



REFERENCES

- [1]. Marshall, B. J., and J. R. Warren. 1984. Unidentified curved bacilli in the stomach of patients with gastritis and peptic ulceration. Lancet 1: 1311-1315.
- [2]. Blaser, M. J. 1998. *Helicobacter pylori* and gastric diseases. BMJ 316: 1507-1510.
- [3]. Parsonnet, J., G. D. Friedman, D. P. Vandersteen, Y. Chang, J. H. Vogelman, N. Orentreich, et al. 1991. *Helicobacter pylori* infection and the risk of gastric carcinoma. N Engl J Med 325: 1127-1131.
- [4]. Suerbaum, S., and P. Michetti. 2002. *Helicobacter pylori* infection. N Engl J Med 347: 1175-1186.
- [5]. Pounder, R. E., and D. Ng. 1995. The prevalence of *Helicobacter pylori* in different countries. Aliment Pharmacol Ther 9: 33-39.
- [6]. Meyer, J. M., N. P. Silliman, W. Wang, N. Y. Siepmann, J. E. Sugg, D. Morris, et al. 2002. Risk factors for *Helicobacter pylori* resistance in the United States: the Surveillance of *H. pylori* Antimicrobial Resistance Partnership (SHARP) study, 1993-1999. Ann Intern Med 136: 13-24.
- [7]. Ruby, A. J., G. Kuttan, K. D. Babu, K. N. Rajasekharan, and R. Kuttan. 1995. Antitumor and antioxidant activity of natural curcuminoids. Cancer Lett 94: 79-83.
- [8]. Mazumber, A., K. Raghavan, J. Weinstein, K. W. Kohn, and Y. Pommer. 1995. Inhibition of human immunodeficiency virus type-1 integrase by curcumin. Biochem Pharmacol 49: 1165-1170.
- [9]. Mahady, G. B., S. L. Pendland, G. Yun, and Z. Z. Lu. 2002. Turmeric (*Curcuma longa*) and curcumin inhibit the growth of *Helicobacter pylori*, a group 1 carcinogen. Anticancer Res 22: 4179-4181.
- [10]. Apisariyakul, A., M. Vanittanakom, and D. Buddhasukh. 1995. Antifungal activity of turmeric oil extracted from *Curcuma longa* (Zingiberaceae). J Ethnopharmacol 49: 163-169.
- [11]. Roy, M., S. Chakraborty, M. Siddiqi, and R. K. Bhattacharya. 2002. Induction of apoptosis in tumor cells by natural phenolic compounds. Asian Pac J Cancer Prev 3: 61-67.

- [12]. Arbiser, J. L., N. Klauber, R. Rohan, R. V. Leeuwen, M. T. Huang, and C. Fisher. 1998. Curcumin is an in vivo inhibitor of angiogenesis. Mol Med 4: 376-383.
- [13]. Ammon, H. P. T., and M. A. Walh. 1991. Pharmacology of *Curcuma longa*. Planta Med 57: 1.
- [14]. Commander, J. N. M., and N. P. E. Vermeulen. 1996. Cytotoxicity and cytoprotective activities of natural compounds. the case of curcumin. Xenobiotica 26: 667.
- [15]. Cantorna, M. T., and E. Balish. 1990. Inability of human clinical strains of *Helicobacter pylori* to colonize the alimentary tract of germfree rodents. Can J Microbiol 36: 237-241.
- [16]. Krakowka, S., D. R. Morgan, W. G. Kraft, and R. D. Leunk. 1987. Establishment of gastric *Campylobacter pylori* infection in the neonatal gnotobiotic piglet. Infect Immun 55: 2789-2796.
- [17]. Karita, M., Q. Li, D. Cantero, and K. Okita. 1994. Establishment of a small animal model for human *Helicobacter pylori* infection using germfree mouse. Gastroenterology 89: 208-213.
- [18]. Tsuda, M., M. Karita, M. G. Morshed, K. Okita, and T. Nakazawa. 1994. A urease-negative mutant of *Helicobacter pylori* constructed by allelic exchange mutagenesis lacks the ability to colonize the nude mouse stomach. Infect Immun 62: 3586-3589.
- [19]. Euler, A. R., G. E. Zurenko, J. B. Moe, R. G. Ulrich, and Y. Yagi. 1990. Evaluation of two monkey species (*Macaca mulatta* and *Macaca fascicularis*) as possible models for human *Helicobacter pylori* disease. J Clin Microbiol 28: 2285-2290.
- [20]. Lee, A., J. G. Fox, G. Otto, and J. Murphy. 1990. A small animal model of human *Helicobacter pylori* active chronic gastritis. Gastroenterology 99: 1315-1323.
- [21]. Fox, J. G., G. Otto, J. C. Murphy, N. S. Taylor, and A. Lee. 1991. Gastric colonization of the ferret with *Helicobacter* species: natural and experimental infections. Rev Infect Dis 13: S671-S680.
- [22]. Telford, J. L., P. Ghiara, M. Dell'Orco, M. Comanducci, D. Burroni, M. Buqnoli, et al. 1994. Gene structure of the *Helicobacter pylori* cytotoxin and evidence of its key role in gastric disease. J Exp Med 179: 1653-1658.

- [23]. Lee, A., J. O'Rourke, M. C. De Ungria, B. Robertson, G. Daskalopoulos, and M. F. Dixon. 1997. A standardized mouse model of *Helicobacter pylori* infection: introducing the Sydney strain. Gastroenterology 112: 1386-1397.
- [24]. Ferrero, R. L., J. M. Thiberge, M. Huerre, and A. Libigne. 1998. Immune responses of specific-phenotype-free mice to chronic *Helicobacter pylori* (strain SS1) infection. Infect Immun 66: 1349-1355.
- [25]. Marchetti, M., B. Arico, D. Burrone, N. Figura, R. Rappuoli, and P. Ghiara. 1995. Development of a mouse model of *Helicobacter pylori* infection that mimics human disease. Science 267: 1655-1658.
- [26]. Elizalde, J. I., A. Mendez, J. Gomez, M. Del Rivero, M. Gironella, D. Closa, et al. 2003. Gastric mucosal blood flow changes in *Helicobacter pylori* infection and NSAID-induced gastric injury. Helicobacter 8: 124-131.
- [27]. Li, H., I. Kalies, B. Mellgard, and H. F. Helander. 1998. A rat model of chronic *Helicobacter pylori* infection: studies of epithelial cell turnover and gastric ulcer healing. Scand J Gastroenterol 33: 370-378.
- [28]. Li, H., E. M. Anderson, and H. F. Helander. 1999. Reactions from rat gastric mucosa during one year of *Helicobacter pylori* infection. Dig Dis Sci 44: 116-124.
- [29]. Thong-Ngam, D., R. Prabjone, N. Visedopas, and T. Chatsuwan. 2005. A simple rat model of chronic *Helicobacter pylori* infection for research study. Thai J Gastroenterol 6: 2-6.
- [30]. Brzozowski, T., P. C. Konturek, S. J. Konturek, S. Kwiecien, R. Pajdo, E. Karczewska, et al. 1999. Water extracts of *Helicobacter pylori* delay healing of chronic gastric ulcer in rats: role of cytokine and gastrin-somatostatin link. Digestion 60: 22-33.
- [31]. Kang, J., and M. J. Blaser. 2006. Bacterial populations as perfect gases: genomic integrity and diversification tensions in *Helicobacter pylori*. Nat Rev Microbiol 4: 826-836.
- [32]. Thomson, A. B. R., and E. A. Shaffer. 1992. First principles of gastroenterology. In A.B.R. Thomson (ed.), *The basis of disease and an approach to management*, pp. 133-136. Canada: University of Toronto Press.
- [33]. Blaser, M. J. 1992. Hypothesis on the pathogenesis and natural history of *Helicobacter pylori*-induced inflammation. Gastroenterology 102: 720-727.

