

6 References

- Acheson, A., and Lindsay, R. M. (1996). Non target-derived roles of the neurotrophins. *Philos Trans R Soc Lond B Biol Sci* 351, 417-422.
- Airaksinen, M. S., Koltzenburg, M., Lewin, G. R., Masu, Y., Helbig, C., Wolf, E., Brem, G., Toyka, K. V., Thoenen, H., and Meyer, M. (1996). Specific subtypes of cutaneous mechanoreceptors require neurotrophin-3 following peripheral target innervation. *Neuron* 16, 287-295.
- Akopian, A. N., Abson, N. C., and Wood, J. N. (1996). Molecular genetic approaches to nociceptor development and function. *Trends Neurosci* 19.
- Akopian, A. N., and Wood, J. N. (1995). Peripheral Nervous System-specific Genes Identified by Subtractive cDNA Cloning. *J Biol Chem* 270.
- Anishkin, A., and Kung, C. (2005). Microbial mechanosensation. *Current opinion in neurobiology*, 397-405.
- Arevalo, M. I., Escribano, E., Calpena, A., Domenech, J., and Queralt, J. (2004). Rapid skin anesthesia using a new topical amethocaine formulation: a preclinical study. *Anesth Analg* 98, 1407-1412, table of contents.
- Babinski, K., Catarsi, S., Biagini, G., and Seguela, P. (2000). Mammalian ASIC2a and ASIC3 subunits co-assemble into heteromeric proton-gated channels sensitive to Gd³⁺. *J Biol Chem* 275, 28519-28525.
- Bassilana, F., Champigny, G., Waldmann, R., de Weille, J. R., Heurteaux, C., and Lazdunski, M. (1997). The acid-sensitive ionic channel subunit ASIC and the mammalian degenerin MDEG form a heteromultimeric H⁺-gated Na⁺ channel with novel properties. *J Biol Chem* 272, 28819-28822.
- Benson, C. J., Xie, J., Wemmie, J. A., Price, M. P., Henss, J. M., Welsh, M. J., and Snyder, P. M. (2002). Heteromultimers of DEG/ENaC subunits form H⁺-gated channels in mouse sensory neurons. *Proc Natl Acad Sci U S A* 99, 2338-2343.
- Berryman, M., and Bretscher, A. (2000). Identification of a novel member of the chloride intracellular channel gene family (CLIC5) that associates with the actin cytoskeleton of placental microvilli. *Mol Biol Cell* 11, 1509-1521.
- Bhattacharya, R., and Cabral, F. (2004). A ubiquitous beta-tubulin disrupts microtubule assembly and inhibits cell proliferation. *Mol Biol Cell* 15, 3123-3131.
- Booth, I. R., Edwards, M. D., and Miller, S. (2003). Bacterial ion channels. *Biochemistry* 42, 10045-10053.
- Bornstein, P. (1995). Diversity of function is inherent in matricellular proteins: an appraisal of

- thrombospondin 1. *J Cell Biol* 130, 503-506.
- Bornstein, P., and Sage, E. H. (2002). Matricellular proteins: extracellular modulators of cell function. *Curr Opin Cell Biol* 14, 608-616.
- Botchkarev, V. A., Botchkareva, N. V., Peters, E. M., and Paus, R. (2004). Epithelial growth control by neurotrophins: leads and lessons from the hair follicle. *Prog Brain Res* 146, 493-513.
- Botchkarev, V. A., Yaar, M., Peters, E. M., Raychaudhuri, S. P., Botchkareva, N. V., Marconi, A., Raychaudhuri, S. K., Paus, R., and Pincelli, C. (2006). Neurotrophins in skin biology and pathology. *J Invest Dermatol* 126, 1719-1727.
- Bothwell, M. (1997). Neurotrophin function in skin. *J Investig Dermatol Symp Proc* 2, 27-30.
- Brekken, R. A., and Sage, E. H. (2001). SPARC, a matricellular protein: at the crossroads of cell-matrix communication. *Matrix Biol* 19, 816-827.
- Bretscher, A., Reczek, D., and Berryman, M. (1997). Ezrin: a protein requiring conformational activation to link microfilaments to the plasma membrane in the assembly of cell surface structures. *J Cell Sci* 110 (Pt 24), 3011-3018.
- Cao, W., Epstein, C., Liu, H., DeLoughery, C., Ge, N., Lin, J., Diao, R., Cao, H., Long, F., Zhang, X., *et al.* (2004). Comparing gene discovery from Affymetrix GeneChip microarrays and Clontech PCR-select cDNA subtraction: a case study. *BMC Genomics* 5, 26.
