

CHAPTER 6: REFERENCES

- Adachi, Y., Yamamoto, H., Itoh, F., Arimura, Y., Nishi, M., Endo, T., Imai, K. (2001). Clinicopathologic and prognostic significance of matrilysin expression at the invasive front in human colorectal cancers. *Int. J. Cancer*, **95**: 290-294
- Agochiya, M., Brunton, V.G., Owens, D.W., Parkinson, E.K., Paraskeva, C., Keith, W.N., Frame, M.C. (1999). Increased dosage and amplification of the focal adhesion kinase gene in human cancer cells. *Oncogene*, **18**: 5646-5653
- Akasaka, T., van Leeuwen, R.L., Yoshinaga, I.G., Mihm, M.C. Jr., Byers, H.R. (1995). Focal adhesion kinase (p125^{FAK}) expression correlates with motility of human melanoma cell lines. *J. Invest. Dermatol.*, **105**: 104-108
- Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K., Watson, J.D. (1994). *Molecular Biology of the Cell*, Third Edition. Published: *Garland Publishing Inc., New York* pp 30, 504, 949, 950, 966, 967, 968, 997
- Angelucci, A., and Bologna, M. (2007). Targeting vascular cell migration as a strategy for blocking angiogenesis: the central role of focal adhesion protein tyrosine kinase family. *Curr. Pharm. Des.*, **13**: 2129-2145
- Aronsohn, M.S., Brown, H.M., Hauptman, G., Kornberg, L.J. (2003). Expression of focal adhesion kinase and phosphorylated focal adhesion kinase in squamous cell carcinoma of the larynx. *Laryngoscope*, **113**: 1944-1948
- Bazley, L.A. and Gullick, W.J. (2005). The epidermal growth factor receptor family. *Endocr. Relat. Cancer*, **12**: S17-S27
- Beviglia, L., Golubovskaya, V., Xu, L-H., Yang, X-H., Craven, R.J., Cance, W.G. (2003). Focal adhesion kinase N-terminus in breast carcinoma cells induces rounding, detachment and apoptosis. *Biochem. J.*, **373**: 201-210

- Bill, H.M., Knudsen, B., Moores, S.L., Muthuswamy, S.K. (2004). Epidermal growth factor receptor-dependent regulation of integrin-mediated signaling and cell cycle entry in epithelial cells. *Mol. Cell. Biol.*, **24**: 8586-8599
- Blagosklonny, M.V. (1997). Loss of function and p53 protein stabilization. *Oncogene*, **15**: 1889-1893
- Brakebusch, C., Bouvard, D., Stanchi, F., Sakai, T., Fässler, R. (2002). Integrins in invasive growth. *J. Clin. Invest.*, **109**: 999-1006
- Brakebusch, C. and Fässler, R. (2003). The integrin-actin connection, an eternal love affair. *EMBO J.*, **22**: 2324-2333
- Bramhall, S., Noack, N., Wu, M., Loewenberg, J.R. (1969). A simple colorimetric method for determination of protein. *Anal. Biochem.*, **31**: 146-148
- Brunton, V.G., Ozanne, B.W., Paraskeva, C., Frame, M.C. (1997). A role for epidermal growth factor receptor, c-Src and focal adhesion kinase in an *in vitro* model for the progression of colon cancer. *Oncogene*, **14**: 283-293
- Busatto, G., Shiao, Y-H., Parenti, A.R., Baffa, R., Ruol, A., Plebani, M., Rugge, M. (1998). p16/CDKN2 alterations and pRb expression in oesophageal squamous carcinoma. *J. Clin. Pathol: Mol. Pathol.*, **51**: 80-84
- Cai, X., Lietha, D., Ceccarelli, D.F., Karginov, A.V., Rajfur, Z., Jacobson, K., Hahn, K.M., Eck, M.J., Schaller, M.D. (2008). Spatial and temporal regulation of focal adhesion kinase activity in living cells. *Mol. Cell. Biol.*, **28**: 201-214
- Carlin, S.M., Resink, T.J., Tamm, M., Roth, M. (2005). Urokinase signal transduction and its role in cell migration. *FASEB J.*, **19**: 195-202

- Carlioni, V., Mazzocca, A., Pantaleo, P., Cordella, C., Laffi, G., Gentilini, P. (2001). The integrin, $\alpha 6 \beta 1$, is necessary for the matrix-dependent activation of FAK and MAP kinase and the migration of human hepatocarcinoma cells. *Hepatology*, **34**: 42-49
- Carragher, N.O., Levkau, B., Ross, R., Raines, E.W. (1999). Degraded collagen fragments promote rapid disassembly of smooth muscle focal adhesions that correlates with cleavage of pp125^{FAK}, paxillin, and talin. *J. Cell Biol.*, **147**: 619-630
- Carragher, N.O., Fincham, V.J., Riley, D., Frame, M.C. (2001). Cleavage of focal adhesion kinase by different proteases during Src-regulated transformation and apoptosis. Distinct roles for calpain and caspases. *J. Biol. Chem.*, **276**: 4270-4275
- Carragher, N.O., Westhoff, M.A., Riley, D., Potter, D.A., Dutt, P., Elee, J.S., Greer, P.A., Frame, M.C. (2002). v-Src-induced modulation of the calpain-calpastatin proteolytic system regulates transformation. *Mol. Cell. Biol.*, **22**: 257-269
- Carragher, N.O., Westhoff, M.A., Fincham, V.J., Schaller, M.D., Frame, M.C. (2003). A novel role for FAK as a protease-targeting adaptor protein: regulation by p42 ERK and Src. *Curr. Biol.*, **13**: 1442-1450
- Carragher, N.O. and Frame, M.C. (2004). Focal adhesion and actin dynamics: a place where kinases and proteases meet to promote invasion. *Trends Cell Biol.*, **14**: 241-249
- Cary, L.A., Chang, J.F., Guan, J-L. (1996). Stimulation of cell migration by overexpression of focal adhesion kinase and its association with Src and Fyn. *J. Cell Sci.*, **109**: 1787-1794
- Chan, P-Y., Kanner, S.B., Whitney, G., Aruffo, A. (1994). A transmembrane-anchored chimeric focal adhesion kinase is constitutively activated and

