPases: corrupting the exocyst in cancer cells. *Trends Cell Biol* 15:327-32.
- Chen CJ, Shively JE (2004):** The cell-cell adhesion molecule carcinoembryonic antigen-related cellular adhesion molecule 1 inhibits IL-2 production and proliferation in human T cells by association with Src homology protein-1 and down-regulates IL-2 receptor. *J Immunol* 172:3544-52.
- Cox D, Condeelis J, Wessels D, Soll D, Kern H, Knecht DA (1992):** Targeted disruption of the ABP-120 gene leads to cells with altered motility. *J Cell Biol* 116:943-55.
- Cox D, Wessels D, Soll DR, Hartwig J, Condeelis J (1996):** Re-expression of ABP-120 rescues cytoskeletal, motility, and phagocytosis defects of ABP-120- *Dictyostelium* mutants. *Mol Biol Cell* 7:803-23.
- Crossin KL, Krushel LA (2000):** Cellular signaling by neural cell adhesion molecules of the immunoglobulin superfamily. *Dev Dyn* 218:260-79.
- Crowe DL, Ohannessian A (2004):** Recruitment of focal adhesion kinase and paxillin to beta1 integrin promotes cancer cell migration via mitogen activated protein kinase activation. *BMC Cancer* 4:18.
- Cunningham CC (1995):** Actin polymerization and intracellular solvent flow in cell surface blebbing. *J Cell Biol* 129:1589-99.
- Cunningham CC, Gorlin JB, Kwiatkowski DJ, Hartwig JH, Janmey PA, Byers HR, Stossel TP (1992):** Actin-binding protein requirement for cortical stability and efficient locomotion. *Science* 255:325-7.
- Cunningham CC, Leclerc N, Flanagan LA, Lu M, Janmey PA, Kosik KS (1997):** Microtubule-associated protein 2c reorganizes both microtubules and microfilaments into distinct cytological structures in an actin-binding protein-280-deficient melanoma cell line. *J Cell Biol* 136:845-57.
- Da Silva-Azevedo L, Reutter W (1999):** The long isoform of the cell adhesion molecule C-CAM binds to actin. *Biochem Biophys Res Commun* 256:404-8.
- Daeron M, Latour S, Malbec O, Espinosa E, Pina P, Pasmans S, Fridman WH (1995):** The same tyrosine-based inhibition motif, in the intra-cytoplasmic domain of FcγRIIB, regulates negatively BCR-, TCR-, and FcR-dependent cell activation. *Immunity* 3:635-646.
- Dai J, Sheetz MP (1999):** Membrane tether formation from blebbing cells. *Biophys J* 77:3363-70.

- Derycke LD, Bracke ME (2004):** N-cadherin in the spotlight of cell-cell adhesion, differentiation, embryogenesis, invasion and signalling. *Int J Dev Biol* 48:463-76.
- Dveksler GS, Pensiero MN, Cardellichio CB, Williams RK, Jiang GS, Holmes KV, Dieffenbach CW (1991):** Cloning of the mouse hepatitis virus (MHV) receptor: expression in human and hamster cell lines confers susceptibility to MHV. *J Virol* 65:6881-91.
- Earley K, Luo W, Qiu Y, Thompson NL, Chou J, Hixson DC, Lin SH (1996):** Identification of a new isoform of cell-cell adhesion molecule 105 (C-CAM), C-CAM4: a secretory protein with only one Ig domain. *Biochem J* 315:799-806.
- Ebrahimnejad A, Flayeh R, Unteregger G, Wagener C, Brümmer J (2000):** Cell adhesion molecule CEACAM1 associates with paxillin in granulocytes and epithelial and endothelial cells. *Exp Cell Res* 260:365-73.
- Ebrahimnejad A, Streichert T, Nollau P, Horst AK, Wagener C, Bamberger AM, Brümmer J (2004):** CEACAM1 enhances invasion and migration of melanocytic and melanoma cells. *Am J Pathol* 165:1781-7.
- Edlund M, Blikstad I, Öbrink B (1996):** Calmodulin binds to specific sequences in the cytoplasmic domain of C-CAM and down-regulates C-CAM self-association. *J Biol Chem* 271:1393-9.
- Edlund M, Öbrink B (1993):** Evidence for calmodulin binding to the cytoplasmic domains of two C-CAM isoforms. *FEBS Lett* 327:90-4.