- Carroll, P., Gayet, O., Feuillet, C., Kallenbach, S., de Bovis, B., Dudley, K., and Alonso, S. (2001). Juxtaposition of CNR protocadherins and reelin expression in the developing spinal cord. *Mol Cell Neurosci* 17, 611-623.
- Carroll, P., Lewin, G. R., Koltzenburg, M., Toyka, K. V., and Thoenen, H. (1998). A role for BDNF in mechanosensation. *Nat Neurosci* 1, 42-46.
- Carvalho, R. S., Schaffer, J. L., and Gerstenfeld, L. C. (1998). Osteoblasts induce osteopontin expression in response to attachment on fibronectin: demonstration of a common role for integrin receptors in the signal transduction processes of cell attachment and mechanical stimulation. *J Cell Biochem* 70, 376-390.
- Caterina, M. J., Schumacher, M. A., Tominaga, M., Rosen, T. A., Levine, J. D., and Julius, D. (1997). The capsaicin receptor: a heat-activated ion channel in the pain pathway. *Nature* 389, 816-824.
- Chen, C. C., Zimmer, A., Sun, W. H., Hall, J., Brownstein, M. J., and Zimmer, A. (2002). A role for ASIC3 in the modulation of high-intensity pain stimuli. *Proc Natl Acad Sci U S A* 99, 8992-8997.
- Cho, H., Shin, J., Shin, C. Y., Lee, S. Y., and Oh, U. (2002). Mechanosensitive ion channels in cultured sensory neurons of neonatal rats. *J Neurosci* 22, 1238-1247.

- Davis, B. M., Lewin, G. R., Mendell, L. M., Jones, M. E., and Albers, K. M. (1993). Altered expression of nerve growth factor in the skin of transgenic mice leads to changes in response to mechanical stimuli. *Neuroscience* 56, 789-792.
- Denhardt, D. T., and Guo, X. (1993). Osteopontin: a protein with diverse functions. *Faseb J* 7, 1475-1482.
- Denhardt, D. T., Noda, M., O'Regan, A. W., Pavlin, D., and Berman, J. S. (2001). Osteopontin as a means to cope with environmental insults: regulation of inflammation, tissue remodeling, and cell survival. *J Clin Invest* 107, 1055-1061.
- Desai, B., Rogers, M. J., and Chellaiah, M. A. (2007). Mechanisms of osteopontin and CD44 as metastatic principles in prostate cancer cells. *Mol Cancer* 6, 18.
- Deval, E., Friend, V., Thirant, C., Salinas, M., Jodar, M., Lazdunski, M., and Lingueglia, E. (2006). Regulation of sensory neuron-specific acid-sensing ion channel 3 by the adaptor protein Na⁺/H⁺ exchanger regulatory factor-1. *J Biol Chem* 281, 1796-1807.
- Diatchenko, L., Lau, Y. F., Campbell, A. P., Chenchik, A., Moqadam, F., Huang, B., Lukyanov, S., Lukyanov, K., Gurskaya, N., Sverdlov, E. D., and Siebert, P. D. (1996). Suppression subtractive hybridization: a method for generating differentially regulated or tissue-specific cDNA probes and libraries. *Proc Natl Acad Sci U S A* 93, 6025-6030.
- Djoughri, L., and Lawson, S. N. (2004). Abeta-fiber nociceptive primary afferent neurons: a review of incidence and properties in relation to other afferent A-fiber neurons in mammals. *Brain Res Brain Res Rev* 46, 131-145.
- Drummond, H. A., Abboud, F. M., and Welsh, M. J. (2000). Localization of beta and gamma subunits of ENaC in sensory nerve endings in the rat foot pad. *Brain Res* 884, 1-12.
- Ebihara, M., Ohba, H., Kikuchi, M., and Yoshikawa, T. (2004). Structural characterization and promoter analysis of human potassium channel Kv8.1 (KCNV1) gene. *Gene* 325, 89-96.
- Elola, M. T., Wolfenstein-Todel, C., Troncoso, M. F., Vasta, G. R., and Rabinovich, G. A. (2007). Galectins: matricellular glycan-binding proteins linking cell adhesion, migration, and survival. *Cell Mol Life Sci*.