- phosphorylated at tyrosine residues identical to pp125^{FAK}. *J. Biol. Chem.*, **269**: 20567-20574
- Chen, C.S., Alonso, J.L., Ostuni, E., Whitesides, G.M., Ingber, D.E. (2003). Cell shape provides global control of focal adhesion assembly. *Biochem. Biophys. Res. Commun.*, **307**: 355-361
- Chrzanowska-Wodnicka, M. and Burridge, K. (1996). Rho-stimulated contractility drives the formation of stress fibers and focal adhesions. *J. Cell Biol.*, **133**: 1403-1415
- Cohen, L.A. and Guan, J-L. (2005a). Mechanisms of focal adhesion kinase regulation. *Curr. Cancer Drug Targets*, **5**: 629-643
- Cohen, L.A. and Guan, J-L. (2005b). Residues within the first subdomain of the FERM-like domain in focal adhesion kinase are important in its regulation. *J. Biol. Chem.*, **280**: 8187-8207
- Cooray, P., Yuan, Y., Schoenwaelder, S.M., Mitchell, C.A., Salem, H.H., Jackson, S.P. (1996). Focal adhesion kinase (pp125^{FAK}) cleavage and regulation by calpain. *Biochem. J.*, **318**: 41-47
- Corsi, J., Rouer, E., Girault, J., Enslen, H. (2006). Organization and post-transcriptional processing of focal adhesion kinase gene. *BMC Genomics*, **7**: 198-220
- Cox, B.D., Natarajan, M., Stettner, M.R., Gladson, C.L. (2006). New concepts regarding focal adhesion kinase promotion of cell migration and proliferation. *J. Cell. Biochem.*, **99**: 36-52
- Craven, R.J., Lightfoot, H., Cance, W.G. (2003). A decade of tyrosine kinases: from gene discovery to therapeutics. *Surg. Oncol.*, **12**: 39-50

- Crowe, D.L. and Ohannessian, A. (2004). Recruitment of focal adhesion kinase and paxillin to $\beta 1$ integrin promotes cancer cell migration via mitogen activated protein kinase activation. *BMC Cancer*, **4**: 18
- Cryns, V. and Yuan, J. (1998). Proteases to die for. *Genes Dev.*, **12**: 1551-1570
- Datta, S.R., Dudek, H., Tao, X., Masters, S., Fu, H., Gotoh, Y., Greenberg, M.E. (1997). Akt phosphorylation of BAD couples survival signals to the cell-intrinsic death machinery. *Cell*, **91**: 231-241
- Defilippi, P. and Vallés, A.M. (2002). The winding road from adhesive receptors to the nucleus. *EMBO Rep.*, **3**: 312-316
- Dewar, J.B. (2000). The effect of transfected tumour suppressor genes on the growth of SNO oesophageal carcinoma cells. *University of the Witwatersrand, Johannesburg, William Cullen Library, PhD thesis.*
- Downward, J., Yarden, Y., Mayes, E., Scrace, G., Totty, N., Stockwell, P., Ullrich, A., Schlessinger, J., Waterfield, M.D. (1984). Close similarity of epidermal growth factor receptor and v-erb-B oncogene protein sequences. *Nature*, **307**: 521-527
- Driver, G.A. and Veale, R.B. (2006). Modulation of integrin-linked kinase (ILK) in human oesophageal squamous cell carcinoma cell lines by the EGF and TGF β 1 growth factors. *Cancer Cell Int.*, **6**: 12
- Dunty, J.M., Gabarra-Niecko, V., King, M.L., Ceccarelli, D.F.J., Eck, M.J., Schaller, M.D. (2004). FERM domain interaction promotes FAK signaling. *Mol. Cell. Biol.*, **24**: 5353-5368

- Duxbury, M. S., Ito, H., Benoit, E., Zinner, M.J., Ashley, S.W., Whang, E.E. (2003). RNA interference targeting focal adhesion kinase enhances pancreatic adenocarcinoma gemcitabine chemosensitivity. *Biochem. Biophys. Res. Commun.*, **311**: 786-792
- Earley, S. and Plopper, G.E. (2006). Disruption of focal adhesion kinase slows transendothelial migration of AU-565 breast cancer cells. *Biochem. Biophys. Res. Commun.*, **350**: 405-412
- Faried, A., Faried, L.S., Kimura, H., Nakajima, M., Sohda, M., Miyazaki, T., Kato, H., Usman, N., Kuwano, H. (2006). RhoA and RhoC proteins promote both cell proliferation and cell invasion of human oesophageal squamous cell carcinoma cell lines *in vitro* and *in vivo*. *Eur. J. Cancer*, **42**: 1455-1465
- Fischer, U., Jänicke, R.U., Schulze-Osthoff, K. (2003). Many cuts to ruin: a comprehensive update of caspase substrates. *Cell Death Differ.*, **10**: 76-100
- Fornaro, M., Steger, C.A., Bennett, A.M., Wu, J.J., Languino, L.R. (2000). Differential role of β_{1C} and β_{1A} integrin cytoplasmic variants in modulating focal adhesion kinase, protein kinase B/Akt, and Ras/Mitogen-activated protein kinase pathways. *Mol. Biol. Cell*, **11**: 2235-2249
- Franco, S.J., Rogers, M.A., Perrin, B.J., Han, J., Bennin, D.A., Critchley, D.R., Hittenlocher, A. (2004). Calpain-mediated proteolysis of talin regulates adhesion dynamics. *Nature Cell Biol.*, **6**: 977-983
- Franco, S.J. and Huttenlocher, A. (2005). Regulating cell migration: calpains make the cut. *J. Cell Sci.*, **118**: 3829-3838
- French, A.R., Sudlow, G.P., Wiley, H.S., Lauffenburger, D.A. (1994). Postendocytic trafficking of epidermal growth factor-receptor complexes is mediated through saturable and specific endosomal interactions. *J. Biol. Chem.*, **269**: 15749-15755

