C U R R I C U L U M V I T A E

Name: Peter Anthony McNaughton BSc, MA, DPhil, F Med Sci

Education:	1962-1966	Auckland Grammar School, New Zealand.
	1967-1970	Auckland University, studying for BSc (Hons) in Physics. Sir George Grey Prize for top science student in the University.
	1971	Graduated BSc (Hons), Class I.
	1971	Awarded Rhodes Scholarship for study in Oxford.
	1971-1974	Balliol College, Oxford, studying for D.Phil. in Physiology. Graduated D.Phil. (equivalent of PhD)
Principal posts held:	1974-1978	Research Fellow, Clare College, Cambridge.
	1978-1983	University Demonstrator, Physiological Laboratory, Cambridge.
	1983-1991	University Lecturer, Physiological Laboratory, Cambridge.
	1991 – 1999	Halliburton Professor of Physiology and Head of Dept. of Physiology, King's College London
	1999 – 2013	Sheild Professor of Pharmacology and Head of Dept. of Pharmacology, University of Cambridge
	2008-2009	BBVA Foundation Professor, Universidad Miguel Hernandez, Alicante, Spain
	2013 – present	Professor of Pharmacology, King’s College London
Part-time etc posts:	1977-1978	Elmore Medical Research Student, Physiological Laboratory, Cambridge.
	1983-1991	Fellow and Director of Studies in Physiology, Christ's College, Cambridge.
	1988-1989	Nuffield Science Research Fellow
	1989-1991	Director of Studies in Medicine, Christ's College, Cambridge
	1993-1996	Dean of Basic Medical Sciences, King's College London
	1999-2013	Wolf Fellow in Pharmacology of Christ’s College, Cambridge

Membership of Research Council Boards etc:

1996-2000	Member of Biochemistry and Cell Biology Panel, Biotechnology and Biological Sciences Research Council (BBSRC).
1998-2002	Chairman, Bio-imaging Initiative Panel, BBSRC
1998-2001	Member of Neuroscience Board, Wellcome Trust
2001-2004	Member of Neurone Initiative Panel, BBSRC
2001-2006	Member of Advisory Board, Medical Research Council
2001	Member of BBSRC Institute Assessment Panel
2002	Member of selection panel for Ramon y Cajal Fellowships, Spanish Foundation for Science and Technology
2003-6	Member of Performance Based Research Fund Biological Sciences panel, New Zealand (equivalent of UK Research Assessment Exercise)
2007-2011	Member of BBSRC Strategy Panel "The Healthy Organism"

Scientific societies:	1979 - present	Member, Physiological Society
	1988 - 92	Committee Member, Physiological Society
	1989 - 92	Manager of the Dale and Rushton Funds, Physiological Society
	1999 - present	Member, British Pharmacological Society
Honorary positions:	1998 - 2003	Honorary Professor, Dept. of Optometry and Vision Sciences, University of Wales Cardiff.
	2003	Visiting Professor, Universitá la Sapienza, Rome

Awards and Prizes: 2011 Prize "Investigación en Dolor 2011" (Investigation in Pain 2011), from the Grünenthal Foundation, Salamanca.

2013 Elected Fellow of the Academy of Medical Sciences

Grants in last 5 years (all are with P. McNaughton as sole applicant unless otherwise stated)

2005 – 8	"Signalling pathways and scaffolding proteins modulating the activity of the heat and capsaicin receptor, TRPV1."	BBSRC, £258k
2005 – 8	"The cellular basis of magnetic sensation"	BBSRC, £241k
2007 – 10	"Structure and function of candidate magnetite-based magnetoreceptor cells" Human Frontiers Science Program,	$USD 1,320,000