- [34]. Kalia, N., K. D. Bardhan, J. C. Atherton, and N. J. Brown. 2002. Toxigenic *Helicobacter pylori* induces changes in the gastric mucosal microcirculation in rats. Gut 51: 641-647.
- [35]. Johnson, L. R. 1997. Gastrointestinal physiology; Fifth edition: Mosby-year Book Inc.
- [36]. Peti-Peterdi, J., G. Kovacs, P. Hamar, and L. Rosivall. 1998. Hemodynamics of gastric microcirculation in rats. Am J Physiol Heart Circ Physiol 275: 1404-1410.
- [37]. Peterson, W. L., and D. Y. Graham. 2002. Gastrointestinal and liver disease. In, *Helicobacter pylori*, pp. 732-746. Philadelphia: Saunders.
- [38]. Yamada, T., D. H. Alpers, C. O. Yang, D. W. Powell, and F. E. Silversten. 1991. Text book of gastroenterology. In, pp. 1241-1250: J.B. Lippincott.
- [39]. Akopyanz, N., N. O. Bukanov, T. U. Westblom, S. Kresovich, and D. E. Berg. 1992. DNA diversity among clinical isolates of *Helicobacter pylori* detected by PCR-based RAPD fingerprinting. Nucleic Acids Res 20: 5137-5142.
- [40]. Mobley, H. L. T. 2001. *Helicobacter pylori*: molecular and cellular biology; *Helicobacter pylori* urease. edition, ed. M. Achtman, and S. Suerbaum Wymondham, UK: Horizon Scientific Press. 155-170.
- [41]. Montecucco, C., and R. Rappuoli. 2001. Living dangerously: how *Helicobacter pylori* survives in the human stomach. Nat Rev Mol Cell Biol 2: 457-466.
- [42]. Ilver, D., A. Arnqvist, J. Ogren, I. M. Frick, D. Kersulyte, E. T. Incecik, et al. 1998. *Helicobacter pylori* adhesin binding fucosylated histo-blood group antigens revealed by retagging. Science 279: 373-377.
- [43]. Atherton, J. C. 1998. *H. pylori* virulence factors. Br. Med. Bull 54: 105-120.
- [44]. Covacci, A., J. L. Telford, G. Del Giudice, J. Parsonnet, and R. Rappuoli. 1999. *Helicobacter pylori* virulence and genetic geography. Science 284: 1328-1333.
- [45]. Odenbreit, S., J. Puls, B. Sedlmaier, E. Gerland, W. Fischer, and R. Haas. 2000. Translocation of *Helicobacter pylori* CagA into gastric epithelial cells by type IV secretion. Science 287: 1497-1500.
- [46]. Segal, E. D., J. Cha, J. Lo, S. Falkow, and L. S. Tompkins. 1999. Altered states: involvement of phosphorylated CagA in the induction of host cellular growth changes by *Helicobacter pylori*. Proc Natl Acad Sci 96: 14559-14564.

- [47]. Higashi, H., R. Tsutsumi, S. Muto, T. Sugiyama, T. Azuma, M. Asaka, et al. 2002. SHP-2 tyrosine phosphatase as an intracellular target of *Helicobacter pylori* CagA protein. Science 295: 683-686.
- [48]. Naumann, M., and J. E. Crabtree. 2004. *Helicobacter pylori*-induced epithelial cell signalling in gastric carcinogenesis. Trends Microbiol 12: 29-36.
- [49]. Reyrat, J. M., V. Pelicic, E. Papini, C. Montecucco, R. Rappuoli, and J. L. Telford. 1999. Towards deciphering the *Helicobacter pylori* cytotoxin. Mol Microbiol 34: 197-204.
- [50]. Dundon, W. G., H. Nishioka, A. Polenghi, E. Papinutto, G. Zanotti, P. Montemurro, et al. 2002. The neutrophil-activating protein of *Helicobacter pylori*. Int J Med Microbiol 291: 545-550.
- [51]. Montecucco, C., and M. de Bernard. 2003. Molecular and cellular mechanisms of action of the vacuolating cytotoxin (VacA) and neutrophil-activating protein (HP-NAP) virulence factors of *Helicobacter pylori*. Microbes Infect 5: 715-721.
- [52]. Goodwin, C. S., J. A. Armstrong, and B. J. Marshall. 1986. *Campylobacter pyloridis*, gastritis, and peptic ulceration. J Clin Pathol 39: 353-365.
- [53]. Brandt, S., T. Kwok, R. Hartig, W. Konig, and S. Backert. 2005. NF- κ B activation and potentiation of proinflammatory responses by the *Helicobacter pylori* CagA protein. PNAS 102: 9300-9305.
- [54]. Naumann, M., S. Wessler, C. Bartsch, B. Wieland, A. Covacci, and R. Hoss. 1999. Activation of activator protein 1 and stress response kinases in epithelial cells colonized by *Helicobacter pylori* encoding the cag pathogenicity island. J Biol Chem 274: 31655-31662.
- [55]. Keates, S., A. C. Keates, M. Warny, R. M. Peek, P. G. Murray, Jr, and C. P. Kelly. 1999. Differential activation of mitogen-activated protein kinases in AGS gastric epithelial cells by cag⁺ and cag⁻ *Helicobacter pylori*. J Immunol 163: 5552-5559.
- [56]. Mai, U. E., G. I. Perez-Perez, J. B. Allen, S. M. Wahl, M. J. Blaser, and P. D. Smith. 1992. Surface proteins from *Helicobacter pylori* exhibit chemotactic activity for human leukocytes and are present in gastric mucosa. J Exp Med 175: 517-525.