- Gabarra-Niecko, V., Schaller, M.D., Dunty, J.M. (2003). FAK regulates biological processes important for the pathogenesis of cancer. *Cancer Metastasis Rev.*, **22**: 359-374
- George, S.J., and Dwivedi, A. (2004). MMPs, cadherins, and cell proliferation. *Trends Cardiovasc. Med.*, **14**: 100-105
- Gervais, F.G., Thornberry, N.A., Ruffolo, S.C., Nicholson, D.W., Roy, S. (1998). Caspases cleave focal adhesion kinase during apoptosis to generate a FRNK-like polypeptide. *J. Biol. Chem.*, **273**: 17102-17108
- Gibault, L., Metges, J.P., Conan-Charlet, V., Lozac'h, P., Robaszkiewicz, M., Bessaguet, C., Lagarde, N., Volant, A. (2005). Diffuse EGFR staining is associated with reduced overall survival in locally advanced oesophageal squamous cell carcinoma. *Br. J. Cancer*, **93**: 107-115
- Gimona, M. and Buccione, R. (2006). Adhesions that mediate invasion. *Int. J. Biochem. Cell Biol.*, **38**: 1875-1892
- Golubovskaya, V., Beviglia, L., Xu, L.H., Earp III, H.S., Craven, R., Cance, W. (2002). Dual inhibition of focal adhesion kinase and epidermal growth factor receptor pathways cooperatively induces death receptor-mediated apoptosis in human breast cancer cells. *J. Biol. Chem.*, **277**: 38978-38987
- Golubovskaya, V., Kaur, A., Cance, W.G. (2004). Cloning and characterization of the promoter region of human focal adhesion kinase gene: nuclear factor kappa B and p53 binding sites. *Biochim. Biophys. Acta*, **1678**: 111-125
- Golubovskaya, V., Finch, R., Cance, W.G. (2005). Direct interaction of the N-terminal domain of focal adhesion kinase with the N-terminal transactivation domain of p53. *J. Biol. Chem.*, **280**: 25008-25021

- Grant, S.G.N., Karl, K.A., Kiebler, M.A., Kandel, E.R. (1995). Focal adhesion kinase in the brain: novel subcellular localization and specific regulation by Fyn tyrosine kinase in mutant mice. *Genes Dev.*, **9**: 1909-1921
- Green, L.J., Mould, A.P., Humpries, M.J. (1998). The integrin beta subunit. *Int. J. Biochem. Cell. Biol.*, **30**: 179-184
- Greenwood, J.A. and Murphy-Ullrich, J.E. (1998). Signaling of de-adhesion in cellular regulation and motility. *Microsc. Res. Tech.*, **43**: 420-432
- Guvakova, M.A. and Surmacz, E. (1999). The activated insulin-like growth factor I receptor induces depolarization in breast epithelial cells characterized by actin filament disassembly and tyrosine dephosphorylation of FAK, Cas, and paxillin. *Exp. Cell Res.*, **251**: 244-255
- Hamadi, A., Bouali, M., Dontenwill, M., Stoeckel, H., Takeda, K., Rondé, P. (2005). Regulation of focal adhesion dynamics and disassembly by dephosphorylation of FAK at tyrosine 397. *J. Cell Sci.*, **118**: 4415-4425
- Hanahan, D. and Weinberg, R.A. (2000). The hallmarks of cancer. *Cell*, **100**: 57-70
- Hanawa, M., Suzuki, S., Dobashi, Y., Yamane, T., Kono, K., Enomoto, N., Ooi, A. (2006). EGFR protein overexpression and gene amplification in squamous cell carcinomas of the esophagus. *Int. J. Cancer*, **118**: 1173-1180
- Harris, A. (1991). Telling changes of base. *Nature*, **350**: 377-378
- Harris, C. (1993). p53 – at the crossroads of molecular carcinogenesis and risk assessment. *Science*, **262**: 1980-1981

- Haskell, H., Natarajan, M., Hecker, T.P., Ding, Q., Stewart, J. Jr., Grammer, J.R., Gladson, C.L. (2003). Focal adhesion kinase is expressed in the angiogenic blood vessels of malignant astrocytic tumors *in vivo* and promotes capillary tube formation of brain microvascular endothelial cells. *Clin. Cancer Res.*, **9**: 2157-2165
- Hauck, C.R., Sieg, D.J., Hsia, D.A., Loftus, J.C., Gaarde, W.A., Monia, B.P., Schlaepfer, D.D. (2001). Inhibition of FAK expression or activity disrupts EGF-stimulated signaling promoting the migration of invasive human carcinoma cells. *Cancer Res.*, **61**: 7079-7090
- Hauck, C.R., Hsia, D.A., Punte, X.S., Cheresch, D.A., Schlaepfer, D.D. (2002). FRNK blocks v-Src stimulated invasion and experimental metastases without effects on cell motility or growth. *EMBO J.*, **21**: 6289-6302
- He, Y-Y., Huang, J-L., Chignell, C.F. (2006). Cleavage of epidermal growth factor receptor by caspase during apoptosis is independent of its internalization. *Oncogene*, **25**: 1521-1531
- Hehlgans, S., Haase, M., Cordes, N. (2007). Signalling via integrins: Implications for cell survival and anticancer strategies. *Biochim. Biophys. Acta*, **1775**: 163-180
- Hess, A.R. and Hendrix, M.J.C. (2006). Focal adhesion kinase signaling and the aggressive melanoma phenotype. *Cell Cycle*, **5**: 478-480
- Hildebrand, J.D., Schaller, M.D., Parsons, J.T. (1993). Identification of sequences required for the efficient localization of the focal adhesion kinase, pp125^{FAK}, to cellular focal adhesions. *J. Cell Biol.*, **123**: 993-1005
- Holbro, T., Civenni, G., Hynes, N.E. (2003). The ErbB receptors and their role in cancer progression. *Exp. Cell Res.*, **284**: 99-110