2008 – 11	"Modulation of thermo-TRP ion channel activity by phosphorylation and trafficking to the membrane" BBSRC, £404,500
2008 - 9	"Role of HCN ion channels in somatic sensation and pain" Marie Curie EU, £133,400.
2008 – 11	"Role of HCN channels in somatic sensation and pain" BBSRC, £383,510
2008-11	"Involvement of the hyperpolarisation-activated current Ih in nociceptor function" Organon Inc., £30k
2008-10	"Modulation of the TRPM8 cold-sensitive ion chan*n*el" BBVA Foundation Chair in Biomedicine, £110,000
2009-10	"Development of next-generation analgesics based on antagonism of the scaffolding protein TRPV1" BBSRC, £118,375
2010- 11	"Role of the scaffolding protein AKAP79 in inflammatory hyperalgesia" Newton Trust, University of Cambridge, £26158
2011-12	Ion channels of the HCN family underlying inflammatory and neuropathic pain" Newton Trust, University of Cambridge, £14025
2012-15	"HCN ion channels and pain" BBSRC, £416,771
2012-15	"Role of HCN ion channels in neuropathic pain: a combined animal and human study" Grant joint between PMcN (PI), D. Menon and D. Wheeler MRC, £627,847
2012-15	"MICA: a comprehensive genomic and functional approach to discover new ion channel targets" Grant joint between G. Woods (PI), PMcN, D. Menon and D. Wheeler. MRC £990,632
2012-15	"Discovery and development of novel small molecule inhibitors of the HCN2 ion channel for the treatment of inflammatory and neuropathic pain" Wellcome Trust, £4,410,226
2013 – 14	"A new approach to analgesia: novel antagonists of sensitization of TRPV1" MRC Confidence in Concept award, £106,117
2013 – 16	"Thermal sensory mechanisms involved in body temperature regulation" BBSRC, £401,664

Invited lectures at conferences and presentations in last 5 years (international meetings only)

2005 Plenary lecture, Convegno Nazionale del Gruppo di Studio Neuroscienze e Dolore, Italy
Symposium speaker, European Winter Conference on Brain Research, France
Symposium speaker, 11th World Congress on Pain, Sydney

2006 Symposium speaker, Membrane Transport in Health and Disease, Venezuela (unable to attend because of illness)
Symposium speaker, DBSF, Universitá di Varese, Italy
Symposium speaker, SISSA, Trieste, Italy
Seminar speaker, Auckland, New Zealand

2007 Seminar speaker, Universidad Miguel Hernandez, Alicante, Spain.
Seminar speaker, Universidad de Valladolid, Valladolid, Spain.
Symposium speaker, PENS, Bucharest, Romania
Symposium speaker, Spanish Physiological Society, Valladolid, Spain

2008 Symposium speaker, Ion Channel Targets Conference, Berlin, Germany
Symposium speaker, Federation of European Neuroscience Societies, Geneva, Switzerland
Symposium speaker, Max Delbruck Zentrum, Berlin, Germany
Seminar speaker, Max Delbruck Zentrum, Berlin, Germany
Symposium speaker, 5th Annual Pain Management Conference, London
Symposium speaker, International Association for the Study of Pain, Glasgow
Symposium speaker, Inflammopharmacology, Queens' College, Cambridge

2009 Seminar speaker, Universidad Miguel Hernandez, Alicante, Spain
Symposium speaker, Ion Channel Targets Conference, Barcelona, Spain
Symposium speaker, Physiological Society, Dublin, Ireland
Symposium speaker, Keystone Symposium on the Neurobiology of Pain and Analgesia, Santa Fe, USA
Seminar speaker, Fu Jen Catholic University, Ocean University, Tri Services Hospital, Taichung University (all Taiwan)

2010 Plenary speaker, Chinese Association for the Study of Pain, Taipei, Taiwan.
Plenary speaker, Chilean Society for Neuroscience, Valdivia, Chile
Seminar speaker, University of Santiago, Chile
Symposium speaker, Human Frontiers Science Program, Kerala, India
Sympsoium speaker, 3rd International congress of Cell Membranes and Oxidative Stress, Isparta, Turkey
Symposium speaker, Physiological Society, Manchester, UK.
Symposium speaker, Boehringer Ingelheim Fonds conference, Titisee, Germany
Symposium speaker, World Pharma 2010, Copenhagen, Denmark
Symposium speaker, European Winter Conference on Brain Research, France