- Edlund M, Wikström K, Toomik R, Ek P, Öbrink B (1998):** Charakterisation of protein kinase C-mediated phosphorylation of the short cytoplasmic domain of C-CAM. *FEBS Letters* 425:166-170.
- Ergün S, Kilik N, Ziegeler G, Hansen A, Nollau P, Gotze J, Wurmbach JH, Horst A, Weil J, Fernando M, Wagener C (2000):** CEA-related cell adhesion molecule 1: a potent angiogenic factor and a major effector of vascular endothelial growth factor. *Mol Cell* 5:311-20.
- Feig LA (2003):** Ral-GTPases: approaching their 15 minutes of fame. *Trends Cell Biol* 13:419-25.
- Feig LA, Urano T, Cantor S (1996):** Evidence for a Ras/Ral signaling cascade. *Trends Biochem Sci* 21:438-41.
- Folkman J (2003):** Fundamental concepts of the angiogenic process. *Curr Mol Med* 3:643-51.
- Friedl P, Wolf K (2003a):** Proteolytic and non-proteolytic migration of tumour cells and leucocytes. *Biochem Soc Symp*:277-85.
- Friedl P, Wolf K (2003b):** Tumour-cell invasion and migration: diversity and escape mechanisms. *Nat Rev Cancer* 3:362-74.
- Garlick JA, Taichman LB (1994):** Fate of human keratinocytes during reepithelialization in an organotypic culture model. *Lab Invest* 70:916-24.
- Giancotti FG, Ruoslahti E (1999):** Integrin signaling. *Science* 285:1028-32.
- Glogauer M, Arora P, Chou D, Janmey PA, Downey GP, McCulloch CA (1998):** The role of actin-binding protein 280 in integrin-dependent mechanoprotection. *J Biol Chem* 273:1689-98.

- Godfraind C, Langreth SG, Cardellichio CB, Knobler R, Coutelier JP, Dubois-Dalcq M, Holmes KV (1995):** Tissue and cellular distribution of an adhesion molecule in the carcinoembryonic antigen family that serves as a receptor for mouse hepatitis virus. *Lab Invest* 73:615-27.
- Gonzalez-Garcia A, Pritchard CA, Paterson HF, Mavria G, Stamp G, Marshall CJ (2005):** RalGDS is required for tumor formation in a model of skin carcinogenesis. *Cancer Cell* 7:219-26.
- Greicius G, Severinson E, Beauchemin N, Öbrink B, Singer BB (2003):** CEACAM1 is a potent regulator of B cell receptor complex-induced activation. *J Leukoc Biol* 74:126-34.
- Haass NK, Smalley KS, Li L, Herlyn M (2005):** Adhesion, migration and communication in melanocytes and melanoma. *Pigment Cell Res* 18:150-9.
- Hagel M, George EL, Kim A, Tamimi R, Opitz SL, Turner CE, Imamoto A, Thomas SM (2002):** The adaptor protein paxillin is essential for normal development in the mouse and is a critical transducer of fibronectin signaling. *Mol Cell Biol* 22:901-15.
- Hall A (1998):** Rho GTPases and the actin cytoskeleton. *Science* 279:509-14.
- Harris TJ, Peifer M (2005):** Decisions, decisions: beta-catenin chooses between adhesion and transcription. *Trends Cell Biol* 15:234-7.
- Hawke NA, Yoder JA, Litman GW (1999):** Expanding our understanding of immunoglobulin, T-cell antigen receptor, and novel immune-type receptor genes: a subset of the immunoglobulin gene superfamily. *Immunogenetics* 50:124-33.
- Houde C, Roy S, Leung N, Nicholson DW, Beauchemin N (2003):** The cell adhesion molecule CEACAM1-L is a substrate of caspase-3-mediated cleavage in apoptotic mouse intestinal cells. *J Biol Chem* 278:16929-35.
- Huang J, Hardy JD, Sun Y, Shively JE (1999):** Essential role of biliary glycoprotein (CD66a) in morphogenesis of the human mammary epithelial cell line MCF10F. *J Cell Sci* 112:4193-4205.
- Huber M, Izzi L, Grondin P, Houde C, Kunath T, Veillette A, Beauchemin N (1999):** The carboxyl-terminal region of biliary glycoprotein controls its tyrosine phosphorylation and association with protein-tyrosine phosphatases SHP-1 and SHP-2 in epithelial cells. *J Biol Chem* 274:335-44.
- Hunter I, Lindh M, Öbrink B (1994):** Differential regulation of C-CAM isoforms in epithelial cells. *J Cell Sci* 107:1205-16.