- Ernfors, P., Lee, K. F., and Jaenisch, R. (1994). Mice lacking brain-derived neurotrophic factor develop with sensory deficits. *Nature* 368, 147-150.
- Ernfors, P., Lee, K. F., Kucera, J., and Jaenisch, R. (1994). Lack of neurotrophin-3 leads to deficiencies in the peripheral nervous system and loss of limb proprioceptive afferents. *Cell* 77, 503-512.
- Evans, S. J., Datson, N. A., Kabbaj, M., Thompson, R. C., Vreugdenhil, E., De Kloet, E. R., Watson, S. J., and Akil, H. (2002). Evaluation of Affymetrix Gene Chip sensitivity in rat hippocampal tissue using SAGE analysis. *Serial Analysis of Gene Expression. Eur J Neurosci*

16, 409-413.

- Fang, X., Djouhri, L., Black, J. A., Dib-Hajj, S. D., Waxman, S. G., and Lawson, S. N. (2002). The presence and role of the tetrodotoxin-resistant sodium channel Na(v)1.9 (NaN) in nociceptive primary afferent neurons. *J Neurosci* 22, 7425-7433.
- Friedel, R. H., Schnurch, H., Stubbusch, J., and Barde, Y. A. (1997). Identification of genes differentially expressed by nerve growth factor- and neurotrophin-3-dependent sensory neurons. *Proc Natl Acad Sci U S A* 94, 12670-12675.
- Fundin, B. T., Arvidsson, J., Aldskogius, H., Johansson, O., Rice, S. N., and Rice, F. L. (1997). Comprehensive immunofluorescence and lectin binding analysis of intervibrissal fur innervation in the mystacial pad of the rat. *J Comp Neurol* 385, 185-206.
- Gagnon, L. H., Longo-Guess, C. M., Berryman, M., Shin, J. B., Saylor, K. W., Yu, H., Gillespie, P. G., and Johnson, K. R. (2006). The chloride intracellular channel protein CLIC5 is expressed at high levels in hair cell stereocilia and is essential for normal inner ear function. *J Neurosci* 26, 10188-10198.
- Gao, C., Guo, H., Wei, J., and Kuo, P. C. (2003). Osteopontin inhibits expression of cytochrome c oxidase in RAW 264.7 murine macrophages. *Biochem Biophys Res Commun* 309, 120-125.
- Garcia-Anoveros, J., Derfler, B., Neville-Golden, J., Hyman, B. T., and Corey, D. P. (1997). BNaC1 and BNaC2 constitute a new family of human neuronal sodium channels related to degenerins and epithelial sodium channels. *Proc Natl Acad Sci U S A* 94, 1459-1464.
- Gurskaya, N. G., Diatchenko, L., Chenchik, A., Siebert, P. D., Khaspekov, G. L., Lukyanov, K. A., Vagner, L. L., Ermolaeva, O. D., Lukyanov, S. A., and Sverdlov, E. D. (1996). Equalizing cDNA subtraction based on selective suppression of polymerase chain reaction: cloning of Jurkat cell transcripts induced by phytohemagglutinin and phorbol 12-myristate 13-acetate. *Anal Biochem* 240, 90-97.
- Hamill, O. P., and Martinac, B. (2001). Molecular basis of mechanotransduction in living cells. *Physiol Rev* 81, 685-740.
- Hargreaves, K., Dubner, R., Brown, F., Flores, C., and Joris, J. (1988). A new and sensitive method for measuring thermal nociception in cutaneous hyperalgesia. *Pain* 32, 77-88.
- Hashimoto, M., Sun, D., Rittling, S. R., Denhardt, D. T., and Young, W. (2007). Osteopontin-deficient mice exhibit less inflammation, greater tissue damage, and impaired locomotor recovery from spinal cord injury compared with wild-type controls. *J Neurosci* 27, 3603-3611.
- Holleville, N., Mateos, S., Bontoux, M., Bollerot, K., and Monsoro-Burq, A. H. (2007). Dlx5 drives Runx2 expression and osteogenic differentiation in developing cranial suture mesenchyme. *Dev Biol* 304, 860-874.

- Hughes, P. A., Brierley, S. M., Young, R. L., and Blackshaw, L. A. (2007). Localization and comparative analysis of acid-sensing ion channel (ASIC1, 2, and 3) mRNA expression in mouse colonic sensory neurons within thoracolumbar dorsal root ganglia. *J Comp Neurol* 500, 863-875.