- [57]. Tufano, M. A., F. Rossano, P. Catalanotti, G. Liguori, C. Capasso, M. T. Ceccarelli, et al. 1994. Immunobiological activities of *Helicobacter pylori* porins. Infect Immun 62: 1392-1399.
- [58]. Zhang, Q. B., I. M. Nakashabendi, M. S. Mokhashi, J. B. Dawodu, C. G. Gemmell, and R. I. Russell. 1996. Association of cytotoxin production and neutrophil activation by strains of *Helicobacter pylori* isolated from patients with peptic ulceration and chronic gastritis. Gut 38: 841-845.
- [59]. Perez-Perez, G. I., B. M. Dworkin, J. E. Chodos, and M. J. Blaser. 1988. *Campylobacter pylori* antibodies in humans. Ann Intern Med 109: 11-17.
- [60]. Harris, P. R., L. E. Smythies, P. D. Smith, and A. Dubois. 2000. Inflammatory cytokine mRNA expression during early and persistent *Helicobacter pylori* infection in nonhuman primates. J Infect Dis 181: 783-786.
- [61]. Smythies, L. E., K. B. Waites, J. R. Lindsey, P. R. Harris, P. Ghiara, and P. D. Smith. 2000. *Helicobacter pylori*-induced mucosal inflammation is Th1 mediated and exacerbated in IL-4, but not IFN-gamma, gene-deficient mice. J Immunol 165: 1022-1029.
- [62]. Wang, J., E. G. Brooks, K. B. Bamford, T. L. Denning, J. Pappo, and P. B. Ernst. 2001. Negative selection of T cells by *Helicobacter pylori* as a model for bacterial strain selection by immune evasion. J Immunol 167: 926-934.
- [63]. Negrini, R., A. Savio, and B. J. Appelmelk. 1997. Autoantibodies to gastric mucosa in *Helicobacter pylori* infection. Helicobacter 2:Suppl 1: S13-S16.
- [64]. Allen, L. A., L. S. Schlesinger, and B. Kang. 2000. Virulent strains of *Helicobacter pylori* demonstrate delayed phagocytosis and stimulate homotypic phagosome fusion in macrophages. J Exp Med 191: 115-128.
- [65]. Baldari, T. A., A. Lanzavecchia, and J. L. Telford. 2005. Immune subversion by *Helicobacter pylori*. Trends Immun 26: 199-207.
- [66]. McGee, D. J., and H. L. Mobley. 1999. Mechanisms of *Helicobacter pylori* infection: bacterial factors. Curr Top Microbiol Immunol 241: 155-180.
- [67]. Yoshida, N., D. N. Granger, D. J. Evans, D. G. Evans, D. Y. Graham, D. C. Anderson, et al. 1993. Mechanism involved in *Helicobacter pylori*-induced inflammation. Gastroenterology 105: 1431-1440.

- [68]. Wedmore, C. V., and T. J. Williams. 1981. Control of vascular permeability by polymorphonuclear leukocytes in inflammation. Nature 289: 646-650.
- [69]. Rosengren, S., K. Ley, and K.-E. Arfors. 1989. Dextran sulfate prevents LTB₄-induced permeability increase, but not neutrophil emigration in the hamster cheek pouch. Microvasc res 38: 243-254.
- [70]. Guatam, N., A. M. Olofsson, H. Herwald, L. F. Iversen, E. Lundgren-Akerlund, P. Hedqvist, et al. 2001. Heparin-binding protein (HBP/CAP37): A missing link in neutrophil-evoked alteration of vascular permeability in inflammation. Nature Med 7: 1123-1127.
- [71]. Bussolino, F., G. Cammusoi, M. Aglietta, P. Braquet, A. Bosia, G. Pescarmona, et al. 1987. Human endothelial cells are target for platelet-activating factor. I. Platelet-activating factor induces changes in cytoskeleton structures. J Immunol 139: 2439-2446.
- [72]. Eliceiri, B. P., R. Paul, P. L. Schwartzberg, J. D. Hood, J. Leng, and D. A. Cheresh. 1999. Selective requirement for Src kinases during VEGF-induced angiogenesis and vascular permeability Mol. Cell 4: 915-924.
- [73]. Ley, K. 2001. Plugging the leaks. Nat Med 7: 1105-1106.
- [74]. Innocenti, M., A.-C. Thoreson, R. L. Ferrero, E. Stromberg, I. Bolin, L. Eriksson, et al. 2002. *Helicobacter pylori*-induced activation of human endothelial cells. Infect Immun 70: 4581-4590.
- [75]. Kurose, I., D. N. Granger, D. J. Evans, JR., D. G. Evans, D. Y. Graham, M. Miyasaka, et al. 1994. *Helicobacter pylori*-induced microvascular protein leakage in rats: role of neutrophils, mast cells, and platelets. Gastroenterology 107: 70-79.
- [76]. Kalia, N., K. D. Bardhan, M. W. R. Reed, S. Jacob, and N. J. Brown. 2000. Mechanisms of *Helicobacter pylori*-induced rat gastric mucosal microcirculatory disturbances *in vivo*. Dig Dis Sci 45: 763-772.
- [77]. Caputo, R., C. Tuccillo, B. A. Manzo, R. Zarrilli, G. Tortora, C. D. V. Blanco, et al. 2003. *Helicobacter pylori* VacA Toxin Up-Regulates Vascular Endothelial Growth Factor Expression in MKN 28 Gastric Cells through an Epidermal Growth Factor Receptor-, Cyclooxygenase-2- dependent Mechanism. Clin Cancer Res 9: 2015-2021.

- [78]. Strowski, M. Z., T. Cramer, G. Schafer, S. Juttner, A. Waldduck, E. Schipani, et al. 2004. *Helicobacter pylori* stimulates host vascular endothelial growth factor-A (*vegf-A*) gene expression via MEK/ERK-dependent activation of Sp1 and Sp3. FASEB J 18: 218-220.
- [79]. Weis, S. M., and D. A. Cheresh. 2005. Pathophysiological consequences of VEGF-induced vascular permeability. Nature 43: 497-504.
- [80]. Cohen, A. W., J. M. Carbajal, and R. C. J. Schaeffer. 1999. VEGF stimulates tyrosine phosphorylation of β -catenin and small-pore endothelial barrier dysfunction. Am J Physiol 277: H2038-H2049.
- [81]. Esser, S., M. G. Lampugnani, M. Corada, E. Dejana, and W. Risau. 1998. Vascular endothelial growth factor induces VE-cadherin tyrosine phosphorylation in endothelial cells. J Cell Sci 111: 1853-1865.
- [82]. Miles, A. A., and E. M. Miles. 1952. Vascular reactions to histamine, histamine-liberator and leukotaxine in the skin of guinea pigs. J Physiol 118: 228-257.
- [83]. Liao, F., J. F. Doody, J. Overholser, B. Finnerty, R. Bassi, Y. Wu, et al. 2002. Selective targeting of angiogenic tumour vasculature by vascular endothelial-cadherin antibody inhibits tumour growth without affecting vascular permeability. Cancer Res 62: 2567-2575.
- [84]. Bates, D. O., D. Lodwick, and B. Williams. 1999. Vascular endothelial growth factor and microvascular permeability. Microcirculation 6: 83-96.
- [85]. Paul, R., Z. G. Zhang, B. P. Eliceiri, Q. Jiang, A. D. Boccia, R. L. Zhang, et al. 2001. Src deficiency or blockade of Src activity in mice provides cerebral protection following stroke. Nature Med 7: 222-227.
- [86]. McDonald, D. M., G. Thurston, and P. Baluk. 1999. Endothelial gaps as sites for plasma leakage in inflammation. Microcirculation 6: 7-22.
- [87]. Feng, D., J. A. Nagy, A. M. Dvorak, and H. F. Dvorak. 2000. Different pathways of macromolecule extravasation from hyperpermeable tumour vessels. Microvasc res 59: 24-37.
- [88]. Weis, S., S. Shintani, A. Weber, R. Kirchmair, M. Wood, A. Cravens, et al. 2004. Src blockade stabilizes a Flk/cadherin complex, reducing edema and tissue injury following myocardial infarction. J Clin Invest 113: 885-894.