- Hunter I, Sawa H, Edlund M, Öbrink B (1996):** Evidence for regulated dimerization of cell-cell adhesion molecule (C-CAM) in epithelial cells. *Biochem J* 320:847-53.
- Hunter T (2000):** Signaling--2000 and beyond. *Cell* 100:113-27.
- Huttenlocher A, Palecek SP, Lu Q, Zhang W, Mellgren RL, Lauffenburger DA, Ginsberg MH, Horwitz AF (1997):** Regulation of cell migration by the calcium-dependent protease calpain. *J Biol Chem* 272:32719-22.
- Hynes RO (2002):** Integrins: bidirectional, allosteric signaling machines. *Cell* 110:673-87.
- Ilic D, Furuta Y, Kanazawa S, Takeda N, Sobue K, Nakatsuji N, Nomura S, Fujimoto J, Okada M, Yamamoto T (1995):** Reduced cell motility and enhanced focal adhesion contact formation in cells from FAK-deficient mice. *Nature* 377:539-44.

- Ilyin GP, Rialland M, Pigeon C, Guguen-Guillouzo C (2000):** cDNA cloning and expression analysis of new members of the mammalian F-box protein family. *Genomics* 67:40-7.
- Izzi L, Turbide C, Houde C, Kunath T, Beauchemin N (1999):** cis-Determinants in the cytoplasmic domain of CEACAM1 responsible for its tumor inhibitory function. *Oncogene* 18:5563-72.
- Johnson JP (1991):** Cell adhesion molecules of the immunoglobulin supergene family and their role in malignant transformation and progression to metastatic disease. *Cancer Metastasis Rev* 10:11-22.
- Juliano RL (2002):** Signal transduction by cell adhesion receptors and the cytoskeleton: functions of integrins, cadherins, selectins, and immunoglobulin-superfamily members. *Annu Rev Pharmacol Toxicol* 42:283-323.
- Kammerer R, Hahn S, Singer BB, Luo JS, von Kleist S (1998):** Biliary glycoprotein (CD66a), a cell adhesion molecule of the immunoglobulin superfamily, on human lymphocytes: structure, expression and involvement in T cell activation. *Eur J Immunol* 28:3664-74.
- Kammerer R, Stober D, Singer BB, Öbrink B, Reimann J (2001):** Carcinoembryonic antigen-related cell adhesion molecule 1 on murine dendritic cells is a potent regulator of T cell stimulation. *J Immunol* 166:6537-44.
- Kataoka K, Takata Y, Nakajima A, Saito S, Huh N (2000):** A carcinoembryonic antigen family cDNA from mouse placenta encoding a protein with a rare domain composition. *Placenta* 21:610-4.
- Keck U, Nedellec P, Beauchemin N, Thompson J, Zimmermann W (1995):** The cea10 gene encodes a secreted member of the murine carcinoembryonic antigen family and is expressed in the placenta, gastrointestinal tract and bone marrow. *Eur J Biochem* 229:455-64.
- Kilic N, Oliveira-Ferrer L, Wurmbach JH, Loges S, Chalajour F, Neshat-Vahid S, Weil J, Fernando M, Ergün S (2005):** Pro-angiogenic signaling by the endothelial presence of CEACAM1. *J Biol Chem* 280:2361-9.
- Kirshner J, Schumann D, Shively JE (2003):** CEACAM1, a cell-cell adhesion molecule, directly associates with annexin II in a three-dimensional model of mammary morphogenesis. *J Biol Chem* 278:50338-45.
- Klaile E, Müller MM, Singer BB, Reutter W, Lucka L (2005):** CEACAM1 functionally interacts with filamin A und exerts a dual role in the regulation of cell migration, *Journal of Cell Science*, 118 (Vol 23 - Dez/1), im Druck.
- Klinghoffer RA, Sachsenmaier C, Cooper JA, Soriano P (1999):** Src family kinases are required for integrin but not PDGFR signal transduction. *Embo J* 18:2459-71.
- Kodelja V, Lucas K, Barnert S, von Kleist S, Thompson JA, Zimmermann W (1989):** Identification of a carcinoembryonic antigen gene family in the rat. Analysis of the N-terminal domains reveals immunoglobulin-like, hypervariable regions. *J Biol Chem* 264:6906-12.
- Kunath T, Ordonez-Garcia C, Turbide C, Beauchemin N (1995):** Inhibition of colonic tumor cell growth by biliary glycoprotein. *Oncogene* 11:2375-82.