- Holmes, R.S. and Vaughan, T.L. (2006). Epidemiology and pathogenesis of esophageal cancer. *Semin. Radiat. Oncol.*, **17**: 2-9
- Hsia, D.A., Mitra, S.K., Hauck, C.R., Strebblow, D.N., Nelson, J.A., Ilić, D., Huang, S., Li, E., Nemerow, G.R., Leng, J., Spencer, K.S.R., Cheresch, D.A., Schlaepfer, D.D. (2003). Differential regulation of cell motility and invasion by FAK. *J. Cell Biol.*, **160**: 753-767
- Hu, Y.C., Lam, K.Y., Tang, J.C.O., Srivastava, G. (1999). Mutational analysis of the PTEN/MMAC1 gene in primary oesophageal squamous cell carcinomas. *J. Clin. Pathol.: Mol. Pathol.*, **52**: 353-356
- Huang, H., Cheville, J.C., Pan, Y., Roche, P.C., Schmidt, L.J., Tindall, D.J. (2001). PTEN induces chemosensitivity in PTEN-mutated prostate cancer cells by suppression of Bcl-2 expression. *J. Biol. Chem.*, **276**: 38830-38836
- Huang, J.X., Yan, W., Song, Z.X., Qian, R.Y., Chen, P., Salminen, E., Toppari, J. (2005). Relationship between proliferative activity of cancer cells and clinicopathological factors in patients with esophageal squamous cell carcinoma. *World J. Gastroenterol.*, **11**: 2956-2959
- Hynes, R.O. (1992). Integrins: versatility, modulation, and signaling in cell adhesion. *Cell*, **69**: 11-25
- Ilić, D., Damsky, C.H., Yamamoto, T. (1997). Focal adhesion kinase: at the crossroads of signal transduction. *J. Cell Sci.*, **110**: 401-407
- Ilyas, M., Tomlinson, I.P.M., Rowan, A., Pignatelli, M., Bodmer, W.F. (1997). β -catenin mutations in cell lines established from human colorectal cancers. *Proc. Natl. Acad. Sci.*, **94**: 10330-10334

- Isaacson, C. (2005). The change of the staple diet of black South Africans from sorghum to maize (corn) is the cause of the epidemic of squamous carcinoma of the oesophagus. *Med. Hypothesis*, **64**: 658-660
- Jones, G., Machado, J., Jr., Merlo, A. (2001). Loss of focal adhesion kinase (FAK) inhibits epidermal growth factor receptor-dependent migration and induces aggregation of NH₂-terminal FAK in the nuclei of apoptotic glioblastoma cells. *Cancer Res.*, **61**: 4978-4981
- Jones, G. and Stewart, G. (2004). Nuclear import of N-terminal FAK by activation of the FcεRI receptor in RBL-2H3 cells. *Biochem. Biophys. Res. Commun.*, **314**: 39-45
- Kanner, S.B., Reynolds, A.B., Vines, R.R., Parsons, J.T. (1990). Monoclonal antibodies to individual tyrosine-phosphorylated protein substrates of oncogene-encoded tyrosine kinases. *Proc. Natl. Acad. Sci.*, **87**: 3328-3332
- Kawaguchi, Y., Kono, K., Mimura, K., Sugai, H., Akaike, H., Fujii, H. (2006). Cetuximab induce antibody-dependent cellular cytotoxicity against EGFR-expressing esophageal squamous cell carcinoma. *Int. J. Cancer*, **120**: 781-787
- Kawaguchi, Y., Kono, K., Mimura, K., Mitsui, F., Sugai, H., Akaike, H., Fujii, H. (2007). Targeting EGFR and HER-2 with cetuximab- and trastuzumab-mediated immunotherapy in oesophageal squamous cell carcinoma. *Br. J. Cancer*, **97**: 494-501
- Kishida, M., Hino, S., Michiue, T., Yamamoto, H., Kishida, S., Fukui, A., Asashima, M., Kikuchi, A. (2001). Synergistic activation of the Wnt signaling pathway by Dvl and casein kinase Iα. *J. Biol. Chem.*, **276**: 33147-33155