- [89]. Kalia, N., S. Jacob, N. J. Brown, M. W. R. Reed, D. Morton, and K. D. Bardhan. 1997. Studies on the gastric mucosal microcirculation. 2. *Helicobacter pylori* water soluble extracts induce platelet aggregation in the gastric mucosal microcirculation in vivo. Gut 41: 748-752.
- [90]. Kalia, N., K. D. Bardhan, M. W. R. Reed, S. Jacob, and N. J. Brown. 2000. Effect of chronic administration of *Helicobacter pylori* extracts on rat gastric mucosal microcirculation *in vivo*. Dig Dis Sci 45: 1343-1351.
- [91]. Gerber, H. P., V. Dixit, and N. Ferrara. 1998. Vascular endothelial growth factor induces expression of antiapoptotic proteins Bcl-2 and A1 in vascular endothelial cells. J Biol Chem 273: 13313-13316.
- [92]. Benjamin, L. E., D. Golijanin, A. Itin, D. Pode, and E. Keshet. 1999. Selective ablation of immature blood vessels in established human tumors follows vascular endothelial growth factor withdrawal. J Clin Invest 103: 159-165.
- [93]. Dvorak, H. F., L. F. Brown, M. Detmar, and A. M. Dvorak. 1995. Vascular permeability factor/vascular endothelial growth factor, microvascular hyperpermeability, and angiogenesis. Am J Pathol 146: 1029-1039.
- [94]. Senger, D. R., S. J. Galli, A. M. Dvorak, C. A. Perruzzi, V. S. Harvey, and H. F. Dvorak. 1983. Tumor cells secrete a vascular permeability factor that promotes accumulation of ascites fluid. Science 219: 983-985.
- [95]. Bates, D. O., and F. E. Curry. 1997. Vascular endothelial growth factor increases microvascular permeability via a Ca(2+)-dependent pathway. Am J Physiol 273: H687-H694.
- [96]. Monacci, W. T., M. J. Merrill, and E. H. Oldfield. 1993. Expression of vascular permeability factor/vascular endothelial growth factor in normal rat tissues. Am J Physiol 264: C995-C1002.
- [97]. Dvorak, H. F. 1990. Leaky tumour vessels: consequences for tumour stroma generation and for solid tumour therapy. Prog Clin Biol Res 354A.
- [98]. Roberts, W. G., and G. E. Palade. 1995. Increased microvascular permeability and endothelial fenestration induced by vascular endothelial growth factor. J Cell Sci 108: 2369-2379.

- [99]. Esser, S., S. Wolburg, G. Breier, T. Kurzchalia, and W. Raisau. 1998. Vascular endothelial growth factor induces endothelial fenestration *in vitro*. J Cell Biol 140: 947-959.
- [100]. Feng, D., J. A. Nagy, K. Pyne, I. Hammel, H. F. Dvorak, and A. M. Dvorak. 1999. Pathways of macromolecular extravasion across microvascular endothelial in response to VPF/VEGF and other vasoactive mediators. Microcirculation 6: 23-44.
- [101]. Monsky, W. L., D. Fukumura, T. Gohongi, M. Ancukiewicz, H. A. Weich, P. Torchilin, et al. 1999. Augmentation of transvascular transport of macromolecules and nanoparticles in tumors using vascular endothelial growth factor. Cancer Res 59: 4129-4135.
- [102]. Reynolds, L. E., L. Wyder, J. C. Lively, D. Taverna, S. D. Robinson, X. Huang, et al. 2002. Enhanced pathological angiogenesis in mice lacking $\beta 3$ integrin or $\beta 3$ and $\beta 5$ integrins. Nat Med 8: 27-34.
- [103]. Weis, S., J. Cui, L. Barnes, and D. Cheresh. 2004. Endothelial barrier disruption by VEGF-mediated Src activity potentiates tumour cell extravasation and metastasis. J Cell Biol 167: 223-229.
- [104]. Salgado, R., I. Benoy, J. Bogers, R. Weytjens, P. Vermeulen, L. Dirix, et al. 2001. Platelets and vascular endothelial growth factor (VEGF): a morphological and functional study. Angiogenesis 4: 37-43.
- [105]. Dor, Y., R. Porat, and E. Keshet. 2001. Vascular endothelial growth factor and vascular adjustments to perturbations in oxygen homeostasis. Am J Physiol 280: C1367-C1374.
- [106]. Semenza, G. 2002. Signal transduction to hypoxia-inducible factor 1. Biochem Pharmacol 64: 993-998.
- [107]. Ferrara, N., and T. Davis-Smyth. 1997. The biology of vascular endothelial growth factor. Endocr Rev 18: 4-25.
- [108]. Neufeld, G., T. Cohen, S. Gengrinovitch, and C. Poltorak. 1999. Vasular endothelial growth factor (VEGF) and its receptors. FASEB J 13: 9-22.
- [109]. Folkman, J., and Y. Shing. 1992. Angiogenesis. J Biol Chem 267: 10931-10934.