- Hugnot, J. P., Salinas, M., Lesage, F., Guillemare, E., de Weille, J., Heurteaux, C., Mattei, M. G., and Lazdunski, M. (1996). Kv8.1, a new neuronal potassium channel subunit with specific inhibitory properties towards Shab and Shaw channels. *Embo J* 15, 3322-3331.
- Ichikawa, H., Itota, T., Nishitani, Y., Torii, Y., Inoue, K., and Sugimoto, T. (2000). Osteopontin-immunoreactive primary sensory neurons in the rat spinal and trigeminal nervous systems. *Brain Res* 863, 276-281.
- Ichikawa, H., Jacobowitz, D. M., and Sugimoto, T. (1997). Coexpression of calretinin and parvalbumin in Ruffini-like endings in the rat incisor periodontal ligament. *Brain Res* 770, 294-297.
- Ichikawa, H., and Sugimoto, T. (1997). Parvalbumin- and calbindin D-28k-immunoreactive innervation of orofacial tissues in the rat. *Exp Neurol* 146, 414-418.
- Ichikawa, H., Yamashita, K., Takano-Yamamoto, T., and Sugimoto, T. (2001). Osteopontin-immunoreactivity in the rat trigeminal ganglion and trigeminal sensory nuclei. *Brain Res* 919, 147-154.
- Jiang, Y., Harlocker, S. L., Molesh, D. A., Dillon, D. C., Stolk, J. A., Houghton, R. L., Repasky, E. A., Badaro, R., Reed, S. G., and Xu, J. (2002). Discovery of differentially expressed genes in human breast cancer using subtracted cDNA libraries and cDNA microarrays. *Oncogene* 21, 2270-2282.
- Katagiri, Y. U., Sleeman, J., Fujii, H., Herrlich, P., Hotta, H., Tanaka, K., Chikuma, S., Yagita, H., Okumura, K., Murakami, M., *et al.* (1999). CD44 variants but not CD44s cooperate with beta1-containing integrins to permit cells to bind to osteopontin independently of arginine-glycine-aspartic acid, thereby stimulating cell motility and chemotaxis. *Cancer Res* 59, 219-226.
- Keay, K. A., Feil, K., Gordon, B. D., Herbert, H., and Bandler, R. (1997). Spinal afferents to functionally distinct periaqueductal gray columns in the rat: an anterograde and retrograde tracing study. *J Comp Neurol* 385, 207-229.
- Kellenberger, S., and Schild, L. (2002). Epithelial sodium channel/degenerin family of ion channels: a variety of functions for a shared structure. *Physiol Rev* 82, 735-767.
- Klein-Nulend, J., Roelofsen, J., Semeins, C. M., Bronckers, A. L., and Burger, E. H. (1997). Mechanical stimulation of osteopontin mRNA expression and synthesis in bone cell cultures. *J Cell Physiol* 170, 174-181.

- Koltzenburg, M., Stucky, C. L., and Lewin, G. R. (1997). Receptive properties of mouse sensory neurons innervating hairy skin. *J Neurophysiol* 78, 1841-1850.
- Korte, M., Carroll, P., Wolf, E., Brem, G., Thoenen, H., and Bonhoeffer, T. (1995). Hippocampal long-term potentiation is impaired in mice lacking brain-derived neurotrophic factor. *Proc Natl Acad Sci U S A* 92, 8856-8860.
- Kovacic, N., Lukic, I. K., Grcevic, D., Katavic, V., Croucher, P., and Marusic, A. (2007). The Fas/Fas ligand system inhibits differentiation of murine osteoblasts but has a limited role in osteoblast and osteoclast apoptosis. *J Immunol* 178, 3379-3389.
- Kubota, T., Yamauchi, M., Onozaki, J., Sato, S., Suzuki, Y., and Sodek, J. (1993). Influence of an intermittent compressive force on matrix protein expression by ROS 17/2.8 cells, with selective stimulation of osteopontin. *Arch Oral Biol* 38, 23-30.
- Kung, C. (2005). A possible unifying principle for mechanosensation. *Nature* 436, 647-654.
- Lee, J. L., Wang, M. J., Sudhir, P. R., Chen, G. D., Chi, C. W., and Chen, J. Y. (2007). Osteopontin promotes integrin activation through outside-in and inside-out mechanisms: OPN-CD44V interaction enhances survival in gastrointestinal cancer cells. *Cancer Res* 67, 2089-2097.
- Lewin, G. R., and Barde, Y. A. (1996). Physiology of the neurotrophins. *Annu Rev Neurosci* 19, 289-317.
