

## 7. Literaturverzeichnis

- Adam, D, Wiegmann, K, Adam-Klages, S, Ruff, A and Krönke, M (1996)**  
A novel cytoplasmic domain of the p55 tumor necrosis factor receptor initiates the neutral sphingomyelinase pathway. *J. Biol. Chem.* 271: 14617-14622.
- Adam-Klages, S, Adam, D, Wiegmann, K, Struve, S, Kolanus, W, Schneider-Mergener, J and Krönke, M (1996)**  
FAN, a novel WD-repeat protein, couples the p55 TNF-receptor to neutral sphingomyelinase. *Cell* 86: 937-947.
- Adams, JM and Cory, S (1998)**  
The Bcl-2 protein family: Arbiters of cell survival. *Science* 281: 1322-1326.
- Alnemri, ES (1997)**  
Mammalian cell death proteases: A family of highly conserved aspartate specific cysteine proteases. *J. Cell. Biochem.* 64: 33-42.
- Alnemri, ES, Livingston, DJ, Nicholson, DW, Salvesen, G, Thornberry, NA, Wong, WW and Yuan, J (1996)**  
Human ICE/CED-3 protease nomenclature. *Cell* 87: 171.
- Ashkenazi, A and Dixit, VM (1998)**  
Death receptors: Signaling and modulation. *Science* 281: 1305-1308.
- Ballou, LR, Laulederkind, SJF, Rosloniec, EF and Raghow, R (1996)**  
Ceramide signalling and the immune response. *Biochim. Biophys. Acta* 1301: 273-287.
- Bektas, M, Dullin, Y, Kolter, T, Sandhoff, K, Brossmer, R, Ihrig, P, Orfanos, CE and Geilen, CC (1998)**  
Induction of apoptosis by synthetic ceramide analogues in the human keratinocyte cell line HaCaT. *Exp. Dermatol.* 7: 342-349.
- Bernardo, K, Hurwitz, R, Zenk, T, Desnick, RJ, Ferlinz, K, Schuchman, EH and Sandhoff, K (1995)**  
Purification, characterization, and biosynthesis of human acid ceramidase. *J. Biol. Chem.* 270: 11098-11102.
- Berridge, MJ (1993)**  
Inositol trisphosphate and calcium signalling. *Nature* 361: 315-325.
- Bianchi, L, Farrace, MG, Nini, G and Piacentini, M (1994)**  
Abnormal Bcl-2 and "tissue" transglutaminase expression in psoriatic skin. *J. Invest. Dermatol.* 103: 829-833.
- Bielawska, A, Crane, HM, Liotta, D, Obeid, LM and Hannun, YA (1993)**  
Selectivity of ceramide-mediated biology. *J. Biol. Chem.* 268: 26226-26232.
- Bielawska, A, Greenberg, MS, Perry, D, Jayadevi, S, Shayman, JA, McKay, C and Hannun, YA (1996)**  
(1S,2R)-D-erythro-2-(N-Myristoylamino)-1-phenyl-1-propanol as an inhibitor of ceramidase. *J. Biol. Chem.* 271: 12646-12654.
- Bikle, DD (1997)**  
Vitamin D: A calcitropic hormone regulating calcium-induced keratinocyte differentiation. *J. Am. Acad Dermatol.* 37: S42-S52.

**Bikle, DD, Nemanic, MK, Gee, E and Elias, P (1986a)**

1,25-Dihydroxyvitamin D<sub>3</sub> production by human keratinocytes. J. Clin. Invest. 78: 557-566.

**Bikle, DD, Nemanic, MK, Whitney, JO and Elias, P (1986b)**

Neonatal human foreskin keratinocytes produce 1,25-dihydroxyvitamin D<sub>3</sub>. Biochemistry 25: 1545-1548.

**Bikle, DD and Pillai, S (1993)**

Vitamin D, calcium, and epidermal differentiation. Endoc. Rev. 14: 3-19.

**Bikle, DD, Pillai, S, Gee, E and Hincenbergs, M (1991)**

Tumor necrosis factor-a regulation of 1,25-dihydroxyvitamin D production by human keratinocytes. Endocrin. 129: 33-38.

**Binder, C und Wörmann, B (1996)**

Apoptose - Regulator der Gewebehomöostase. Onkologe 2: 82-86.

**Binderup, L and Bramm, E (1988)**

Effects of a novel vitamin D analogue MC 903 on cell proliferation and differentiation in vitro and on calcium metabolism in vivo. Biochem. Pharmacol. 37: 889-895.

**Bligh, EG and Dyer, WJ (1959)**

A rapid method of total lipid extraction and purification. Can. J. Biochem. Physiol. 37: 911-917.

**Bose, R and Verheij, M (1995)**

Ceramide synthase mediates Daunorubicin-induced apoptosis: An alternative mechanism for generating death signals. Cell 82: 405-414.

**Boukamp, P, Petrussevska, RT, Breitkreutz, D, Hornung, J, Markham, A and Fusenig, NE (1988)**

Normal keratinization in a spontaneously immortalized aneuploid human keratinocyte cell line. J. Cell Biol. 106: 761-771.

**Boyce, ST and Ham, RG (1983)**

Calcium-regulated differentiation of normal human epidermal keratinocytes in chemically defined clonal culture and serum-free serial culture. J. Invest. Dermatol. 81: 33-40.