- Lederer B, Boger P (2005):** A ligand function of glutathione S-transferase. *Z Naturforsch [C]* 60:166-71.

- Lee JW, Juliano R (2004):** Mitogenic signal transduction by integrin- and growth factor receptor-mediated pathways. *Mol Cells* 17:188-202.
- Lee T, Feig L, Montell DJ (1996):** Two distinct roles for Ras in a developmentally regulated cell migration. *Development* 122:409-18.
- Li G, Satyamoorthy K, Herlyn M (2002):** Dynamics of cell interactions and communications during melanoma development. *Crit Rev Oral Biol Med* 13:62-70.
- Li G, Satyamoorthy K, Meier F, Berking C, Bogenrieder T, Herlyn M (2003):** Function and regulation of melanoma-stromal fibroblast interactions: when seeds meet soil. *Oncogene* 22:3162-71.
- Li M, Bermak JC, Wang ZW, Zhou QY (2000):** Modulation of dopamine D(2) receptor signaling by actin-binding protein (ABP-280). *Mol Pharmacol* 57:446-52.
- Liu L, Rodriguez-Belmonte EM, Mazloun N, Xie B, Lee MY (2003):** Identification of a novel protein, PDIP38, that interacts with the p50 subunit of DNA polymerase delta and proliferating cell nuclear antigen. *J Biol Chem* 278:10041-7.
- Loo DT, Kanner SB, Aruffo A (1998):** Filamin binds to the cytoplasmic domain of the beta1-integrin. Identification of amino acids responsible for this interaction. *J Biol Chem* 273:23304-12.
- Maga G, Hubscher U (2003):** Proliferating cell nuclear antigen (PCNA): a dancer with many partners. *J Cell Sci* 116:3051-60.
- Maniatis T, Fritsch E F, Sambrook J (1989):** Molecular cloning: a laboratory manual, 2<sup>nd</sup> ed., Cold Spring Harbor Laboratory, Cold Spring Harbor, New York.
- Margolis RN, Schell MJ, Taylor SI, Hubbard AL (1990):** Hepatocyte plasma membrane ECTO-ATPase (pp120/HA4) is a substrate for tyrosine kinase activity of the insulin receptor. *Biochem Biophys Res Commun* 166:562-6.
- Marti A, Luo Z, Cunningham C, Ohta Y, Hartwig J, Stossel TP, Kyriakis JM, Avruch J (1997):** Actin-binding protein-280 binds the stress-activated protein kinase (SAPK) activator SEK-1 and is required for tumor necrosis factor-alpha activation of SAPK in melanoma cells. *J Biol Chem* 272:2620-8.
- McGary EC, Lev DC, Bar-Eli M (2002):** Cellular adhesion pathways and metastatic potential of human melanoma. *Cancer Biol Ther* 1:459-65.
- Meyer SC, Zuerbig S, Cunningham CC, Hartwig JH, Bissell T, Gardner K, Fox JE (1997):** Identification of the region in actin-binding protein that binds to the cytoplasmic domain of glycoprotein IBalpha. *J Biol Chem* 272:2914-9.
- Mowery J, Hixson DC (1991):** Detection of cell-CAM 105 in the pericanalicular domain of the rat hepatocyte plasma membrane. *Hepatology* 13:47-56.
- Müller MM, Singer BB, Klaile E, Öbrink B, Lucka L (2005):** Transmembrane CEACAM1 affects integrin-dependent signaling and regulates extracellular matrix protein-specific morphology and migration of endothelial cells. *Blood* 105:3925-34.
- Nagano T, Yoneda T, Hatanaka Y, Kubota C, Murakami F, Sato M (2002):** Filamin A-interacting protein (FILIP) regulates cortical cell migration out of the ventricular zone. *Nat Cell Biol* 4:495-501.
- Nair KS, Zingde SM (2001):** Adhesion of neutrophils to fibronectin: role of the cd66 antigens. *Cell Immunol* 208:96-106.

- Najjar SM, Philippe N, Suzuki Y, Ignacio GA, Formisano P, Accili D, Taylor SI (1995):** Insulin-stimulated phosphorylation of recombinant pp120/HA4, an endogenous substrate of the insulin receptor tyrosine kinase. *Biochemistry* 34:9341-9.
- Nakajima A, Iijima H, Neurath MF, Nagaishi T, Nieuwenhuis EE, Raychowdhury R, Glickman J, Blau DM, Russell S, Holmes KV, Blumberg RS (2002):** Activation-induced expression of carcinoembryonic antigen-cell adhesion molecule 1 regulates mouse T lymphocyte function. *J Immunol* 168:1028-35.