- Koppert, L.B., Wijnhoven, B.P.L., van Dekken, H., Tilanus, H.W., Dinjens, W.N.M. (2005). The molecular biology of esophageal adenocarcinoma. *J. Surg. Oncol.*, **92**: 169-190
- Koshy, M., Esiashvilli, N., Landry, J.C., Thomas, C.R., Matthews, R.H. (2004). Multiple management modalities in esophageal cancer: epidemiology, presentation and progression, work-up, and surgical approaches. *Oncologist*, **9**: 137-146
- Kuwano, H., Sonoda, K., Yasuda, M., Sumiyoshi, K., Nozoe, T., Sugimachi, K. (1997). Tumor invasion and angiogenesis in early esophageal squamous cell carcinoma. *J. Surg. Oncol.*, **65**: 199-193
- Laemmli, U.K. (1970). Cleavage of structural proteins during the assembly of the head of bacteriophage T4. *Nature*, **227**: 680-685
- Lam, A.K.Y. (2000). Molecular biology of esophageal squamous cell carcinoma. *Crit. Rev. Oncol/Hematol.*, **33**: 71-90
- Lark, A.L., Livasy, C.A., Calvo, B., Caskey, L., Moore, D.T., Yang, X., Cance, W.G. (2003). Overexpression of focal adhesion kinase in primary colorectal carcinomas and colorectal liver metastases: immunohistochemistry and real-time PCR analyses. *Clin. Cancer Res.*, **9**: 215-222
- Lee, C-H., Wu, D-C., Lee, J-M., Wu, I-C., Goan, Y-G., Kao, E-L., Huang, H-L., Chan, T-F., Chou, S-H., Chou, Y-P., Lee, C-Y., Chen, P-S., Ho, C-K., He, J., Wu, M-T. (2007). Carcinogenic impact of alcohol intake on squamous cell carcinoma risk of the oesophagus in relation to tobacco smoking. *Eur. J. Cancer*, **43**: 1188-1199
- Lehrbach, D.M., Nita, M.E., Cecconello, I. (2003). Molecular aspects of esophageal squamous cell carcinoma carcinogenesis. *Arq. Gastroenterol.*, **40**: 256-261

- Leslie, N.R. and Downes, C.P. (2004). PTEN function: how normal cells control it and tumour cells lose it. *Biochem. J.*, **382**: 1-11
- Levkau, B., Herren, B., Koyama, H., Ross, R., Raines, E.W. (1998). Caspase-mediated cleavage of focal adhesion kinase pp125^{FAK} and disassembly of focal adhesions in human endothelial cell apoptosis. *J. Exp. Med.*, **187**: 579-586
- Lietha, D., Cai, X., Ceccarelli, D.F., Li, Y., Schaller, M.D., Eck, M.J. (2007). Structural basis for the autoinhibition of focal adhesion kinase. *Cell*, **129**: 1177-1187
- Lim, S-T., Mikolon, D., Stupack, D.G., Schlaepfer, D.D. (2008). FERM control of FAK function. *Cell Cycle*, **7**: 2306-2314
- Liu, S., Calderwood, D.A., Ginsberg, M.H. (2000). Integrin cytoplasmic domain-binding proteins. *J. Cell Sci.*, **113**: 3563-3571
- Lobo, M., and Zachary, I. (2000). Nuclear localization and apoptotic regulation of an amino-terminal domain focal adhesion kinase fragment in endothelial cells. *Biochem. Biophys. Res. Commun.*, **276**: 1068–1074
- Lu, Z., Jiang, G., Blume-Jensen, P., Hunter, T. (2001). Epidermal growth factor-induced tumor cell invasion and metastasis initiated by dephosphorylation and downregulation of focal adhesion kinase. *Mol. Cell. Biol.*, **21**: 4016-4031
- Mao, H., Li, F., Ruchalski, K., Mosser, D.D., Schwartz, J.H., Wang, Y., Borkan, S.C. (2003). hsp72 inhibits focal adhesion kinase degradation in ATP-depleted renal epithelial cells. *J. Biol. Chem.*, **278**: 18214-18220
- Maung, K., Easty, D.J., Hill, S.P., Bennett, D.C. (1999). Requirement for focal adhesion kinase in tumor cell adhesion. *Oncogene*, **18**: 6824-6828

- Mayo, M.W., Dixon, J.E., Durden, D.L., Tonks, N.K., Donner, D.B. (2002a). PTEN protects p53 from Mdm2 and sensitizes cancer cells to chemotherapy. *J. Biol. Chem.*, **277**: 5484-5489
- Mayo, M.W., Madrid, L.V., Westerheide, S.D., Jones, D.R., Yuan, X-J, Baldwin, A.S. Jr., Whang, Y.E. (2002b). PTEN blocks tumour necrosis factor-induced NF- κ B-dependent transcription by inhibiting the transactivation potential of the p65 subunit. *J. Biol. Chem.*, **277**: 11116-11125
- McCabe, M.L. and Dlamini, Z. (2005). The molecular mechanisms of oesophageal cancer. *Int. Immunopharmacol.*, **5**: 1113-1130
- McLean, G.W., Carragher, N.O., Avizienyte, E., Evans, J., Brunton, V.G., Frame, M.C. (2005). The role of focal-adhesion kinase in cancer – a new therapeutic opportunity. *Nature Revs. Cancer*, **5**: 505-515
- Merlino, G.T., Xu, Y., Richert, N., Clark, A.J.L., Ishii, S., Banks-Schlegel, S., Pastan, I. (1985). Elevated epidermal growth factor receptor gene copy number and expression in a squamous carcinoma cell line. *J. Clin. Invest.*, **75**: 1077-1079
- Metcalfe, C. (2006). MUC1 interacts with Wnt-effector β -catenin in human oesophageal squamous cell carcinoma cell lines. *University of the Witwatersrand, Johannesburg, William Cullen Library, MSc dissertation.*
- Miller, S.E. and Veale, R.B. (2001). Environmental modulation of α_v , α_2 and β_1 integrin subunit expression in human oesophageal squamous cell carcinomas. *Cell Biol. Int.*, **25**: 61-69
- Mitra, S.K. and Schlaepfer, D.D. (2006). Integrin-regulated FAK-Src signaling in normal and cancer cells. *Curr. Opin. Cell Biol.*, **18**: 1-8