**Brown, TA and DeLuca, HF (1990)**

Phosphorylation of the 1,25-Dihydroxyvitamin D<sub>3</sub> Receptor. J. Biol. Chem. 265: 10025-10029.

**Cao, X, Ross, FP, Zhang, L, MacDonald, PN, Chappel, J and Teitelbaum, SL (1993)**

Cloning of the promoter for the avian integrin  $\beta_3$  subunit gene and its regulation by 1,25-dihydroxyvitamin D<sub>3</sub>. J. Biol. Chem. 268: 27371-27380.

**Carlberg, C (1995)**

Mechanism of nuclear signalling by vitamin D<sub>3</sub>. Eur. J. Biochem. 231: 517-527.

**Carlberg, C (1996)**

The antiproliferative effect of vitamin D<sub>3</sub> analogues. Dermatology 192: 195-197.

**Carlberg, C and Polly, P (1998)**

Gene regulation by vitamin D<sub>3</sub>. Crit. Rev. Eukar. Gene 8: 19-42.

**Carson, DA and Ribeiro, JM (1993)**

Apoptosis and disease. Lancet 341: 1251-1254.

**Chen, TC, Persons, K, Liu, W-W, Chen, ML and Holick, MF (1995)**

The antiproliferative and differentiative activities of 1,25-dihydroxyvitamin D<sub>3</sub> are potentiated by epidermal growth factor and attenuated by insulin in cultured human keratinocytes. *J. Invest. Dermatol.* 104: 113-117.

**Chmura, SJ, Nodzenski, E, Weichselbaum, RR and Quintans, J (1996)**

Protein kinase C inhibition induces apoptosis and ceramide production through activation of a neutral sphingomyelinase. *Can. Res.* 56: 2711-2714.

**Cifone, MG, De Maria, R, Roncaioli, P, Rippo, MR, Azuma, M, Lanier, LL, Santoni, A and Testi, R (1993)**

Apoptotic signaling through CD95 (Fas/Apo-1) activates an acidic sphingomyelinase. *J. Exp. Med.* 177: 1547-1552.

**Cleary, ML, Smith, SD and Sklar, J (1986)**

Cloning and structural analysis of cDNAs for bcl-2 and a hybrid bcl-2/immunoglobulin transcript resulting from the t(14;18) translocation. *Cell* 47: 19-.

**Cockcroft, S (1996)**

ARF-regulated phospholipase D: A potential role in membrane traffic. *Chem. Phys. Lipids* 80: 59-80.

**Cohen, G (1997)**

Caspases: The executioners of apoptosis. *Biochem. J.* 326: 1-16.

**Culvenor, JG, Harris, AW, Mandel, TE, Whitelaw, A and Ferber, E (1981)**

Alkaline phosphatase in hematopoietic tumor cell line of the mouse. *J. Immunol.* 126: 1974-1977.

**Cuvillier, O, Pirianov, G, Kleuser, B, Vanek, PG, Coso, OA, Gutkind, S and Spiegel, S (1996)**

Suppression of ceramide-mediated programmed cell death by sphingosine-1-phosphate. *Nature* 381: 800-803.

**Danielsson, C, Mathiasen, IS, James, SY, Nayeri, S, Bretting, C, Hansen, CM, Colston, KW and Carlberg, C (1997)**

Sensitive induction of apoptosis in breast cancer cells by a novel 1,25-dihydroxyvitamin D<sub>3</sub> analogue shows relation to promoter selectivity. *J. Cell. Biochem.* 66: 552-562.

**Darwish, HM and DeLuca, HF (1992)**

Identification of a 1,25-dihydroxyvitamin D<sub>3</sub>-response element in the 5'-flanking region of the rat calbindin D-9k gene. *Proc. Natl. Acad. Sci. USA* 89: 603-607.

**Davis, RJ (1993)**

The mitogen-activated protein kinase signal transduction pathway. *J. Biol. Chem.* 268: 14553-14556.

**Demay, MB, Gerardi, JM, DeLuca, HF and Kronenberg, HM (1990)**

DNA sequences in the rat osteocalcin gene that bind the 1,25-dihydroxyvitamin D<sub>3</sub> receptor confer responsiveness to 1,25-dihydroxyvitamin D<sub>3</sub>. *Proc. Natl. Acad. Sci. USA* 87: 369-373.

**Demay, MB, Kieran, MS, DeLuca, HF and Kronenberg, HM (1992)**

Sequences in the human parathyroid hormone gene that bind the 1,25-dihydroxyvitamin D<sub>3</sub>. *Proc. Natl. Acad. Sci. USA* 89: 8097-8101.

**Diringer, H, Marggraf, WD, Koch, MA and Anderer, FA (1972)**

Evidence for a new biosynthetic pathway of sphingomyelin in SV 40 transformed mouse cells. *Biochem. Biophys. Res. Com.* 47: 1345-1352.

**Dlugosz, AA and Yuspa, SH (1994)**

Protein kinase C regulates keratinocyte transglutaminase (TGk) gene expression in cultured primary mouse epidermal keratinocytes induced to terminally differentiate by calcium. *J. Invest. Dermatol.* 102: 409-414.