- Lewin, G. R., Lisney, S. J., and Mendell, L. M. (1992). Neonatal Anti-NGF Treatment Reduces the Delta- and C-Fibre Evoked Vasodilator Responses in Rat Skin: Evidence That Nociceptor Afferents Mediate Antidromic Vasodilatation. *Eur J Neurosci* 4, 1213-1218.
- Lewin, G. R., and McMahon, S. B. (1991). Physiological properties of primary sensory neurons appropriately and inappropriately innervating skeletal muscle in adult rats. *J Neurophysiol* 66, 1218-1231.
- Lewin, G. R., and Mendell, L. M. (1993). Nerve growth factor and nociception. *Trends Neurosci* 16, 353-359.
- Lewin, G. R., and Mendell, L. M. (1994). Regulation of cutaneous C-fiber heat nociceptors by nerve growth factor in the developing rat. *J Neurophysiol* 71, 941-949.
- Lewin, G. R., and Mendell, L. M. (1996). Maintenance of modality-specific connections in the spinal cord after neonatal nerve growth factor deprivation. *Eur J Neurosci* 8, 1677-1684.
- Lewin, G. R., Ritter, A. M., and Mendell, L. M. (1992). On the role of nerve growth factor in the development of myelinated nociceptors. *J Neurosci* 12, 1896-1905.
- Lewin, G. R., Ritter, A. M., and Mendell, L. M. (1993). Nerve growth factor-induced hyperalgesia in the neonatal and adult rat. *J Neurosci* 13, 2136-2148.
- Lewin, G. R., Rueff, A., and Mendell, L. M. (1994). Peripheral and central mechanisms of

- NGF-induced hyperalgesia. *Eur J Neurosci* 6, 1903-1912.
- Liaw, L., Birk, D. E., Ballas, C. B., Whitsitt, J. S., Davidson, J. M., and Hogan, B. L. (1998). Altered wound healing in mice lacking a functional osteopontin gene (*spp1*). *J Clin Invest* 101, 1468-1478.
- Linden, R. W., Millar, B. J., and Halata, Z. (1994). A comparative physiological and morphological study of periodontal ligament mechanoreceptors represented in the trigeminal ganglion and the mesencephalic nucleus of the cat. *Anat Embryol (Berl)* 190, 127-135.
- Lingueglia, E., de Welle, J. R., Bassilana, F., Heurteaux, C., Sakai, H., Waldmann, R., and Lazdunski, M. (1997). A modulatory subunit of acid sensing ion channels in brain and dorsal root ganglion cells. *J Biol Chem* 272, 29778-29783.
- Littler, D. R., Assaad, N. N., Harrop, S. J., Brown, L. J., Pankhurst, G. J., Luciani, P., Aguilar, M. I., Mazzanti, M., Berryman, M. A., Breit, S. N., and Curmi, P. M. (2005). Crystal structure of the soluble form of the redox-regulated chloride ion channel protein CLIC4. *Febs J* 272, 4996-5007.
- Lopez, C. A., Olson, E. S., Adams, J. C., Mou, K., Denhardt, D. T., and Davis, R. L. (1995). Osteopontin expression detected in adult cochleae and inner ear fluids. *Hear Res* 85, 210-222.
- Lumpkin, E. A., and Caterina, M. J. (2007). Mechanisms of sensory transduction in the skin. *Nature* 445, 858-865.
- Lyons, A. J., and Jones, J. (2007). Cell adhesion molecules, the extracellular matrix and oral squamous carcinoma. *Int J Oral Maxillofac Surg* 36, 671-679.
- Mannsfeldt, A. G., Carroll, P., Stucky, C. L., and Lewin, G. R. (1999). Stomatin, a MEC-2 like protein, is expressed by mammalian sensory neurons. *Mol Cell Neurosci* 13, 391-404.
- Mano, I., and Driscoll, M. (1999). DEG/ENaC channels: a touchy superfamily that watches its salt. *Bioessays* 21, 568-578.
- Marsh, B. C., Kerr, N. C., Isles, N., Denhardt, D. T., and Wynick, D. (2007). Osteopontin expression and function within the dorsal root ganglion. *Neuroreport* 18, 153-157.
- McIlwrath, S. L., Hu, J., Anirudhan, G., Shin, J. B., and Lewin, G. R. (2005). The sensory mechanotransduction ion channel ASIC2 (acid sensitive ion channel 2) is regulated by neurotrophin availability. *Neuroscience* 131, 499-511.