- Miyazaki, T., Kato, H., Nakajima, M., Sohda, M., Fukai, Y., Masuda, N., Manda, R., Fukuchi, M., Tsukada, K. (2003). FAK overexpression is correlated with tumour invasiveness and lymph node metastasis in oesophageal squamous cell carcinoma. *Br. J. Cancer*, **89**: 140-145
- Montesano, R., Hollstein, M., Hainaut, P. (1996). Genetic alterations in esophageal cancer and their relevance to etiology and pathogenesis: a review. *Int. J. Cancer (Pred. Oncol.)*, **69**: 225-235
- Mukhopadhyay, N., Gordon, G.J., Chen, C.J., Bueno, R., Sugarbaker, D.J., Jaklitsch, M.T. (2005). Activation of FAK in human lung cancer cells involves multiple and potentially parallel signaling events. *J. Cell. Mol. Med.*, **9**: 387-397
- Nagoshi, Y., Yamamoto, G., Irie, T., Tachikawa, T. (2006). Expression of FAK-related non-kinase (FRNK) coincides with morphological change in the early stage of cell adhesion. *Med. Mol. Morphol.*, **39**: 154-160
- Nair, K.S., Naidoo, R., Chetty, R. (2005). Expression of cell adhesion molecules in oesophageal carcinoma and its prognostic value. *J. Clin. Pathol.*, **58**: 343-351
- Nelson, C.M., Pirone, P.M., Tan, J.L., Chen, C.S. (2004). Vascular endothelial-cadherin regulates cytoskeletal tension, cell spreading, and focal adhesions by stimulating RhoA. *Mol. Biol. Cell*, **15**: 2943-2953
- Normanno, N., De Luca, A., Bianco, C., Strizzi, L., Mancino, M., Maiello, M.R., Carotenuto, A., De Feo, G., Caponigro, F., Salomon, D.S. (2006). Epidermal growth factor receptor (EGFR) signaling in cancer. *Gene*, **366**: 2-16
- Oda, A., Druker, B.J., Ariyoshi, H., Smith, M., Salzman, E.W. (1993). pp60src is an endogenous substrate for calpain in human blood platelets. *J. Biol. Chem.*, **268**: 12603-12608

- Owens, L.V., Xu, L., Craven, R.J., Dent, G.A., Weiner, T.M., Kornberg, L., Liu, E.T., Cance, W.G. (1995). Overexpression of the focal adhesion kinase (p125FAK) in invasive human tumours. *Cancer Res.*, **55**: 2752-2755
- Ozawa, S., Ueda, M., Ando, N., Abe, O., Shimizu, N. (1987). High incidence of EGF receptor hyperproduction in esophageal squamous-cell carcinomas. *Int. J. Cancer*, **39**: 333-337
- Park, S-Y., Li, H., Avraham, S. (2007). RAFTK/Pyk2 regulates EGF-induced PC12 cell spreading and movement. *Cell. Signal.*, **19**: 289-300
- Parsons, J.T., Martin, K.H., Slack, J.K., Taylor, J.M., Weed, S.A. (2000). Focal adhesion kinase: a regulator of focal adhesion dynamics and cell movement. *Oncogene*, **19**: 5606-5613
- Parsons, J.T. (2003). Focal adhesion kinase: the first ten years. *J. Cell Sci.*, **116**: 1409-1416
- Playford, M.P. and Schaller, M.D. (2004). The interplay between Src and integrins in normal and tumor biology. *Oncogene*, **23**: 7928-7946
- Poullet, P., Gautreau, A., Kadaré, G., Girault, J-A., Louvard, D., Arpin, M. (2001). Ezrin interacts with focal adhesion kinase and induces its activation independently of cell-matrix adhesion. *J. Biol. Chem.*, **276**: 37686-37691
- Qin, J., Vinogradova, O., Plow, E.F. (2004). Integrin bidirectional signaling: a molecular view. *PLoS Biol.*, **2**: 0726-0729
- Radinsky, R., Risin, S., Fan, D., Dong, Z., Bielenberg, D., Bucana, C.D., Fidler, I.J. (1995). Level and function of epidermal growth factor receptor predict the metastatic potential of human colon carcinoma cells. *Clin. Cancer Res.*, **1**: 19-31

- Rosales, C., O'Brien, V., Kornberg, L., Juliano, R. (1995). Signal transduction by cell adhesion receptors. *Biochim. Biophys. Acta*, **1242**: 77-98
- Rothhut, B., Ghoneim, C., Antonicelli, F., Soula-Rothhut, M. (2007). Epidermal growth factor stimulates matrix metalloproteinase-9 expression and invasion in human follicular thyroid carcinoma cells through focal adhesion kinase. *Biochimie*, **89**: 613-624
- Rottner, K., Hall, A., Small, J.V. (1999). Interplay between Rac and Rho in the control of substrate contact dynamics. *Curr. Biol.*, **9**: 640-648
- Ruoslahti, E. and Öbrink, B. (1996). Common principles in cell adhesion. *Exp. Cell Res.*, **227**: 1-11
- Schaller, M.D., Borgman, C.A., Cobb, B.S., Vines, R.R., Reynolds, A.B., Parsons, J.T. (1992). pp125^{FAK}, a structurally distinctive protein-tyrosine kinase associated with focal adhesions. *Proc. Natl. Acad. Sci.*, **89**: 5192-5196
- Schaller, M.D. (2001). Biochemical signals and biological responses elicited by the focal adhesion kinase. *Biochim. Biophys. Acta*, **1540**: 1-21
- Schlaepfer, D.D. and Hunter, T. (1996). Evidence for in vivo phosphorylation of the Grb2 SH2-domain binding site on focal adhesion kinase by Src-family protein-tyrosine kinases. *Mol. Cell. Biol.*, **16**: 5623-5633
- Schlaepfer, D.D. and Mitra, S.K. (2004). Multiple connections link FAK to cell motility and invasion. *Curr. Opin. Genet. Dev.*, **14**: 92-101
- Schlaepfer, D.D., Mitra, S.K., Ilić, D. (2004). Control of motile and invasive cell phenotypes by focal adhesion kinase. *Biochim. Biophys. Acta*, **1692**: 77-102