**Dobrowsky, RT and Hannun, YA (1992)**

Ceramide stimulates a cytosolic protein phosphatase. *J. Biol. Chem.* 267: 5048-5051.

**Dobrowsky, RT, Kamibayashi, C, Mumby, MC and Hannun, YA (1993)**

Ceramide activates heterotrimeric protein phosphatase 2A. *J. Biol. Chem.* 268: 15523-15530.

**Eckert, LR and Welter, JF (1996)**

Transcription factor regulation of epidermal keratinocyte gene expression. *Mol. Biol. Reports* 23: 59-70.

**Enari, M, Sakahira, H, Yokoyama, H, Okawa, K, Iwamatsu, A and Nagata, S (1998)**

A caspase-activated DNase that degrades DNA during apoptosis, and its inhibitor ICAD. *Nature* 391: 43-50.

**Falzon, M (1996)**

DNA sequences in the rat parathyroid hormone-related peptide gene responsible for 1,25-dihydroxyvitamin D<sub>3</sub>-mediated transcriptional repression. *Mol. Endocr.* 10: 672-681.

**Fesus, L (1993)**

Biochemical events in naturally occurring forms of cell death. *FEBS Lett.* 328: 1-5.

**Fife, RS, Sledge, GWJ and Proctor, C (1997)**

Effects of vitamin D<sub>3</sub> on proliferation of cancer cells in vitro. *Cancer Letters* 120: 65-69.

**Fioravanti, L, Miodini, P, Cappelletti, V and DiFronzo, G (1998)**

Synthetic analogs of vitamin D<sub>3</sub> have inhibitory effects on breast cancer cell lines. *Anticancer Res.* 18: 1703-1708.

**Folch, J, Lees, M and Sloane, GHS (1957)**

A simple method for the isolation and purification of total lipides from animal tissues. *J. Biol. Chem.* 272: 497-509.

**Fraser, A and Evan, G (1996)**

A license to kill. *Cell* 85: 781-784.

**Futerman, AH, Stieger, B, Hubbard, AL and Pagano, RE (1990)**

Sphingomyelin synthesis in rat liver occurs predominantly at the cis and medial cisternae of the golgi apparatus. *J. Biol. Chem.* 265: 8650-8657.

**Gajewski, TF and Thompson, CB (1996)**

Apoptosis meets signal transduction: Elimination of a BAD influence. *Cell* 87: 589-592.

**Geilen, CC, Bektas, M, Wieder, T, Kodelja, V, Goerdt, S and Orfanos, CE (1997)**

1 $\alpha$ ,25-Dihydroxyvitamin D<sub>3</sub> induces sphingomyelin hydrolysis in HaCaT cells via tumor necrosis factor  $\alpha$ . *J. Biol. Chem.* 272: 8997-9001.

**Geilen, CC, Bektas, M, Wieder, T and Orfanos, CE (1996)**

The vitamin D<sub>3</sub> analogue, calcipotriol, induces sphingomyelin hydrolysis in human keratinocytes. *FEBS Lett.* 378: 88-92.

**Gerschenson, LE and Rotello, RJ (1992)**

Apoptosis: a different type of cell death. *FASEB J.* 6: 2450-2455.

**Gill, RK and Christakos, S (1993)**

Identification of sequence elements in mouse calbindin-D28k gene that confer 1,25-dihydroxyvitamin D<sub>3</sub>-and butyrate-inducible responses.

**Gillies, RJ, Didier, N and Denton, M (1986)**

Determination of cell number in monolayer cultures. Anal. Biochem. 159: 109-113.

**Gniadecki, R (1996)**

Activation of Raf-mitogen-activated protein kinase signaling pathway by 1,25-dihydroxyvitamin D<sub>3</sub> in normal human keratinocytes. J. Invest. Dermatol. 106: 1212-1217. Proc. Natl. Acad. Sci. USA. 90:2984-2988.

**Gomez-Munoz, A, Frago, LM, Alvarez, L and Varela-Nieto, I (1997)**

Stimulation of DNA synthesis by natural ceramide 1-phosphate. Biochem. J. 325: 435-440.

**Green, DR and Ware, CF (1997)**

Fas-ligand: Privilege and peril. Proc. Natl. Acad. Sci. USA 94: 5986-5990.

**Haake, AR and Polakowska, RR (1993)**

Cell death by apoptosis in epidermal biology. J. Invest. Dermatol. 101: 107-112.

**Hale, AJ, Smith, CA, Sutherland, LC, Stoneman, VEA, Longthorne, VL, Culhane, AC and Williams, GT (1996)**

Apoptosis: molecular regulation of cell death. Eur. J. Biochem. 236: 1-26.

**Hannun, YA (1994)**

The sphingomyelin cycle and the second messenger function of ceramide. J. Biol. Chem. 269: 3125-3128.

**Hannun, YA (1997)**

In: Sphingolipid second messengers: Tumor suppressor lipids, Plenum Press, New York.

**Hannun, YA, Loomis, CR, Merrill, AH and Bell, RM (1986)**

Sphingosine inhibition of protein kinase C activity and of phorbol dibutyrate binding in vitro and in human platelets. J. Biol. Chem. 261: 12604-12609.

**Hannun, YA and Obeid, LM (1995)**

Ceramide: An intracellular signal for apoptosis. TIBS 20: 73-77.