- [110]. Kolch, W., G. Martiny-Baron, A. Kieser, and D. Marme. 1995. Regulation of the expression of the VEGF/VPS and its receptors: role in tumor angiogenesis. Breast Cancer Res Treat 36: 139-155.
- [111]. Schafer, G., T. Cramer, G. Suske, W. Kemmner, B. Wiedenmann, and M. Hocker. 2002. Oxidative stress regulates vascular endothelial growth factor-A gene transcription through Sp1- and Sp3-dependent activation of two proximal GC-rich promotor elements. J Biol Chem 278: 8190-8198.
- [112]. Milanini, J., F. Vinals, J. Pouyssegur, and G. Pages. 1998. p42/p44 MAP kinase module plays a key role in the transcriptional regulation of the vascular endothelial growth factor gene in fibroblasts. J Biol Chem 273: 18165-18172.
- [113]. Grugel, S., G. Finkenzeller, K. Weindel, B. Barleon, and D. Marme. 1995. Both v-Ha-Ras and v-Ras stimulate expression of vascular endothelial growth factor in NIH 3T3 cells. J Biol Chem 270: 25915-25919.
- [114]. Mueller, A., D. S. Merrell, J. Grimm, and S. Falkow. 2004. Profiling of microdissected gastric epithelial cells reveals a cell type-specific response to *Helicobacter pylori* infection. Gastroenterology 127: 1446-1462.
- [115]. Jung, Y. J., J. S. Isaacs, S. Lee, J. Trepel, and L. Neckers, IL-1b mediated up-regulation of HIF-1a via an NF-kB/COX-2 pathway identifies HIF-1 as a critical link between inflammation and oncogenesis. 2003, The FASEB Journal Express Article.
- [116]. Ma, L., S. N. Elliott, G. Cirino, A. Buret, L. J. Ignarro, and J. L. Wallace. 2001. Platelets modulate gastric ulcer healing: Role of endostatin and vascular endothelial growth factor release. PNAS 98: 6470-6475.
- [117]. Ma, L., P. del Soldato, and J. L. Wallace. 2002 Divergent effects of new cyclooxygenase inhibitors on gastric ulcer healing: Shifting the angiogenic balance. PNAS 99: 13243-13247.
- [118]. Pahl, H. L. 1999. Activators and target genes of Rel/NF-kB transcription factors. Oncogene 18: 6853-6866.
- [119]. Chen, F. E., and G. Ghosh. 1999. Regulation of DNA binding by Rel/NF-kB transcription factors: structural views. Oncogene 18: 6845-6852.
- [120]. Gilmore, T. D. 1999. The Rel/NF-kB signal transduction pathway: introduction. Oncogene 18: 6842-6844.

- [121]. Arenzana-Seisdedos, F., P. Turpin, M. Rodriguez, D. Thomas, R. T. Hay, J. L. Virelizier, et al. 1997. Nuclear localization of I kappa B alpha promotes active transport of NF-kappa B from the nucleus to the cytoplasm. *J Cell Science* 110: 369-378.
- [122]. Sachdev, S., A. Hoffmann, and M. Hannink. 1998. Nuclear localization of IkappaB alpha is mediated by the second ankyrin repeat: the IkappaB alpha ankyrin repeats define a novel class of cis-acting nuclear import sequences. *Mol Cell Biol* 18: 2524-2534.
- [123]. Aihara, M., D. Tsuchimoto, H. Takizawa, A. Azuma, H. Wakebe, Y. Ohmoto, et al. 1997. Mechanisms involved in *Helicobacter pylori*-induced interleukin-8 production by a gastric cancer cell line, MKN45. *Infect. Immun* 65: 3218-3224.
- [124]. Keates, S., Y. S. Hitti, M. Upton, and C. P. Kelly. 1997. *Helicobacter pylori* infection activates NF-KB in gastric epithelial cells. *Gastroenterology* 113: 1099-1109.
- [125]. Sharma, S. A., M. K. Tummuru, M. J. Blaser, and L. D. Kerr. 1998. Activation of IL-8 gene expression by *Helicobacter pylori* is regulated by transcription factor nuclear factor-kappa B in gastric epithelial cells. *J. Immunol.* 160: 2401-2407.
- [126]. Karin, M., Y. Gao, F. R. Creten, and Z. W. Li. 2002. NF-kappa B in cancer: from innocent bystander to major culprit. *Nat Rev Cancer* 2: 301-310.
- [127]. Lin, A., and M. Karin. 2003. NF-kappa B in cancer: a marked target. *Semin Cancer Biol* 13: 107-114.
- [128]. Sasaki, N., T. Morisaki, K. Hashizume, T. Yao, M. Tsuneyoshi, H. Noshiro, et al. 2001. Nuclear factor-kappaB p65 (RelA) transcription factor is constitutively activated in human gastric carcinoma tissue. *Clin Cancer Res* 7: 4136-4142.
- [129]. Zhang, X. J., B. Ruiz, P. Correa, and M. J. S. Miller. 2000. Cellular dissociation of NF-KB and inducible nitric oxide synthase in *Helicobacter pylori* infection. *Free Radic Biol Med* 29: 730-735.
- [130]. Isomoto, H., Y. Mizuta, M. Miyazaki, F. Takeshima, K. Omagari, K. Murase, et al. 2000. Implication of NF-kB in *Helicobacter pylori*-Associated Gastritis. *Am J Gastroenterology* 95: 2768-2776.
- [131]. Yang, G. F., C. S. Deng, Y. Y. Xiong, L. L. Gong, B. C. Wang, and J. Luo. 2004. Expression of nuclear factor-kappa B and target genes in gastric precancerous lesions and adenocarcinoma: Association with *Helicobacter pylori* cagA (+) infection. *World J Gastroenterol* 10: 491-496.

- [132]. Cao, H. J., Y. Fang, X. Zhang, W. J. Chen, W. P. Zhou, H. Wang, et al. 2005. Tumor metastasis and the reciprocal regulation of heparanase gene expression by nuclear factor kappa B in human gastric carcinoma tissue. World J Gastroenterol 11: 903-907.
- [133]. Lee, B. L., H. S. Lee, J. Jung, S. J. Cho, H. Y. Chung, W. H. Kim, et al. 2005. Nuclear factor-KB activati on correlates with better prognosis and Akt activation in human gastric cancer. Clin Cancer Res 11.
- [134]. Takahashi, S., T. Fujita, and A. Yamamoto. 2001. Role of nuclear factor-KB in gastric ulcer healing in rats. Am J Physiol Gastrointest Liver Physiol 280: G1296-G1304.
- [135]. Kim, S. G., J. S. Kim, J. M. Kim, H. C. Jung, and I. S. Song. 2005. Inhibition of proinflammatory cytokine expression by NF-KB (p65) antisense oligonucleotide in *Helicobacter pylori* infected mice. Helicobacter 10.
- [136]. Eigner, D., and D. Scholz. 1999. *Ferula asa-foetida* and *Curcuma longa* in traditional medical treatment and diet in Nepal. J Ethnopharmacol 67: 1-6.
- [137]. Ammon, H. P. T., M. I. Anazodo, H. Safayhi, B. N. Dhawan, and R. C. Srimal. 1992. Curcumin: a potent inhibitor of leukotriene B4 formation in rat peritoneal polymorphonuclear neutrophils (PMNL). Planta Med 58: 26.
- [138]. Roughley, P. J., and D. A. Whiting. 1973. Experiments in the biosynthesis of curcumin. J Chem Soc 20: 2379-2388.
- [139]. Cheng, A. L., C. H. Hsu, J. K. Lin, M. M. Hsu, Y. F. Ho, T. S. Shen, et al. 2001. Phase I clinical trial of curcumin, a chemopreventive agent, in patients with high-risk or pre-malignant lesions. Anticancer Res 21: 2895-2900.
- [140]. Deodhar, S. D., R. Sethi, and R. C. Srimal. 1980. Preliminary studies on antirheumatic activity of curcumin. Indian J Med Res 71: 632-634.
- [141]. Satoskar, R. R., S. J. Shah, and S. G. Shenoy. 1986. Evaluation of anti-inflammatory property of curcumin (diferuloyl methane) in patients with postoperative inflammation. Int J Clin Pharmacol Ther Toxicol 24: 651-654.
- [142]. Wahlstrom, B., and G. Blennow. 1978. A study on the fate of curcumin in the rat. Pharmacol Toxicol 43: 86-92.
- [143]. Arora, R., N. Basu, and V. Kapoor. 1971. Anti-inflammatory studies on *Curcuma longa* (tumeric). Indian J Med Res 59: 1289-1295.