- McLatchie, L. M., Fraser, N. J., Main, M. J., Wise, A., Brown, J., Thompson, N., Solari, R., Lee, M. G., and Foord, S. M. (1998). RAMPs regulate the transport and ligand specificity of the calcitonin-receptor-like receptor. *Nature* 393, 333-339.
- McMahon, S. B., Armanini, M. P., Ling, L. H., and Phillips, H. S. (1994). Expression and coexpression of Trk receptors in subpopulations of adult primary sensory neurons projecting to identified peripheral targets. *Neuron* 12, 1161-1171.

- Mendell, L. M., and Lewin, G. R. (1992). Removing constraints on neural sprouting. *Curr Biol* 2, 259-261.
- Midwood, K. S., Williams, L. V., and Schwarzbauer, J. E. (2004). Tissue repair and the dynamics of the extracellular matrix. *Int J Biochem Cell Biol* 36, 1031-1037.
- Miles, R. R., Turner, C. H., Santerre, R., Tu, Y., McClelland, P., Argot, J., DeHoff, B. S., Mundy, C. W., Rosteck, P. R., Jr., Bidwell, J., *et al.* (1998). Analysis of differential gene expression in rat tibia after an osteogenic stimulus in vivo: mechanical loading regulates osteopontin and myeloperoxidase. *J Cell Biochem* 68, 355-365.
- Mogil, J. S., Breese, N. M., Witty, M. F., Ritchie, J., Rainville, M. L., Ase, A., Abbadi, N., Stucky, C. L., and Seguela, P. (2005). Transgenic expression of a dominant-negative ASIC3 subunit leads to increased sensitivity to mechanical and inflammatory stimuli. *J Neurosci* 25, 9893-9901.
- Mogil, J. S., Wilson, S. G., Bon, K., Lee, S. E., Chung, K., Raber, P., Pieper, J. O., Hain, H. S., Belknap, J. K., Hubert, L., *et al.* (1999). Heritability of nociception I: responses of 11 inbred mouse strains on 12 measures of nociception. *Pain* 80, 67-82.
- Mosavi, L. K., Cammett, T. J., Desrosiers, D. C., and Peng, Z. Y. (2004). The ankyrin repeat as molecular architecture for protein recognition. *Protein Sci* 13, 1435-1448.
- Naciff, J. M., Behbehani, M. M., Kaetzel, M. A., and Dedman, J. R. (1996). Annexin VI modulates Ca²⁺ and K⁺ conductances of spinal cord and dorsal root ganglion neurons. *Am J Physiol* 271, C2004-2015.
- Neidhardt, L., Gasca, S., Wertz, K., Obermayr, F., Worpenberg, S., Lehrach, H., and Herrmann, B. G. (2000). Large-scale screen for genes controlling mammalian embryogenesis, using high-throughput gene expression analysis in mouse embryos. *Mech Dev* 98, 77-94.
- O'Hagan, R., and Chalfie, M. (2006). Mechanosensation in *Caenorhabditis elegans*. *Int Rev Neurobiol* 69, 169-203.
- Oldberg, A., Franzen, A., and Heinegard, D. (1986). Cloning and sequence analysis of rat bone sialoprotein (osteopontin) cDNA reveals an Arg-Gly-Asp cell-binding sequence. *Proc Natl Acad Sci U S A* 83, 8819-8823.
- Page, A. J., Brierley, S. M., Martin, C. M., Hughes, P. A., and Blackshaw, L. A. (2007). Acid sensing ion channels 2 and 3 are required for inhibition of visceral nociceptors by benzamil. *Pain*.
- Page, A. J., Brierley, S. M., Martin, C. M., Price, M. P., Symonds, E., Butler, R., Wemmie, J. A., and Blackshaw, L. A. (2005). Different contributions of ASIC channels 1a, 2, and 3 in gastrointestinal mechanosensory function. *Gut* 54, 1408-1415.
- Pasquali-Ronchetti, I., and Baccarani-Contri, M. (1997). Elastic fiber during development and

- aging. *Microsc Res Tech* 38, 428-435.
- Pezet, S., and McMahon, S. B. (2006). Neurotrophins: mediators and modulators of pain. *Annu Rev Neurosci* 29, 507-538.