- Schwartz, M.A. (1997). Integrins, oncogenes, and anchorage independence. *J. Cell Biol.*, **139**: 575-578
- Sears, R.C. and Nevins, J.R. (2002). Signaling networks that link cell proliferation and cell fate. *J. Biol. Chem.*, **277**: 11617-11620
- Shibata, K., Kikkawa, F., Nawa, A., Thant, A.A., Naruse, K., Mizutani, S., Hamaguchi, M. (1998). Both focal adhesion kinase and c-Ras are required for the enhanced matrix metalloproteinase 9 secretion by fibronectin in ovarian cancer cells. *Cancer Res.*, **58**: 900-903
- Shofuda, T., Shofuda, K., Ferri, N., Kenagy, R.D., Raines, E.W., Clowes, A.W. (2004). Cleavage of focal adhesion kinase in vascular smooth muscle cells overexpressing membrane-type matrix metalloproteinases. *Arterioscler. Thromb. Vasc. Biol.*, **24**: 839-844
- Shtutman, M., Zhurinsky, J., Simcha, I., Albanese, C., D'Amico, M. (1999). The cyclin D1 gene is a target of the β -catenin/LEF-1 pathway. *Proc. Natl. Acad. Sci.*, **96**: 5522-5527
- Sieg, D.J., Hauck, C.R., Ilić, D., Klingbeil, C.K., Schaefer, E., Damsky, C.H., Schlaepfer, D.D. (2000). FAK integrates growth-factor and integrin signals to promote cell migration. *Nature Cell Biol.*, **2**: 249-256
- Small, J.V., Stradal, T., Vignal, E., Rottner, K. (2002). The lamellipodium: where motility begins. *Trends Cell Biol.*, **12**: 112-120
- Sonoda, Y., Matsumoto, Y., Funakoshi, M., Yamamoto, D., Hanks, S.K., Kasahara, T. (2000). Anti-apoptotic role of focal adhesion kinase (FAK). Induction of inhibitor-of-apoptosis proteins and apoptosis suppression by the overexpression of FAK in a human leukemic cell line, HL-60. *J. Biol. Chem.*, **275**: 16309-16315

- Stamenkovic, I. (2000). Matrix metalloproteinases in tumor invasion and metastasis. *Semin. Cancer Biol.*, **10**: 415-433
- Stewart, D.A., Cooper, C.R., Sikes, R.A. (2004). Changes in extracellular matrix (ECM) and ECM-associated proteins in the metastatic progression of prostate cancer. *Reprod. Biol. Endocrinol.*, **2**: 2
- Stoner, G.D. and Gupta, A. (2001). Etiology of chemoprevention of esophageal squamous cell carcinoma. *Carcinogenesis*, **22**: 1737-1746
- Sutter, A.P., Höpfner, M., Huether, A., Maaser, K., Scherübl, H. (2006). Targeting the epidermal growth factor receptor by erlotinib (Tarceva TM) for the treatment of esophageal cancer. *Int. J. Cancer*, **118**: 1814-1822
- Tamura, M., Gu, J., Danen, E.H.J., Takino, T., Miyamoto, S., Yamada, K.M. (1999). PTEN interactions with focal adhesion kinase and suppression of the extracellular matrix-dependent phosphatidylinositol 3-kinase/Akt cell survival pathway. *J. Biol. Chem.*, **274**: 20693-20703
- Tilghman, R.W., Slack-Davis, J.K., Sergina, N., Martin, K.H., Iwanicki, M., Hershey, E.D., Beggs, H.E., Reichardt, L.F., Parsons, J.T. (2005). Focal adhesion kinase is required for the spatial organization of the leading edge in migrating cells. *J. Cell Sci.*, **118**: 2613-2623
- Tilghman, R.W. and Parsons, J.T. (2008). Focal adhesion kinase as a regulator of cell tension in the progression of cancer. *Semin. Cancer Biol.*, **18**: 45-52
- Toutant, M., Studler, J., Burgaya, F., Costa, A., Ezan, P., Gelman, M., Girault, J. (2000). Autophosphorylation of Tyr³⁹⁷ and its phosphorylation by Src-family kinases are altered in focal-adhesion-kinase neuronal isoforms. *Biochem. J.*, **348**: 119-128

- Troussard, A.A., Tan, C., Yoganathan, N., Dedhar, S. (1999). Cell-extracellular matrix interactions stimulate the AP-1 transcription factor in an integrin-linked kinase and glycogen synthase kinase-3-dependent manner. *Mol. Cell. Biol.*, **19**: 7420-7427
- Van de Water, B., Nagelkerke, J.F., Stevens, J.L. (1999). Dephosphorylation of focal adhesion kinase (FAK) and loss of focal contacts precede caspase-mediated cleavage of FAK during apoptosis in renal epithelial cells. *J. Biol. Chem.*, **274**: 13328-13337
- Van Nimwegen, M.J., Huigsloot, M., Camier, A., Tijdens, I.B., van de Water, B. (2006). Focal adhesion kinase and protein kinase B cooperate to suppress Doxorubicin-induced apoptosis of breast tumor cells. *Mol. Pharmacol.*, **70**: 1330-1339
- Van Nimwegen, M.J. and van de Water, B. (2007). Focal adhesion kinase: a potential target in cancer therapy. *Biochem. Pharmacol.*, **73**: 597-609
- Veale, R.B. and Thornley, A.L. (1989). Increased single class low-affinity EGF receptors expressed by human oesophageal squamous carcinoma cell lines. *S. Afr. J. Sci.*, **85**: 375-379
- Velling, T., Nilsson, S., Stefansson, A., Johansson, S. (2004). β 1-integrins induce phosphorylation of Akt on serine 473 independently of focal adhesion kinase and Src family kinases. *EMBO Rep.*, **5**: 901-905
- Von Schlippe, M., Marshall, J.F., Perry, P., Stone, M., Zhu, A.J., Hart, I.R. (2000). Functional interaction between E-cadherin and α v-containing integrins in carcinoma cells. *J. Cell Sci.*, **113**: 425-437