- [144]. Majeed, M., V. Badmaev, U. Shivakumar, and R. Rajendran 1995. Curcuminoids; Antioxidant phytonutrients. edition Piscataway NJ: Nutriscience Publishers, Inc.
- [145]. Roth, G., A. Chandra, and M. Nair. 1998. Novel bioactivities of *Curcuma longa* constituents. J Nat Prod 61: 542-545.
- [146]. Young-Joon, S. 1999. Molecular mechanisms of chemopreventive effects of selected dietary and medicinal phenolic substances. Mutat Res 428: 305-327.
- [147]. Araújo, C. A. C., and L. Leon. 2001. Biological Activities of *Curcuma longa* L. Mem Inst Oswaldo Cruz, Rio de Janeiro 96: 723-728.
- [148]. Bhavani Sankar, T. N., and S. Murthy. 1979. Effect of Turmeric (*Curcuma longa*) fractions on the growth of some intestinal and pathogenic bacteria in vitro. Indian J Exp Biol 17: 1363-1366.
- [149]. Mukophadhyay, A., N. Basu, N. Ghatak, and P. K. Gujral. 1982. Anti-inflammatory and irritant activities of curcumin analogues in rats. Agents and Actions 12: 508-515.
- [150]. Srimal, R. C., and B. N. Dhawan. 1973. Phamacology of diferuloyl methane (curcumin), a non-steroidal anti-inflammatory agent. J Pharm Pharmacol 25: 447-452.
- [151]. Duvoix, A., F. Morceau, S. Delhalle, M. Schmitz, M. Schnekenburger, M. M. Galteau, et al. 2003. Induction of apoptosis by curcumin: mediation by glutathione S-transferase P1-1 inhibition. Biochem Pharmacol 66: 1475-1483.
- [152]. Bharti, A. C., N. Donato, S. Singh, and B. B. Aggarwal. 2003. Curcumin (diferuloylmethane) down-regulates the constitutive activation of nuclear factor-kappa B and Ikappa Balpha kinase in human multiple myeloma cells, leading to suppression of proliferation and induction of apoptosis. Blood 101: 1053-1062.
- [153]. Bierhaus, A., Y. Zhang, P. Quehenberger, T. Luther, M. Haase, and M. Muller. 1997. The dietary pigment curcumin reduces endothelial tissue factor gene expression by inhibiting binding of AP-1 to the DNA and activation of NF-kappa B. Thromb Haemost 77: 772-782.
- [154]. Han, S. S., Y. S. Keum, H. J. Seo, and Y. J. Surh. 2002. Curcumin suppresses activation of NF-kappaB and AP-1 induced by phorbol ester in cultured human promyelocytic leukemia cells. J Biochem Mol Biol 35: 337-342.

- [155]. Pendurthi, U. R., J. T. Williams, and L. V. Rao. 1997. Inhibition of tissue factor gene activation in cultured endothelial cells by curcumin. Suppression of activation of transcription factors Egr-1, AP-1, and NF-kappa B. Arterioscler Thromb Vasc Biol 17: 3406-3413.
- [156]. Surh, Y. J., S. S. Han, Y. S. Keum, H. J. Seo, and S. S. Lee. 2000. Inhibitory effects of curcumin and capsaicin on phorbol ester-induced activation of eukaryotic transcription factors, NF-kappaB and AP-1. Biofactors 12: 107-112.
- [157]. Xu, Y. X., K. R. Pindolia, N. Janakiraman, R. A. Chapman, and S. C. Gautam. 1997. Curcumin inhibits IL1 alpha and TNF-alpha induction of AP-1 and NF-kB DNA-binding activity in bone marrow stromal cells. Hematopathol Mol Hematol 11: 49-62.
- [158]. Chuang, S. E., P. Y. Yeh, Y. S. Lu, G. M. Lai, C. M. Liao, and M. Gao. 2002. Basal levels and patterns of anticancer drug-induced activation of nuclear factor-kappaB (NF-kappaB), and its attenuation by tamoxifen, dexamethasone, and curcumin in carcinoma cells. Biochem Pharmacol 63: 1709-1716.
- [159]. Shishodia, S., P. Potdar, C. G. Gairola, and B. B. Aggarwal. 2003. Curcumin (diferuloylmethane) down-regulates cigarette smoke-induced NF-kappaB activation through inhibition of IkappaBalpha kinase in human lung epithelial cells: correlation with suppression of COX-2, MMP-9 and cyclin D1. Carcinogenesis 24: 1269-1279.
- [160]. Nanji, A. A., K. Jokelainen, G. L. Tipoe, A. Rahemtulla, P. Thomas, and A. J. Dannenberg. 2003. Curcumin prevents alcohol-induced liver disease in rats by inhibiting the expression of NF-kappa B-dependent genes. Am J Physiol Gastrointest Liver Physiol 284: G321-G327.
- [161]. Gururaj, A. E., M. Belakavadi, D. A. Venkatesh, D. Marme, and B. P. Salimath. 2002. Molecular mechanisms of anti-angiogenic effect of curcumin. BBRC 297: 934-942.
- [162]. Singh, S., and A. Khar. 2006. Biological effects of curcumin and its role in cancer chemoprevention and therapy. Anticancer Agents Med Chem 6: 259-270.
- [163]. Huang, S., J. B. Robinson, A. DeGuzman, C. D. Bucana, and I. J. Fidler. 2000. Blockade of nuclear factor-KB signaling inhibits angiogenesis and tumorigenicity of human ovarian cancer cells by suppressing expression of