**Hengartner, M (1998)**

Death by crowd control. Science 281: 12981299.

**Henseleit, U, Rosenbach, T and Kolde, G (1996)**

Induction of apoptosis in human HaCaT keratinocytes. Arch. Dermatol. Res. 288: 676-683.

**Holick, MF, Smith, E and Pincus, S (1987)**

Skin as the site of vitamin D synthesis and target tissue for 1,25-dihydroxyvitamin D<sub>3</sub>. Arch. Dermatol. 123: 1677-1683.

**Holleran, WM, Feingold, KR, Mao-Qiang, M, Gao, WN, Lee, JM and Elias, PM (1991a)**

Regulation of epidermal sphingolipid synthesis by permeability barrier function. J. Lipid Res. 32: 1151-1158.

**Holleran, WM, Mao-Qiang, M, Gao, WN, Menon, GK, Elias, PM and Feingold, KR (1991b)**

Sphingolipids are required for mammalian epidermal barrier function. J. Clin. Invest. 88: 1338-1345.

**Hsu, S-C, Wu, CC, Luh, T-Y, Chou, C-K, Han, S-H and Lai, M-Z (1998)**  
Apoptotic signal of Fas is not mediated by ceramide. Blood 91: 2658-2663.

**Iwasaki-Bessho, Y, Banno, Y, Yoshimura, S, Ito, Y, Kitajima, Y and Nozawa, Y (1998)**

Decreased phospholipase D (PLD) activity in ceramide-induced apoptosis of human keratinocyte cell line HaCaT. J. Invest. Dermatol. 110: 376-382.

**Jacobson, MD, Weil, M and Raff, MC (1997)**

Programmed cell death in animal development. Cell 88: 347-354.

**Jayadev, S, Linardic, CM and Hannun, YA (1994)**

Identification of arachidonic acid as a mediator of sphingomyelin hydrolysis in response to tumor necrosis factor. J. Biol. Chem. 269: 5757-5763.

**Jones, MJ and Murray, AW (1995)**

Evidence that ceramide selectively inhibits protein kinase C-translocation and modulates bradykinin activation of phospholipase D. J. Biol. Chem. 270: 5007-5013.

**Joseph, CK, Byun, H-S, Bittman, R and Kolesnick, RN (1993)**

Substrate recognition by ceramide-activated protein kinase. J. Biol. Chem. 268: 20002-20006.

**Jung, EM, Griner, RD, Mann-Blakeney, RS and Bollag, WB (1998)**

A potential role for ceramide in the regulation of mouse epidermal keratinocyte proliferation and differentiation. J. Invest. Dermatol. 110: 318-323.

**Kahlen, J-P and Carlberg, C (1994)**

Identification of a vitamin D receptor homodimer-type response element in the rat calcitriol 24-hydroxylase gene promoter. Biochem. Biophys. Res. Com. 202: 1366-1372.

**Kerner, SA, Scott, RA and Pike, JW (1989)**

Sequence elements in the human osteocalcin gene confer basal activation and inducible response to hormonal vitamin D<sub>3</sub>. Proc. Natl. Acad. Sci. USA 86: 4455-4459.

**Kerr, JFR, Wyllie, AH and Currie, AH (1972)**

Apoptosis: a basic biological phenomenon with wide-ranging implication in tissue kinetics. Br. J. Can. 26: 239-257.

**Kleuser, B, Cuvillier, O and Spiegel, S (1998)**

1 $\alpha$ ,25-Dihydroxyvitamin D<sub>3</sub> inhibits programmed cell death in HL-60 cells by activation of sphingosine kinase. Can. Res. 58: 1817-1824.

**Kluck, RM, Bossy-Wetzel, E, Green, DR and Newmeyer, DD (1997)**

The release of cytochrome c from mitochondria: A primary site for Bcl-2 regulation of apoptosis. Science 275: 1132-1136.

**Kobayashi, T, Hashimoto, K and Yoshikawa, K (1995)**

Growth inhibition of human keratinocytes by MC903 (calcipotriol) is linked to dephosphorylation of retinoblastoma gene product. J. Eur. Acad. Dermatol. Venerol. 5: 132-138.

**Kok, JW, Nikolova-Karakashian, M, Klappe, K, Alexander, C and Merrill Jr., AH (1997)**

Dihydroceramide biology. J. Biol. Chem. 272: 21128-21136.

**Kolesnick, R and Golde, DW (1994)**

The sphingomyelin pathway in tumor necrosis factor and interleukin-1 signaling. Cell 77: 325-328.

**Kothakota, S, Azuma, T, Reinhard, C, Klippe, A, Tang, J, Chu, K, McGarry, TJ, Kirschner, MW, Koths, K, Kwiatkowski, DJ and Williams, LT (1997)**  
Caspase-3-generated fragment of gelsolin: Effector of morphological change in apoptosis. Science 278: 294-298.

**Krauss, G (1997)**

In: Biochemie der Regulation und Signaltransduktion, VCH Verlagsgesellschaft mbH, Weinheim.

**Kristensen, M, Chu, CQ, Eedy, DJ, Feldmann, M, Brennan, FM and Breathnach, SM (1993)**

Localization of tumour necrosis factor-alpha (TNF-alpha) and its receptors in normal and psoriatic skin: Epidermal cells express the 55-kD but not the 75-kDa TNF receptor. Clin. Exp. Immunol. 94: 354-362.