- Price, M. P., Lewin, G. R., McIlwrath, S. L., Cheng, C., Xie, J., Heppenstall, P. A., Stucky, C. L., Mannsfeldt, A. G., Brennan, T. J., Drummond, H. A., *et al.* (2000). The mammalian sodium channel BNC1 is required for normal touch sensation. *Nature* 407, 1007-1011.
- Price, M. P., McIlwrath, S. L., Xie, J., Cheng, C., Qiao, J., Tarr, D. E., Sluka, K. A., Brennan, T. J., Lewin, G. R., and Welsh, M. J. (2001). The DRASIC cation channel contributes to the detection of cutaneous touch and acid stimuli in mice. *Neuron* 32, 1071-1083.
- Rice, F. L., Fundin, B. T., Arvidsson, J., Aldskogius, H., and Johansson, O. (1997). Comprehensive immunofluorescence and lectin binding analysis of vibrissal follicle sinus complex innervation in the mystacial pad of the rat. *J Comp Neurol* 385, 149-184.
- Ritter, A. M., Lewin, G. R., Kremer, N. E., and Mendell, L. M. (1991). Requirement for nerve growth factor in the development of myelinated nociceptors in vivo. *Nature* 350, 500-502.
- Ritter, A. M., Lewin, G. R., and Mendell, L. M. (1993). Regulation of myelinated nociceptor function by nerve growth factor in neonatal and adult rats. *Brain Res Bull* 30, 245-249.
- Rittling, S. R., and Chambers, A. F. (2004). Role of osteopontin in tumour progression. *Br J Cancer* 90, 1877-1881.
- Salinas, M., de Weille, J., Guillemare, E., Lazdunski, M., and Hugnot, J. P. (1997). Modes of regulation of shab K⁺ channel activity by the Kv8.1 subunit. *J Biol Chem* 272, 8774-8780.
- Schratt, G. M., Nigh, E. A., Chen, W. G., Hu, L., and Greenberg, M. E. (2004). BDNF regulates the translation of a select group of mRNAs by a mammalian target of rapamycin-phosphatidylinositol 3-kinase-dependent pathway during neuronal development. *J Neurosci* 24, 7366-7377.
- Shigehara, S., Matsuzaka, K., and Inoue, T. (2006). Morphohistological change and expression of HSP70, osteopontin and osteocalcin mRNAs in rat dental pulp cells with orthodontic tooth movement. *Bull Tokyo Dent Coll* 47, 117-124.
- Shin, J. B., Martinez-Salgado, C., Heppenstall, P. A., and Lewin, G. R. (2003). A T-type calcium channel required for normal function of a mammalian mechanoreceptor. *Nat Neurosci* 6, 724-730.
- Shin, S. L., Cha, J. H., Chun, M. H., Chung, J. W., and Lee, M. Y. (1999). Expression of osteopontin mRNA in the adult rat brain. *Neurosci Lett* 273, 73-76.
- Shoemaker, D. D., Schadt, E. E., Armour, C. D., He, Y. D., Garrett-Engle, P., McDonagh, P. D., Loerch, P. M., Leonardson, A., Lum, P. Y., Cavet, G., *et al.* (2001). Experimental annotation of the human genome using microarray technology. *Nature* 409, 922-927.

- Siemens, J., Lillo, C., Dumont, R. A., Reynolds, A., Williams, D. S., Gillespie, P. G., and Muller, U. (2004). Cadherin 23 is a component of the tip link in hair-cell stereocilia. *Nature* 428, 950-955.
- Silverman, J. D., and Kruger, L. (1989). Calcitonin-gene-related-peptide-immunoreactive innervation of the rat head with emphasis on specialized sensory structures. *J Comp Neurol* 280, 303-330.
- Singh, K., Deonaraine, D., Shanmugam, V., Senger, D. R., Mukherjee, A. B., Chang, P. L., Prince, C. W., and Mukherjee, B. B. (1993). Calcium-binding properties of osteopontin derived from non-osteogenic sources. *J Biochem (Tokyo)* 114, 702-707.
- Sodek, J., Ganss, B., and McKee, M. D. (2000). Osteopontin. *Crit Rev Oral Biol Med* 11, 279-303.
- Sollner, C., Rauch, G. J., Siemens, J., Geisler, R., Schuster, S. C., Muller, U., and Nicolson, T. (2004). Mutations in cadherin 23 affect tip links in zebrafish sensory hair cells. *Nature* 428, 955-959.
- Stoughton, R. B. (2005). Applications of DNA microarrays in biology. *Annu Rev Biochem* 74, 53-82.