- Nakamura F, Osborn E, Janmey PA, Stossel TP (2002):** Comparison of filamin A-induced cross-linking and Arp2/3 complex-mediated branching on the mechanics of actin filaments. *J Biol Chem* 277:9148-54.
- Nedellec P, Dveksler GS, Daniels E, Turbide C, Chow B, Basile AA, Holmes KV, Beauchemin N (1994):** Bgp2, a new member of the carcinoembryonic antigen-related gene family, encodes an alternative receptor for mouse hepatitis viruses. *J Virol* 68:4525-37.
- Neumaier M, Paululat S, Chan A, Matthaes P, Wagener C (1993):** Biliary glycoprotein, a potential human cell adhesion molecule, is down-regulated in colorectal carcinomas. *Proc Natl Acad Sci U S A* 90:10744-8.
- Nikki M, Merilainen J, Lehto VP (2002):** FAP52 regulates actin organization via binding to filamin. *J Biol Chem* 277:11432-40.
- Nittka S, Gunther J, Ebisch C, Erbersdobler A, Neumaier M (2004):** The human tumor suppressor CEACAM1 modulates apoptosis and is implicated in early colorectal tumorigenesis. *Oncogene* 23:9306-13.
- Nollau P, Prall F, Helmchen U, Wagener C, Neumaier M (1997a):** Dysregulation of carcinoembryonic antigen group members CGM2, CD66a (biliary glycoprotein), and nonspecific cross-reacting antigen in colorectal carcinomas. Comparative analysis by northern blot and in situ hybridization. *Am J Pathol* 151:521-30.
- Nollau P, Scheller H, Kona-Horstmann M, Rohde S, Hagenmuller F, Wagener C, Neumaier M (1997b):** Expression of CD66a (human C-CAM) and other members of the carcinoembryonic antigen gene family of adhesion molecules in human colorectal adenomas. *Cancer Res* 57:2354-7.
- Nunnally MH, Powell LD, Craig SW (1981):** Reconstitution and regulation of actin gel-sol transformation with purified filamin and villin. *J Biol Chem* 256:2083-6.
- Öbrink B (1997):** CEA adhesion molecules: multifunctional proteins with signal-regulatory properties. *Curr Opin Cell Biol* 9:616-26.
- Ocklind C, Öbrink B (1982):** Intercellular adhesion of rat hepatocytes. Identification of a cell surface glycoprotein involved in the initial adhesion process. *J Biol Chem* 257:6788-95.
- Odin P, Asplund M, Busch C, Öbrink B (1988):** Immunohistochemical localization of cellCAM 105 in rat tissues: appearance in epithelia, platelets, and granulocytes. *J Histochem Cytochem* 36:729-39.
- Odin P, Öbrink B (1986):** Dynamic expression of the cell adhesion molecule cell-CAM 105 in fetal and regenerating rat liver. *Exp Cell Res* 164:103-14.
- Odin P, Öbrink B (1987):** Quantitative determination of the organ distribution of the cell adhesion molecule cell-CAM 105 by radioimmunoassay. *Exp Cell Res* 171:1-15.

- Ohta Y, Suzuki N, Nakamura S, Hartwig JH, Stossel TP (1999):** The small GTPase RalA targets filamin to induce filopodia. *Proc Natl Acad Sci U S A* 96:2122-8.
- Oikawa S, Kuroki M, Matsuoka Y, Kosaki G, Nakazato H (1992):** Homotypic and heterotypic Ca<sup>++</sup>-independent cell adhesion activities of biliary glycoprotein, a member of carcinoembryonic antigen family, expressed on CHO cell surface. *Biochem Biophys Res Commun* 186:881-7.
- Olsen A, Teglund S, Nelson D, Gordon L, Copeland A, Georgescu A, Carrano A, Hammarström S (1994):** Gene organization of the pregnancy-specific glycoprotein region on human chromosome 19: assembly and analysis of a 700-kb cosmid contig spanning the region. *Genomics* 23:659-68.
- Onoprishvili I, Andria ML, Kramer HK, Ancevska-Taneva N, Hiller JM, Simon EJ (2003):** Interaction between the mu opioid receptor and filamin A is involved in receptor regulation and trafficking. *Mol Pharmacol* 64:1092-100.