**Kroemer, G (1997)**

The proto-oncogene Bcl-2 and its role in regulating apoptosis. Nat. Med. 3: 614-620.

**Kroemer, G, Zamzami, N and Susin, SA (1997)**

Mitochondrial control of apoptosis. Immunol. Today 18: 44-51.

**Laemmli, UK (1970)**

Cleavage of structural proteins during the assembly of the head of bacteriophage T4. Nature 227: 680-685.

**Lansmann, S, Ferlinz, K, Hurwitz, R, Bartelsen, O, Glombitza, G and Sandhoff, K (1996)**

Purification of acid sphingomyelinase from human placenta: Characterization and N-terminal sequence. FEBS Lett. 399: 227-231.

**Lehmann, B (1997)**

HaCaT cell line as a model system for vitamin D<sub>3</sub> metabolism in human skin. J. Invest. Dermatol. 108: 78-82.

**Liu, B, Obeid, LM and Hannun, YA (1997a)**

Sphingomyelinases in cell regulation. Cell Devel. Biol. 8: 311-322.

**Liu, J, Mathias, S, Yang, Z and Kolesnick, RN (1994)**

Renaturation and tumor necrosis factor- $\alpha$  stimulation of a 97-kDa ceramide-activated protein kinase. J. Biol. Chem. 269: 3047-3052.

**Liu, X, Zou, H, Slaughter, C and Wang, X (1997b)**

DFF, a heterodimeric protein that functions downstream of caspase-3 to trigger DNA fragmentation during apoptosis. Cell 89: 175-184.

**MacLaughlin, JA, Cantley, LC and Holick, MF (1990)**

1,25(OH)<sub>2</sub>D<sub>3</sub> increases calcium and phosphatidylinositol metabolism in differentiating cultured human keratinocytes. J. Nutr. Biochem. 1: 81-87.

**Mandon, EC, Ehses, I, Rother, J, van Echten, G and Sandhoff, K (1992)**

Subcellular localization and membrane topology of serine palmitoyltransferase, 3-dehydroosphinganine reductase, and sphinganine N-acyltransferase in mouse liver. J. Biol. Chem. 267: 11144-11148.

**Mangelsdorf, DJ and Evans, RM (1995)**

The RXR heterodimers and orphan receptors. Cell 83: 841-850.

**Mangelsdorf, DJ, Thummel, C, Beato, M, Herrlich, P, Schütz, G, Umesono, K, Blumberg, B, Kastner, P, Mark, M, Chambon, P and Evans, RM (1995)**  
The nuclear receptor superfamily: The second decade. *Cell* 83: 835-839.

**Massagué, J (1990)**

Transforming growth factor- $\alpha$ . *J. Biol. Chem.* 265: 21393-21396.

**Matsumoto, K, Hashimoto, K, Nishida, Y, Hashiro, M and Yoshikawa, K (1990)**

Growth-inhibitory effects of 1,25-dihydroxyvitamin D<sub>3</sub> on normal human keratinocytes cultured in serum-free Medium. *Biochem. Biophys. Res. Com.* 166: 916-923.

**McCall, CA and Cohen, JJ (1991)**

Programmed cell death in terminally differentiating keratinocytes: Role of endogenous endonuclease. *J. Invest. Dermatol.* 97: 111-114.

**Medema, JP, Scaffidi, C, Kischkel, FC, Shevchenko, A, Mann, M, Krammer, PH and Peter, ME (1997)**

FLICE is activated by association with the CD95 death-inducing signaling complex (DISC). *EMBO J.* 16: 2794-2804.

**Merrill, AH and Jones, DD (1990)**

An update of the enzymology and regulation of sphingomyelin metabolism. *Biochim. Biophys. Acta* 1044: 1-12.

**Merrill, AH, Liotta, DC and Riley, RT (1996)**

Fumonisins: Fungal toxins that shed light on sphingolipid function. *TIBS* 6: 218-223.

**Merrill, AH, Sereni, AM, Stevens, VL, Hannun, YA, Loomis, CR, Bell, RM and Kinkade, JM (1986)**

Inhibition of phorbol-ester-dependent differentiation of human promyelocytic leukemic (HL-60) cells by sphinganine and other longchain bases. *J. Biol. Chem.* 261: 12610-12615.

**Michel, C, van Echten-Deckert, G, Rother, J, Sandhoff, K, Wang, E and Merrill, JAH (1997)**

Characterization of ceramide synthesis-a dihydroceramide desaturase introduces the 4, 5-trans-double bond of sphingosine at the level of dihydroceramide. *J. Biol. Chem.* 272: 22432-22437.

**Miller, DK, Myerson, J and Becker, JW (1997)**

The interleukin-1 $\beta$  converting enzyme family of cysteine proteases. *J. Cell. Biochem.* 64: 2-10.

**Minn, AJ, Vélez, P, Schendel, SL, Liang, H, Muchmore, SW, Fesik, SW, Fill, M and Thompson, CB (1997)**

Bcl-x<sub>L</sub> forms an ion channel in synthetic lipid membranes. *Nature* 385: 353-357.