- vascular endothelial growth factor and interleukin 8. Cancer Res 60: 5334-5339.
- [164]. Foryst-Ludwig, A., M. Neumann, W. Schneider-Brachert, and M. Naumanna. 2004. Curcumin blocks NF-KB and the motogenic response in *Helicobacter pylori*-infected epithelial cells. BBRC 316: 1065-1072.
- [165]. Huang, M. T., T. Lysz, T. Ferraro, T. F. Abidi, J. D. Laskin, and A. H. Conney. 1991. Inhibitory effects of curcumin on in vitro lipoxygenase and cyclooxygenase activities in mouse epidermis. Cancer Res. 51: 813-819.
- [166]. Ireson, C., S. Orr, D. J. Jones, R. Verschoyle, C. K. Lim, J. L. Luo, et al. 2001. Characterization of metabolites of the chemopreventive agent curcumin in human and rat hepatocytes and in the rat *in vivo*, and evaluation of their ability to inhibit phorbol ester-induced prostaglandin E2 production. Cancer Res 61: 1058-1064.
- [167]. Fiorucci, S., R. Meli, M. Bucci, and G. Cirino. 2001. Dual inhibitors of cyclooxygenase and 5-lipoxygenase. A new avenue in antiinflammatory therapy? Biochem Pharmacol 62: 1433-1438.
- [168]. Kumar, A., S. Dhawan, N. J. Hardegen, and B. B. Aggarwal. 1998. Curcumin (Diferuloylmethane) inhibition of tumor necrosis factor (TNF)-mediated adhesion of monocytes to endothelial cells by suppression of cell surface expression of adhesion molecules and of nuclear factor-kB activation. Biochem Pharmacol 55: 775-783.
- [169]. Li, C. J., L. J. Zhang, B. J. Dezube, C. S. Crumpacker, and A. B. Pardee. 1993. Three inhibitors of type 1 human immunodeficiency virus long terminal repeat-directed gene expression and virus replication. Proc Natl Acad Sci 90: 1839-1842.
- [170]. Chan, M. M. 1995. Inhibition of tumor necrosis factor by curcumin, a phytochemical. Biochem Pharmacol 49: 1551-1556.
- [171]. Wang, X., and R. Andersson. 1995. The role of endothelial cells in systemic inflammatory response syndrome and multiple system organ failure. Eur J Surg 161: 703-713.
- [172]. Gukovsky, I., C. N. Reyes, E. C. Vaquero, A. S. Gukovskaya, and S. J. Pandol. 2003. Curcumin ameliorates ethanol and nonethanol experimental pancreatitis. Am J Physiol Gastrointest Liver Physiol 284: G85-G95.

- [173]. Pannangpetch, P., J. Watanathorn, O. Phasuriwong, W. Tassaneeyakul, and B. Kongyingyoes. 2000. Antigastric ulcer effect of tumeric in rats. Srinagarind Med J 15: 250-254.
- [174]. Chuang, S., A. Cheng, J. Lin, and M. Kuo. 2000. Inhibition by curcumin of diethylnitrosamine-induced hepatic hyperplasia, inflammation, cellular gene products and cell-cycle-related proteins in rats. Food Chem Toxicol 38: 991-995.
- [175]. Park, E. J., C. H. Jeon, G. Ko, J. Kim, and D. H. Sohn. 2000. Protective effect of curcumin in rat liver injury induced by carbon tetrachloride. J Pharm Pharmacol 52: 437-440.
- [176]. Lehr, H. A., M. Leunig, M. D. Menger, D. Nolte, and K. Messmer. 1993. Technical advances: Dorsal skinfold chamber technique for intravital microscopy in nude mice Am J Pathol 120: 34-35 / 154-155.
- [177]. Majno, G., and G. E. Palade. 1961. Studies on inflammation: I. The effect of histamine and serotonin on vascular permeability: An electron microscopic study. J Biophys Biochem Cytol 11: 571.
- [178]. Majno, G., G. E. Palade, and G. I. Schoeffl. 1961. Studies on inflammation: II. The site of action of histamine and serotonin along the vascular tree: A topographic study. J Biophys Biochem Cytol 11: 607.
- [179]. Lehr, H. A., A. Guhlmann, D. Nolte, D. Keppler, and K. Messmer. 1991. Leukotrienes as meditors in ischemia-reperfusion injury in a microcirculation model in the hamster. J Clin Invest 87: 2036-2041.
- [180]. Somboonwong, J., S. Thanamitramanee, A. Jariyapongskul, and S. Patumraj. 2000. Therapeutic effects of *aloe vera* on cutaneous microcirculation and wound healing in second degree burn model in rat. J Med Assoc Thai 83: 417-425.
- [181]. Nakamura, R. M. 2001. Laboratory tests for the evaluation of *Helicobacter pylori* infection. J Clin Lab Anal 15: 301-307.
- [182]. Dixon, M. F., R. M. Genta, J. H. Yardley, C. S. Kim, D. H. Kim, and E. C. King. 1996. Classification and grading of gastritis. The updated Sydney System. International workshop on the histopathology of gastritis, Houston 1994. Am J Surg Pathol 20: 1161-1181.

- [183]. Peek, R. M. J., G. G. Miller, K. T. Tham, G. I. Perez-Perez, X. Zhao, and J. C. Atherton. 1995. Heightened inflammatory response and cytokine expression *in vivo* to *cagA+* *Helicobacter pylori* strains. *Lab Invest* 73: 760-770.
- [184]. Kuipers, E. J., G. I. Perez-Perez, S. G. Meuwissen, and M. J. Blaser. 1995. *Helicobacter pylori* and atrophic gastritis: importance of *cagA* status. *J Natl Cancer Inst* 87: 1777-1780.
- [185]. Parsonnet, J., G. D. Friedman, N. Orentreich, and H. Vogelmann. 1997. Risk for gastric cancer in people with CagA positive or CagA negative *Helicobacter pylori* infection. *Gut* 40: 297-301.
- [186]. Rudi, J., C. Kolb, M. Maiwald, I. Zuna, A. Von Herbay, R. Gallep, et al. 1997. Serum antibodies against *Helicobacter pylori* proteins VacA and CagA are associated with increased risk for gastric adenocarcinoma. *Dig Dis Sci* 42: 1652-1659.
- [187]. Shimoyama, T., S. Fukuda, M. Tanaka, T. Mikami, A. Munakata, and J. E. Crabtree. 1998. CagA seropositivity associated with development of gastric cancer in a Japanese population. *J Clin Pathol* 51: 225-228.
- [188]. Crabtree, J. E., J. D. Taylor, J. I. Wyatt, R. V. Heatley, T. M. Shallcross, D. S. Tompkins, et al. 1991. Mucosal IgA recognition of *Helicobacter pylori* 120 kDa protein, peptic ulceration, and gastric pathology. *Lancet* 338: 332-335.
- [189]. Zeng, Z., P. Hu, and M. Chen. 1998. Development of mouse and rat model of *Helicobacter pylori* infection. *Zhonghua Y: Xue Za Zhi* 78: 494-497.
- [190]. Fu, S., K. S. Ramanujam, A. Wong, G. T. Fantry, C. B. Drachenberg, S. P. James, et al. 1999. Increased expression and cellular localization of inducible nitric oxide synthase and cyclooxygenase 2 in *Helicobacter pylori* gastritis. *Gastroenterology* 116: 1319-1329.
- [191]. Pique, J. M., B. J. Whittle, and J. V. Esplugues. 1989. The vasodilator role of endogenous nitric oxide in the rat gastric microcirculation. *Eur J Pharmacol* 174: 293-296.
- [192]. Atuma, C., L. Engstrand, and L. Holm. 1995. *Helicobacter pylori* reduces gastric mucus secretion and mucosal blood flow in rats. *Gastroenterology* 109: 1526-1534.
- [193]. Huang, H. C., T. R. Jan, and S. F. Yeh. 1992. Inhibitory effect of curcumin, an anti-inflammatory agent, on vascular smooth muscle cell proliferation. *Eur J Pharmacol* 221: 381-384.