- Ott I, Fischer EG, Miyagi Y, Mueller BM, Ruf W (1998):** A role for tissue factor in cell adhesion and migration mediated by interaction with actin-binding protein 280. *J Cell Biol* 140:1241-53.
- Perkins DN, Pappin DJ, Creasy DM, Cottrell JS (1999):** Probability-based protein identification by searching sequence databases using mass spectrometry data. *Electrophoresis* 20:3551-67.
- Petit V, Thiery JP (2000):** Focal adhesions: structure and dynamics. *Biol Cell* 92:477-94.
- Petrecca K, Miller DM, Shrier A (2000):** Localization and enhanced current density of the Kv4.2 potassium channel by interaction with the actin-binding protein filamin. *J Neurosci* 20:8736-44.
- Poy MN, Ruch RJ, Fernstrom MA, Okabayashi Y, Najjar SM (2002):** Shc and CEACAM1 interact to regulate the mitogenic action of insulin. *J Biol Chem* 277:1076-84.
- Prall F, Nollau P, Neumaier M, Haubeck HD, Drzeniek Z, Helmchen U, Loning T, Wagener C (1996):** CD66a (BGP), an adhesion molecule of the carcinoembryonic antigen family, is expressed in epithelium, endothelium, and myeloid cells in a wide range of normal human tissues. *J Histochem Cytochem* 44:35-41.
- Pudas R, Kiema TR, Butler PJ, Stewart M, Ylanne J (2005):** Structural basis for vertebrate filamin dimerization. *Structure (Camb)* 13:111-9.
- Ridley AJ, Schwartz MA, Burridge K, Firtel RA, Ginsberg MH, Borisy G, Parsons JT, Horwitz AR (2003):** Cell migration: integrating signals from front to back. *Science* 302:1704-9.
- Rosenberg M, Nedellec P, Jothy S, Fleiszer D, Turbide C, Beauchemin N (1993):** The expression of mouse biliary glycoprotein, a carcinoembryonic antigen-related gene, is down-regulated in malignant mouse tissues. *Cancer Res* 53:4938-45.
- Sampson LJ, Leyland ML, Dart C (2003):** Direct interaction between the actin-binding protein filamin-A and the inwardly rectifying potassium channel, Kir2.1. *J Biol Chem* 278:41988-97.
- Sasaki A, Masuda Y, Ohta Y, Ikeda K, Watanabe K (2001):** Filamin associates with Smads and regulates transforming growth factor-beta signaling. *J Biol Chem* 276:17871-7.



- Savagner P (2001):** Leaving the neighborhood: molecular mechanisms involved during epithelial-mesenchymal transition. *Bioessays* 23:912-23.
- Scheffrahn I, Singer BB, Sigmundsson K, Lucka L, Öbrink B (2005):** Control of density-dependent, cell state-specific signal transduction by the cell adhesion molecule CEACAM1, and its influence on cell cycle regulation. *Exp Cell Res* 307:427-35.
- Schlaepfer DD, Hauck CR, Sieg DJ (1999):** Signaling through focal adhesion kinase. *Prog Biophys Mol Biol* 71:435-78.
- Schumann D, Chen CJ, Kaplan B, Shively JE (2001):** Carcinoembryonic antigen cell adhesion molecule 1 directly associates with cytoskeleton proteins actin and tropomyosin. *J Biol Chem* 276:47421-33.
- Seabra MC (1998):** Membrane association and targeting of prenylated Ras-like GTPases. *Cell Signal* 10:167-72.
- Sehgal A, Boynton AL, Young RF, Vermeulen SS, Yonemura KS, Kohler EP, Aldape HC, Simrell CR, Murphy GP (1998):** Cell adhesion molecule Nr-CAM is over-expressed in human brain tumors. *Int J Cancer* 76:451-8.
- Sharma CP, Ezzell RM, Arnaout MA (1995):** Direct interaction of filamin (ABP-280) with the beta 2-integrin subunit CD18. *J Immunol* 154:3461-70.
- Sieg DJ, Hauck CR, Schlaepfer DD (1999):** Required role of focal adhesion kinase (FAK) for integrin-stimulated cell migration. *J Cell Sci* 112:2677-91.
- Sienel W, Dango S, Woelfle U, Morresi-Hauf A, Wagener C, Brümmer J, Mutschler W, Passlick B, Pantel K (2003):** Elevated expression of carcinoembryonic antigen-related cell adhesion molecule 1 promotes progression of non-small cell lung cancer. *Clin Cancer Res* 9:2260-6.