- Wang, L-D., Zheng, S., Zheng, Z-Y., Casson, A.G. (2003). Primary adenocarcinomas of lower esophagus, esophagogastric junction and gastric cardia: in special reference to China. *World J. Gastroenterol.*, **9**: 1156-1164
- Watermann, D.O., Gabriel, B., Jäger, M., Orlowska-Volk, M., Hasenburg, A., zur Hausen, A., Gitsch, G., Stickeler, E. (2005). Specific induction of pp125 focal adhesion kinase in human breast cancer. *Br. J. Cancer*, **93**: 694-698
- Webb, D.J., Donais, K., Whitmore, L.A., Thomas, S.M., Turner, C.E., Parsons, J.T., Horwitz, A.F. (2004). FAK-Src signalling through paxillin, ERK and MLCK regulates adhesion disassembly. *Nature Cell Biol.*, **6**: 154-161
- Weber, B.L. (2002). Cancer genomics. *Cancer Cell*, **1**: 37-47
- Weiner, T.M., Liu, E.T., Craven, R.J., Cance, W.G. (1993). Expression of *focal adhesion kinase* gene and invasive cancer. *Lancet*, **342**: 1024-1025
- Wen, L.P., Fahrni, J.A., Troie, S., Guan, J-L., Orth, K., Rosen, G.D. (1997). Cleavage of focal adhesion kinase by caspases during apoptosis. *J. Biol. Chem.*, **272**: 26056-26061
- Westhoff, M.A., Serrels, B., Fincham, V.J., Frame, M.C., Carragher, N.O. (2004). Src-mediated phosphorylation of focal adhesion kinase couples actin and adhesion dynamics to survival signaling. *Mol. Cell. Biol.*, **24**: 8113-8133
- Wiley, H.S. (2003). Trafficking of the ErbB receptors and its influence on signaling. *Exp. Cell Res.*, **284**: 78-88
- Wozniak, M.A., Modzelewska, K., Kwong, L., Keely, P.J. (2004). Focal adhesion regulation of cell behaviour. *Biochim. Biophys. Acta*, **1692**: 103-119

- Wu, C. and Dedhar, S. (2001). ILK and its interactors: a new paradigm for the coupling of extracellular matrix to actin cytoskeleton and signaling complexes. *J. Biol. Chem.*, **155**: 505-510
- Xie, H., Pallero, M.A., Gupta, K., Chang, P., Ware, M.F., Witke, W., Kwiatkowski, D.J., Lauffenburger, D.A., Murphy-Ullrich, J.E., Wells, A. (1998). EGF receptor regulation of cell motility: EGF induces disassembly of focal adhesions independently of the motility-associated PLC γ signaling pathway. *J. Cell Sci.*, **111**: 615-624
- Yamamoto, T., Kamata, N., Kawano, H., Shimizu, S., Kuroki, T., Toyoshima, K., Rikimaru, K., Nomura, N., Ishizaki, K., Pastan, I., Gamou, S., Shimizu, N. (1986). High incidence of amplification of the epidermal growth factor receptor gene in human squamous carcinoma cell lines. *Cancer Res.*, **46**: 414-416
- Yamanaka, I., Koizumi, M., Baba, T., Yamashita, S., Suzuki, T., Kudo, R. (2003). Epidermal growth factor increased the expression of $\alpha_2\beta_1$ -integrin and modulated integrin-mediated signaling in human cervical adenocarcinoma cells. *Exp. Cell Res.*, **286**: 165-174
- Yarden, Y. and Ullrich, A. (1988). Growth factor receptor tyrosine kinases. *Annu. Rev. Biochem.*, **57**: 443-478
- Yeudall, W.A., Miyazaki, H., Ensley, J.F., Cardinali, M., Gutkind, J.S., Patel, V. (2005). Uncoupling of epidermal growth factor-dependent proliferation and invasion in a model of squamous carcinoma progression. *Oral Oncol.*, **41**: 698-708
- Zaidel-Bar, R., Ballestrem, C., Kam, Z., Geiger, B. (2003). Early molecular events in the assembly of matrix adhesions at the leading edge of migrating cells. *J. Cell Sci.*, **116**: 4605-4613

- Zhang, C., Lambert, M.P., Bunch, C., Barber, K., Wade, W.S., Krafft, G.A., Klein, W.L. (1994). Focal adhesion kinase expressed by nerve cell lines shows increased tyrosine phosphorylation in response to Alzheimer's Ab peptide. *J. Biol. Chem.*, **269**: 25247-25250
- Zhang, H., Chen, S.H., Li, Y.M. (2004). Epidemiological investigation of esophageal carcinoma. *World J. Gastroenterol.*, **10**: 1834-1835
- Zhao, J.H., Reiske, H., Guan, J-L. (1998). Regulation of the cell cycle by focal adhesion kinase. *J. Cell Biol.*, **143**: 1997-2008