**Mitra, RS, Wrone-Smith, T, Simonian, P, Foreman, KE, Nunez, G and Nickoloff, RJ (1997)**

Apoptosis in keratinocytes is not dependent on induction of differentiation. *Lab. Invest.* 76: 99-107.

**Müller, G, Ayoub, M, Storz, P, Rennecke, J, Fabbro, D and Pfizenmaier, K (1995)**

PKC  $\zeta$  is a molecular switch in signal transduction of TNF- $\alpha$ , bifunctionally regulated by ceramide and arachidonic acid. *EMBO J.* 14: 1961-1969.

**Nagata, S (1997)**

Apoptosis by death factor. *Cell* 88: 355-365.

**Nicholson, DW and Thornberry, NA (1997)**  
Caspases: Killer proteases. TIBS 22: 299-306.

**Nickel, W and Wieland, FT (1997)**  
Biogenesis of COPI-coated transport vesicles. FEBS Lett. 413: 395-400.

**Nickoloff, BJ, Mitra, RS, Elder, JT, Fisher, GJ and Voorhees, JJ (1989)**  
Decreased growth inhibition by recombinant gamma interferon is associated with increased transforming growth factor-alpha production in keratinocytes cultured from psoriatic lesions. Br. J. Dermatol. 121: 161-174.

**Okazaki, T, Bell, RM and Hannun, YA (1989)**  
Sphingomyelin turnover induced by vitamin D<sub>3</sub> in HL-60 cells. Role in cell differentiation. J. Biol Chem. 264: 19076-19080.

**Okuda, K-I, Usui, E and Ohyama, Y (1995)**  
Recent progress in enzymology and molecular biology of enzymes involved in vitamin D metabolism. J. Lipid Res. 36: 1641-1652.

**Peters, DC and Balfour, JA (1997)**  
Tacalcitol. Drugs 54: 265-271.

**Petit, PX, Susin, S-A, Zamzami, N, Mignotte, B and Kroemer, G (1996)**  
Mitochondria and programmed cell death: Back to the future. FEBS Lett. 396: 7-13.

**Pillai, S, Bikle, DD, Mancianti, M-L, Cline, P and Hincenberg, M (1990)**  
Calcium regulation of growth and differentiation of normal human keratinocytes: Modulation of differentiation competence by stages of growth and extracellular calcium. J. Cell. Phys. 143: 294-302.

**Pillai, S, Cho, S, Mahajan, M, Frew, L and Rawlings, AV (1996)**  
Synergy between vitamin D precursor 25-hydroxyvitamin D and short chain ceramides on keratinocyte proliferation and differentiation. J. Invest. Dermatol. 1: 39-43.

**Polly, P, Carlberg, C, Eisman, JA and Morrison, NA (1996)**  
Identification of a vitamin D<sub>3</sub> response element in the fibronectin gene that is bound by a vitamin D<sub>3</sub> receptor homodimer. J. Cell. Biochem. 60: 322-333.

**Pyne, S, Tolan, DG, Conway, A-M and Pyne, N (1997)**  
Lipids as regulators of cell function. Biochem. Soc. Trans. 25: 549-556.

**Quack, M, Clarin, A, Binderup, E, Björkling, F, Mork, CM and Carlberg, C (1998)**  
Structural variants of the vitamin D analogue EB 1089 reduce its ligand sensitivity and promoter selectivity. J. Biol. Chem. 71: 340-350.

**Quélo, I, Kahlen, J-P, Rascle, A, Jurdic, P and Carlberg, C (1994)**  
Identification and characterization of a vitamin D<sub>3</sub> response element of chicken carbonic anhydrase-II. DNA Cell Biol. 13: 1181-1187.

**Raskin, CA (1997)**  
Apoptosis and cutaneous biology. J. Am. Acad. Dermatol. 36: 885-896.

**Reinartz, J, Bechtel, MJ and Kramer, MD (1996)**  
Tumor necrosis factor- $\alpha$ -induced apoptosis in a human keratinocyte cell line (HaCaT) is counteracted by transforming growth factor- $\alpha$ . Exp. Cell Res. 228: 334-340.