- Simons K, Ikonen E (1997):** Functional rafts in cell membranes. *Nature* 387:569-72.
- Singer BB, Klaile E, Scheffrahn I, Müller MM, Kammerer R, Reutter W, Öbrink B, Lucka L (2005):** CEACAM1 (CD66a) mediates delay of spontaneous and Fas ligand-induced apoptosis in granulocytes. *Eur J Immunol* 35:1949-59.
- Singer BB, Scheffrahn I, Heymann R, Sigmundsson K, Kammerer R, Öbrink B (2002):** Carcinoembryonic antigen-related cell adhesion molecule 1 expression and signaling in human, mouse, and rat leukocytes: evidence for replacement of the short cytoplasmic domain isoform by glycosylphosphatidylinositol-linked proteins in human leukocytes. *J Immunol* 168:5139-46.
- Singer BB, Scheffrahn I, Öbrink B (2000):** The tumor growth-inhibiting cell adhesion molecule CEACAM1 (C-CAM) is differently expressed in proliferating and quiescent epithelial cells and regulates cell proliferation. *Cancer Res* 60:1236-44.
- Skubitz KM, Campbell KD, Ahmed K, Skubitz AP (1995):** CD66 family members are associated with tyrosine kinase activity in human neutrophils. *J Immunol* 155:5382-90.
- Skubitz KM, Campbell KD, Skubitz AP (2000):** Synthetic peptides of CD66a stimulate neutrophil adhesion to endothelial cells. *J Immunol* 164:4257-64.
- Smilenov LB, Mikhailov A, Pelham RJ, Marcantonio EE, Gundersen GG (1999):** Focal adhesion motility revealed in stationary fibroblasts. *Science* 286:1172-4.

- Sobue K, Morimoto K, Kanda K, Maruyama K, Kakiuchi S (1982):** Reconstitution of Ca<sup>2+</sup>-sensitive gelation of actin filaments with filamin, caldesmon and calmodulin. *FEBS Lett* 138:289-92.
- Sokol NS, Cooley L (2003):** *Drosophila* filamin is required for follicle cell motility during oogenesis. *Dev Biol* 260:260-72.
- Stahlhut M, van Deurs B (2000):** Identification of filamin as a novel ligand for caveolin-1: evidence for the organization of caveolin-1-associated membrane domains by the actin cytoskeleton. *Mol Biol Cell* 11:325-37.
- Stern N, Markel G, Arnon TI, Gruda R, Wong H, Gray-Owen SD, Mandelboim O (2005):** Carcinoembryonic antigen (CEA) inhibits NK killing via interaction with CEA-related cell adhesion molecule 1. *J Immunol* 174:6692-701.
- Stossel TP, Condeelis J, Cooley L, Hartwig JH, Noegel A, Schleicher M, Shapiro SS (2001):** Filamins as integrators of cell mechanics and signalling. *Nat Rev Mol Cell Biol* 2:138-45.
- Sugihara K, Asano S, Tanaka K, Iwamatsu A, Okawa K, Ohta Y (2002):** The exocyst complex binds the small GTPase RalA to mediate filopodia formation. *Nat Cell Biol* 4:73-8.
- Sundberg U, Beauchemin N, Öbrink B (2004):** The cytoplasmic domain of CEACAM1-L controls its lateral localization and the organization of desmosomes in polarized epithelial cells. *J Cell Sci* 117:1091-104.
- Suzuki J, Yamazaki Y, Li G, Kaziro Y, Koide H (2000):** Involvement of Ras and Ral in chemotactic migration of skeletal myoblasts. *Mol Cell Biol* 20:4658-65.
- Takafuta T, Saeki M, Fujimoto TT, Fujimura K, Shapiro SS (2003):** A new member of the LIM protein family binds to filamin B and localizes at stress fibers. *J Biol Chem* 278:12175-81.
- Tang DG, Honn KV (1994):** Adhesion molecules and tumor metastasis: an update. *Invasion Metastasis* 14:109-22.
- Tchevkina E, Agapova L, Dyakova N, Martinjuk A, Komelkov A, Tatosyan A (2005):** The small G-protein RalA stimulates metastasis of transformed cells. *Oncogene* 24:329-35.
- Thiery JP, Chopin D (1999):** Epithelial cell plasticity in development and tumor progression. *Cancer Metastasis Rev* 18:31-42.
- Thies A, Moll I, Berger J, Wagener C, Brümmer J, Schulze HJ, Brunner G, Schumacher U (2002):** CEACAM1 expression in cutaneous malignant melanoma predicts the development of metastatic disease. *J Clin Oncol* 20:2530-6.