- [194]. Yancopoulos, G. D., S. Davis, N. W. Gale, J. S. Rudge, S. J. Wiegand, and J. Holash. 2000. Vascular-specific growth factors and blood vessel formation. *Nature* 407: 242-248.
- [195]. Schleimer, T. R. P., and B. K. Rutledge. 1986. Cultured human vascularendothelial cells acquire adhesiveness for neutrophils after stimulation with interleukin 1, endotoxin, and tumor-promoting phorbol diesters. *J Immunol* 136: 649-654.
- [196]. Majni, G., and G. E. Palade. 1961. Studies of inflammation. I. The effect of histamine and serotonin on vascular permeability: an electron microscopy study. *J Biophys Biochem Cytol* 11: 571-605.
- [197]. Carmeliet, P., and R. K. Jain. 2000. Angiogenesis in cancer and other disease. *Nature* 407: 249-257.
- [198]. Cox, J. M., C. L. Clayton, T. Tomita, D. M. Wallace, P. A. Robinson, and J. E. Crabtree. 2001. cDNA array analysis of cag pathogenicity island-associated Helicobacter pylori epithelial cell response genes. *Infect Immun* 69: 6970-6980.
- [199]. Finkenzeller, G., A. Sparacio, A. Technau, D. Marme, and G. Siemeister. 1997. Sp1 recognition sites in the proximal promoter of the human vascular endothelial growth factor gene are essential for platelet-derived growth factor-induced gene expression. *Oncogene* 15: 669-676.
- [200]. Gille, J., R. A. Swerlick, and S. W. Caughman. 1997. transforming growth factor-alpha-induced transcriptional activation of the vascular permeability factor (VPF/VEGF) gene requires AP-2-dependent DNA binding and transactivation. *EMBO J* 16: 750-759.
- [201]. Nakayama, H., T. Ikebe, M. Beppu, and K. Shirasuma. 2001. High expression levels of nuclear factor KB, IKB kinase α and Akt kinase in squamous cell carcinoma of the oral cavity. *Cancer* 92: 3037-3044.
- [202]. Verma, I. M., J. K. Stevenson, E. M. Schwarz, D. Van Antwerp, and S. Miyamoto. 1995. Rel/NF-KB/I KB family: intimate tales of association and dissociation. *Genes Dev* 9: 2723-2735.
- [203]. Miyamoto, S., P. J. Chiao, and I. M. Verma. 1994. Enhanced IKB α degradation is responsible for constitutive NF-KB activity in mature murine B-cell lines. *Mol Cell Biol* 14: 3276-3282.

- [204]. Ross, J. S., B. V. S. Kallakury, C. E. Sheehan, H. A. G. Fisher, R. P. Kaufman, Jr., and P. Kaur. 2004. Expression of nuclear factor-KB and IKB proteins in prostatic adenocarcinomas: correlation of nuclear factor-KB immunoreactivity with disease recurrent. *Clin Cancer Res* 10: 2466-2472.
- [205]. Shah, B. H., Z. Nawaz, S. A. Pertani, A. Roomi, H. Mahmood, S. A. Saeed, et al. 1999. Inhibitory effect of curcumin, a food spice from tumeric, on platelet- activating factor- and arachidonic acid-mediated platelet aggregation though inhibition of thromboxane formation and Ca²⁺ signaling. *Biochem Pharmacol* 58: 1167-1172.
- [206]. Pulla, R. A., and B. R. Lokesh. 1992. Studies on spice principles as antioxidants in the inhibition of lipid peroxidation of rat liver microsomes. *Mol Cell Biochem* 111: 117-124.
- [207]. Tuccillo, C., A. Cuomo, A. Rocco, E. Martinelli, S. Staibano, M. Mascolo, et al. 2005. Vascular endothelial growth factor and neo-angiogenesis in *H. pylori* gastritis in humans. *J Pathol* 207: 277-284.
- [208]. Jones, M. K., M. Tomikawa, B. Mohajer, and A. S. Tarnawski. 1999. Gastrointestinal mucosal regeneration: role of growth factors. *Front Biosci* 4: D303-D309.
- [209]. Maeda, K., S. M. Kang, N. Onoda, M. Ogawa, Y. Kato, T. Sawada, et al. 1999. Vascular endothelial growth factor expression in preoperative biopsy specimens correlates with disease recurrence in patients with early gastric carcinoma. *Cancer* 86: 566-571.
- [210]. Takahashi, Y., K. R. Cleary, M. Mai, Y. Kitadai, C. D. Bucana, and L. M. Ellis. 1996. Significance of vessel count and vascular endothelial growth factor and its receptor (KRD) in intestinal-type gastric cancer. *Clin Cancer Res* 2: 1679-1684.
- [211]. Kanai, T., H. Konno, T. Tanaka, M. Baba, K. Matsumoto, S. Nakamura, et al. 1998. Anti-tumor and anti-metastatic effects of human-vascular-endothelial-growth-factor neutralizing antibody on human colon and gastric carcinoma xenotransplanted orthotopically into nude mice. *Int J Cancer* 77: 933-936.
- [212]. Chen, Y. R., and T. H. Tan. 1998. Inhibition of the c-Jun N-terminal kinase (JNK) signaling pathway by curcumin. *Oncogene* 17: 173-178.
- [213]. Jobin, C., C. A. Bradham, M. P. Russo, B. Juma, A. S. Narula, D. A. Brenner, et al. 1999. Curcumin blocks cytokine-mediated NF-KB activation and

proinflammatory gene expression by inhibiting inhibitory factor I- κ B kinase activity. J Immunol 163: 3474-3483.

- [214]. Wang, Q., and R. Wieder. 2004. All-trans retinoic acid potentiates Taxotere-induced cell death mediated by Jun N-terminal kinase in breast cancer cells. Oncogene 23: 426-433.
- [215]. Ranjan, D., C. Chen, T. D. Johnston, H. Jeon, and M. Nagabhushan. 2004. Curcumin inhibits mitogen stimulated lymphocyte proliferation, NF- κ B activation, and IL-2 signaling. J Surg Res 121: 171-177.

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