- Rhodes, SJ, Chen, R, DiMatta, GE, Scully, KM, Kalla, KA, Lin, S-C, Yu, VC and Rosenfeld, MG (1993)**  
A tissue-specific enhancer confers Pit-1dependent morphogen inducibility and autoregulation on the pit-1 gene. *Genes & Dev.* 7: 913-932.
- Rother, J, van Echten, G, Schwarzmann, G and Sandhoff, K (1992)**  
Biosynthesis of sphingolipids: Dihydroceramide and not sphinganine is desaturated by cultured cells. *Biochem. Biophys. Res. Com.* 189: 14-20.
- Saiki, RK, Scharf, S, Faloona, F, Mullis, KB, Horn, GT, Erlich, HA and Arnheim, N (1985)**  
Enzymatic amplification of beta-globin genomic sequences and restriction site analysis for diagnosis of sickle cell anemia. *Science* 230: 1350.
- Sakahira, H, Enari, M and Nagata, S (1998)**  
Cleavage of CAD inhibitor in CAD activation and DNA degradation during apoptosis. *Nature* 391: 96-99.
- Salvesen, GS and Dixit, VM (1997)**  
Caspases: Intracellular signaling by proteolysis. *Cell* 91: 443-446.
- Santana, P, Pena, LA, Haimovitz-Friedman, A, Martin, S, Green, D, McLoughlin, M, Cordon-Cardo, C, Schuchman, EH, Fuks, Z and Kolesnick, R (1996)**  
Acid sphingomyelinase-deficient human lymphoblasts and mice are defective in radiation-induced apoptosis. *Cell* 86: 189-199.
- Sawai, H, Okazaki, T, Takeda, Y, Tashima, M, Sawada, H, Okuma, M, Kishi, S, Umebara, H and Domae, N (1997)**  
Ceramide-induced translocation of protein kinase C- $\delta$  and - $\epsilon$  to the cytosol. *J. Biol. Chem.* 272: 2452-2458.
- Schendel, SL, Xie, Z, Montal, MO, Matsuyama, S, Montal, M and Reed, JC (1997)**  
Channel formation by antiapoptotic protein Bcl-2. *Proc. Natl. Acad. Sci. USA* 94: 5113-5118.
- Schräder, M, Kahlen, J-P and Carlberg, C (1997)**  
Functional characterization of a novel type of 1 $\alpha$ ,25-dihydroxyvitamin D $_3$  response element identified in the mouse c-fos promoter. *Biochem. Biophys. Res. Com.* 230: 646-651.
- Schräder, M, Nayeri, S, Kahlen, J-P, Müller, KM and Carlberg, C (1995)**  
Natural vitamin D $_3$  response elements formed by inverted palindromes: Polarity-directed ligand sensitivity of VDR-RXR heterodimer-mediated transactivation. *Mol. Cell. Biol.* 15: 1154-1161.
- Sillence, DJ and Allen, D (1997)**  
Evidence against an early signalling role for ceramide in Fas-mediated apoptosis. *Biochem. J.* 324: 29-.
- Smith, EL, Walworth, SB and Holick, MF (1986)**  
Effect of 1 $\alpha$ ,25-dihydroxyvitamin D $_3$  on the morphologic and biochemical differentiation of cultured human epidermal keratinocytes grown in serum-free conditions. *J. Invest. Dermatol.* 86: 709-714.
- Smith, PK, Krohn, RI, Hermanson, GT, Mallia, aK, Gartner, FH, Provenzano, MD, Fujimoto, EK, Goeke, NM, Olson, BJ and Klenk, DC (1985)**  
Measurement of protein using Bicinchoninic acid. *Anal. Biochem.* 150: 76-85.

**Solvsten, H, Svendsen, ML, Fogh, K and Kragballe, K (1997)**

Upregulation of vitamin D receptor levels by  $1,25(\text{OH})_2$  vitamin  $\text{D}_3$  in cultured human keratinocytes. Arch. Dermatol. Res. 289: 367-372.

**Spence, MW (1993)**

Sphingomyelinases. Adv. Lipid Res. 26: 3-22.

**Spence, MW, Byers, DM, Palmer, FB and Cook, HW (1989)**

A new  $\text{Zn}^{2+}$ -stimulated sphingomyelinase in fetal bovine serum. J. Biol. Chem. 264: 5358-5363.

**Spiegel, S (1993)**

Sphingosine and sphingosine 1-phosphate in cellular proliferation: Relationship with protein kinase C and phosphatidic acid. J. Lipid Med. 8: 169-175.

**Spiegel, S and Milstien, S (1995)**

Sphingolipid metabolites: members of a new class of lipid second messengers. J. Membr. Biol. 146: 225-237.

**Stern, R (1997)**

Psoriasis. Lancet 350: 349-353.

**Su, M-J, Bikle, DD, Mancianti, M-L and Pillai, S (1994)**

1,25-Dihydroxyvitamin  $\text{D}_3$  potentiates the keratinocyte response to calcium. J. Biol. Chem. 269: 14723-14729.

**Takematsu, H, Ozawa, H, Yoshimura, T, Hara, M, Sakakibara, A, Oyama, J and Tagama, H (1991)**

Systemic TNF administration in psoriatic patients: A promising therapeutic modality for severe psoriasis. Br. J. Dermatol. 124: 209-210.

**Thornberry, NA and Lazebnik, Y (1998)**

Caspases: Enemies within. Science 281: 1312-1316.

**Tomiuk, S, Hofmann, K, Nix, M, Zumbansen, M and Stoffel, W (1998)**

Cloned mammalian neutral sphingomyelinase: Functions in sphingolipid signaling ? Proc. Natl. Acad. Sci. USA 95: 3638-3643.

**Trefzer, U, Brockhaus, M, Loetscher, H, Parlow, F, Kapp, A, Schopf, E and Krutmann, J (1991)**

55-kd Tumor necrosis factor receptor is expressed by human keratinocytes and plays a pivotal role in regulation of human keratinocyte ICAM-1 expression. Journal of Investigative Dermatology 97: 911-916.

**van de Kerkhof, PCM (1995)**

Biological activity of vitamin D analogues in the skin, with special reference to antipsoriatic mechanism. Br. J. Dermatol. 132: 675-682.

**van de Kerkhof, PCM, Werfel, T, Haustein, UF, Luger, T, Czarnetzki, BM, Niemann, R and Plänitz-Stenzel, V (1996)**

Tacalcitol ointment in the treatment of psoriasis vulgaris: A multicentre, placebo-controlled, double-blind study on efficacy and safety. Br. J. Dermatol. 135: 758-765.