- Stucky, C. L., Shin, J. B., and Lewin, G. R. (2002). Neurotrophin-4: a survival factor for adult sensory neurons. *Curr Biol* 12, 1401-1404.
- Sugimoto, T., Fujiyoshi, Y., He, Y. F., Xiao, C., and Ichikawa, H. (1997). Trigeminal primary projection to the rat brain stem sensory trigeminal nuclear complex and surrounding structures revealed by anterograde transport of cholera toxin B subunit-conjugated and Bandeiraea simplicifolia isolectin B4-conjugated horseradish peroxidase. *Neurosci Res* 28, 361-371.
- Tchurikov, N. A., and Kretova, O. V. (2007). Suffix-specific RNAi Leads to Silencing of F Element in *Drosophila melanogaster*. *PLoS ONE* 2, e476.
- Tominaga, M., and Julius, D. (2000). Capsaicin receptor in the pain pathway. *Jpn J Pharmacol* 83, 20-24.
- Tulk, B. M., Kapadia, S., and Edwards, J. C. (2002). CLIC1 inserts from the aqueous phase into phospholipid membranes, where it functions as an anion channel. *Am J Physiol Cell Physiol* 282, C1103-1112.
- Van Boven, R. W., and Johnson, K. O. (1994). A psychophysical study of the mechanisms of sensory recovery following nerve injury in humans. *Brain* 117 (Pt 1), 149-167.
- Warton, K., Tonini, R., Fairlie, W. D., Matthews, J. M., Valenzuela, S. M., Qiu, M. R., Wu, W. M., Pankhurst, S., Bauskin, A. R., Harrop, S. J., *et al.* (2002). Recombinant CLIC1 (NCC27) assembles in lipid bilayers via a pH-dependent two-state process to form chloride ion channels with identical characteristics to those observed in Chinese hamster ovary cells

- expressing CLIC1. *J Biol Chem* 277, 26003-26011.
- Weaver, M. S., Sage, E. H., and Yan, Q. (2006). Absence of SPARC in lens epithelial cells results in altered adhesion and extracellular matrix production in vitro. *J Cell Biochem* 97, 423-432.
- Wertz, K., and Herrmann, B. G. (2000). Large-scale screen for genes involved in gonad development. *Mech Dev* 98, 51-70.
- Wetzel, C., Hu, J., Riethmacher, D., Benckendorff, A., Harder, L., Eilers, A., Moshourab, R., Kozlenkov, A., Labuz, D., Caspani, O., *et al.* (2007). A stomatin-domain protein essential for touch sensation in the mouse. *Nature* 445, 206-209.
- Willis, D., Li, K. W., Zheng, J. Q., Chang, J. H., Smit, A., Kelly, T., Merianda, T. T., Sylvester, J., van Minnen, J., and Twiss, J. L. (2005). Differential transport and local translation of cytoskeletal, injury-response, and neurodegeneration protein mRNAs in axons. *J Neurosci* 25, 778-791.
- Wright, D. E., and Snider, W. D. (1995). Neurotrophin receptor mRNA expression defines distinct populations of neurons in rat dorsal root ganglia. *J Comp Neurol* 351, 329-338.
- Yang, J. M., Nam, K., Kim, S. W., Jung, S. Y., Min, H. G., Yeo, U. C., Park, K. B., Lee, J. H., Suhr, K. B., Park, J. K., and Lee, E. S. (1999). Arginine in the beginning of the 1A rod domain of the keratin 10 gene is the hot spot for the mutation in epidermolytic hyperkeratosis. *J Dermatol Sci* 19, 126-133.
- Yu, Q., and Stamenkovic, I. (1999). Localization of matrix metalloproteinase 9 to the cell surface provides a mechanism for CD44-mediated tumor invasion. *Genes Dev* 13, 35-48.
- Zhang, S., Arnadottir, J., Keller, C., Caldwell, G. A., Yao, C. A., and Chalfie, M. (2004). MEC-2 is recruited to the putative mechanosensory complex in *C. elegans* touch receptor neurons through its stomatin-like domain. *Curr Biol* 14, 1888-1896.
- Zhu, B., Suzuki, K., Goldberg, H. A., Rittling, S. R., Denhardt, D. T., McCulloch, C. A., and Sodek, J. (2004). Osteopontin modulates CD44-dependent chemotaxis of peritoneal macrophages through G-protein-coupled receptors: evidence of a role for an intracellular form of osteopontin. *J Cell Physiol* 198, 155-167.