- Tigges U, Koch B, Wissing J, Jockusch BM, Ziegler WH (2003):** The F-actin cross-linking and focal adhesion protein filamin A is a ligand and in vivo substrate for protein kinase C alpha. *J Biol Chem* 278:23561-9.
- Tingstrom A, Blikstad I, Aurivillius M, Öbrink B (1990):** C-CAM (cell-CAM 105) is an adhesive cell surface glycoprotein with homophilic binding properties. *J Cell Sci* 96:17-25.
- Tu Y, Wu S, Shi X, Chen K, Wu C (2003):** Migfilin and Mig-2 link focal adhesions to filamin and the actin cytoskeleton and function in cell shape modulation. *Cell* 113:37-47.

- Vadlamudi RK, Li F, Adam L, Nguyen D, Ohta Y, Stossel TP, Kumar R (2002):** Filamin is essential in actin cytoskeletal assembly mediated by p21-activated kinase 1. *Nat Cell Biol* 4:681-90.
- Van Aelst L, Symons M (2002):** Role of Rho family GTPases in epithelial morphogenesis. *Genes Dev* 16:1032-54.
- van der Flier A, Sonnenberg A (2001):** Structural and functional aspects of filamins. *Biochim Biophys Acta* 1538:99-117.
- Virji M, Evans D, Griffith J, Hill D, Serino L, Hadfield A, Watt SM (2000):** Carcinoembryonic antigens are targeted by diverse strains of typable and non-typable *Haemophilus influenzae*. *Mol Microbiol* 36:784-95.
- Virji M, Watt SM, Barker S, Makepeace K, Doyonnas R (1996):** The N-domain of the human CD66a adhesion molecule is a target for Opa proteins of *Neisseria meningitidis* and *Neisseria gonorrhoeae*. *Mol Microbiol* 22:929-39.
- Wang Y, Gilmore TD (2003):** Zyxin and paxillin proteins: focal adhesion plaque LIM domain proteins go nuclear. *Biochim Biophys Acta* 1593:115-20.
- Watt SM, Teixeira AM, Zhou GQ, Doyonnas R, Zhang Y, Grunert F, Blumberg RS, Kuroki M, Skubitz KM, Bates PA (2001):** Homophilic adhesion of human CEACAM1 involves N-terminal domain interactions: structural analysis of the binding site. *Blood* 98:1469-79.
- Wehrle-Haller B, Imhof BA (2003):** Actin, microtubules and focal adhesion dynamics during cell migration. *Int J Biochem Cell Biol* 35:39-50.
- Wikstrom K, Kjellstrom G, Öbrink B (1996):** Homophilic intercellular adhesion mediated by C-CAM is due to a domain 1-domain 1 reciprocal binding. *Exp Cell Res* 227:360-6.
- Williams AF, Barclay AN (1988):** The immunoglobulin superfamily--domains for cell surface recognition. *Annu Rev Immunol* 6:381-405.
- Woo MS, Ohta Y, Rabinovitz I, Stossel TP, Blenis J (2004):** Ribosomal S6 kinase (RSK) regulates phosphorylation of filamin A on an important regulatory site. *Mol Cell Biol* 24:3025-35.
- Wu C (2005):** Migfilin and its binding partners: from cell biology to human diseases. *J Cell Sci* 118:659-64.
- Wu TR, Hong YK, Wang XD, Ling MY, Dragoi AM, Chung AS, Campbell AG, Han ZY, Feng GS, Chin YE (2002):** SHP-2 is a dual-specificity phosphatase involved in Stat1 dephosphorylation at both tyrosine and serine residues in nuclei. *J Biol Chem* 277:47572-80.
- Xie B, Li H, Wang Q, Xie S, Rahmeh A, Dai W, Lee MY (2005):** Further characterization of human DNA polymerase delta interacting protein 38. *J Biol Chem* 280:22375-84.
- Yamanaka T, Kuroki M, Kinugasa T, Matsuo Y, Matsuoka Y (1996):** Preparation and characterization of two human carcinoembryonic antigen family proteins of neutrophils, CD66b and c, in silkworm larvae. *Protein Expr Purif* 7:438-46.
- Zebhauser R, Kammerer R, Eisenried A, McLellan A, Moore T, Zimmermann W (2005):** Identification of a novel group of evolutionarily conserved members within the rapidly diverging murine Cea family. *Genomics* 31:31.