**van Echten, G and Sandhoff, K (1993)**

Ganglioside metabolism. Enzymology, topology, and regulation. J. Biol. Chem. 268: 5341-5344.

**Venable, ME, Lee, JY, Smyth, MJ, Bielawska, A and Obeid, LM (1995)**

Role of ceramide in cellular senescence. J. Biol. Chem. 270: 30701-30708.

**Villa, P, Kaufmann, SH and Earnshaw, WC (1997)**  
Caspases and caspase inhibitors. TIBS 22: 388-393.

**Wakita, H, Tokura, Y, Nishimura, K, Furukawa, F and Takigawa, M (1994)**  
Keratinocyte differentiation is induced by cell-permeant ceramides and its proliferation is promoted by sphingosine. Arch. Dermatol. Res. 286: 350-354.

**Wallach, D (1997)**  
Cell death induction by TNF:  
A matter of self control. TIBS 22: 107-109.

**Wieder, T, Geilen, CC, Kolter, T, Sadeghlar, F, Sandhoff, K, Brossmer, R, Ihrig, P, Perry, D, Orfanos, CE and Hannun, YA (1997)**  
Bcl-2 antagonizes apoptotic cell death induced by two new ceramide analogues. FEBS Lett. 411: 260-264.

**Wiegmann, K, Schütze, S, Machleidt, T, Witte, D and Krönke, M (1994)**  
Functional dichotomy of neutral and acidic sphingomyelinases in tumor necrosis factor signaling. Cell 78: 1005-1015.

**Wissing, D, Mouritzen, H, Poirier, GG and Jäättelä, M (1997)**  
Involvement of caspase-dependent activation of cytosolic phospholipase A2 in tumor necrosis factor-induced apoptosis. Proc. Natl. Acad. Sci. USA 94: 5073-5077.

**Wolff, RA, Dobrowsky, RT, Bielawska, A, Obeid, LM and Hannun, YA (1994)**  
Role of ceramide-activated protein phosphatase in ceramide-mediated signal transduction. J. Biol. Chem. 269: 19605-19609.

**Wrone-Smith, T, Mitra, RS, Thompson, CB, Jasty, R, Castle, VP and Nickeloff, BJ (1997)**  
Keratinocytes derived from psoriatic plaques are resistant to apoptosis compared with normal skin. Am. J. Pathol. 151: 1321-1329.

**Wu, S, Geilen, CC, Tebbe, B and Orfanos, CE (1996)**  
 $1\alpha,25$ -Dihydroxyvitamin D<sub>3</sub>; its role for homeostasis of keratinocytes. J. Nutr. Biochem. 7: 642-649.

**Wyllie, A (1998)**  
An endonuclease at last. Nature 391: 20-21.

**Yada, Y, Polakowska, RR, Okano, Y and Nozawa, Y (1993)**  
Protein kinase C-dependent expression of type I transglutaminase mRNA in ganglioside GQ1b- and calcium-stimulated human keratinocytes. Biochem. Biophys. Res. Com. 190: 688-694.

**Yang, E and Korsmeyer, SJ (1996)**  
Molecular Thanatopsis: A discourse on the BCL-2 family and cell death. Blood 88: 386-401.

**Yang, J, Liu, X, Bhalla, K, Kim, CN, Ibrado, AM, Cai, J, Peng, T, Jones, DP and Wang, X (1997)**  
Prevention of apoptosis by Bcl-2: Release of cytochrome c from mitochondria blocked. Science 275: 1129-1132.

**Yuan, J, Shaham, S, Ledoux, S, Ellis, HM and Horvitz, HR (1993)**  
The *C. elegans* cell death gene *ced-3* encodes a protein similar to mammalian interleukin-1- $\beta$ -converting enzyme. Cell 75: 641-652.

**Zhang, J, Alter, N, Reed, JC, Borner, C, Obeid, LM and Hannun, YA (1996)**  
Bcl-2 interrupts the ceramide-mediated pathway of cell death. Proc. Natl. Acad. Sci. USA 93: 5325-5328.

**Zhang, W, Wrana, JL and Sodek, J (1992)**  
Characterization of the promoter region of the porcine opn (osteopontin, secreted phosphoprotein 1) gene. Eur. J. Biochem. 207: 649-659.

**Zhang, Y, Yao, B, Delikat, S, Bayoumy, S, Lin, X-H, Basu, S, McGinley, M, Chan-Hui, P-Y, Lichenstein, H and Kolesnick, R (1997)**  
Kinase suppressor of Ras is ceramide-activated protein kinase. Cell 89: 63-72.

**Zierold, C, Darwish, HM and DeLuca, HF (1994)**  
Identification of a vitamin D-response element in the rat calcidiol (25-hydroxyvitamin D<sub>3</sub>) 24-hydroxylase gene. Proc. Natl. Acad. Sci. USA 91: 900-902.

**Zou, H, Henzel, WJ, Liu, X, Lutschg, A and Wang, X (1997)**  
Apaf-1, a human protein homologous to *C. elegans* CED-4, participates in cytochrome c-dependent activation of caspase-3. Cell 90: 405-413.