2011 Symposium speaker, 3rd Italo-Hispano-Portuguese workshop on Ion channels and Transporters, Bologna, Italy.
Symposium speaker, Appel Consulting Pain Management Conference, London
Symposium speaker, Cheltenham Science Festival
Symposium speaker, Inflammopharmacology, Queens' College, Cambridge
Symposium speaker, SMi Pain Therapeutics, London
Symposium speaker, Society for Medicines Research, Girton College, Cambridge

2012 Symposium speaker, Ion Channels for Drug Discovery, Berlin, Germany
Symposium speaker, Neuropharmacology of Brain Receptor Systems, Helsinki, Finland
Symposium speaker, Conference on "Determinants and Modulators of Postoperative Pain", Erlangen, Germany

Symposium speaker, European Winter Conference on Brain Research, Switzerland.
Symposium speaker, Appel Consulting conference on “Pain Management”, London, UK.

2013 Symposium speaker, RSC conference on “Ion channels as therapeutic targets”, Abington Hall, UK
Symposium speaker, SMi Pain Therapeutics, London
Symposium speaker, “Ion channels in health and disease”, Cambridge
Symposium speaker, “Membrane-delimited signalling”, Marburg, Germany.
Symposium speaker, “Cambridge Neurosceince Symposium”, Cambridge
Symposium speaker, EFIC conference, Florence, Italy

2014 Symposium speaker, German Biophysical Society, Strobl, Austria
Plenary speaker, “Ion channel targets”, Clare College, Cambridge
Symposium speaker, “'International Congress on Cell Membranes and Oxidative Stress”, Isparta, Turkey
Symposium speaker, 4th Caesar Conference on “Sensory Systems”, Bonn, Germany

PUBLICATIONS

Full papers and reviews:

McNaughton, P.A. and Matthews, R.E.F. (1971). Sedimentation of small viruses at very low concentrations. *Virology*, **45** : 1-9.

Brown, H.F., McNaughton, P.A., Noble, D. and Noble, S.J. (1975). Adrenergic control of cardiac pacemaker currents. *Phil. Trans. Roy. Soc. Lond. B.,* **270** : 527-537.

Hunter, P.J., McNaughton, P.A. and Noble, D. (1975). Analytical models of propagation in excitable cells. *Prog. Biophys. Mol. Biol.,* **30** : 99-144.

Baker, P.F. and McNaughton, P.A. (1976). Kinetics and energetics of calcium efflux from intact squid giant axons. *J. Physiol.,* **259** : 103-144.

Baker, P.F. and McNaughton, P.A. (1978). The influence of extracellular calcium binding on the calcium efflux from squid axons. *J. Physiol*., **276** : 127-150.

McNaughton, P.A. (1978). Calcium transport in excitable cells. In: **Biophysical Aspects of Cardiac Muscle**, ed. M. Morad, 347-373. Academic Press: New York.

Detwiler, P.B., Hodgkin, A.L. and McNaughton, P.A. (1978). A surprising property of electrical spread in the network of rods in the turtle's retina. *Nature*, **274** : 562-565.

Di Francesco, D. and McNaughton, P.A. (1979). The effects of calcium on outward membrane currents in the cardiac Purkinje fibres. *J. Physiol*., **289** : 347-373.

Detwiler, P.B., Hodgkin, A.L. and McNaughton, P.A. (1980). Temporal and spatial characteristics of the voltage responses of rods in the retina of the snapping turtle. *J. Physiol*., **300** : 213-250.

McNaughton, P.A., Yau, K.-W. and Lamb, T.D. (1980). Spread of activation and desensitization in rod outer segments. *Nature,* **283** : 85-87.

Lamb, T.D., McNaughton, P.A. and Yau, K.-W. (1981). Spatial spread of activation and background desensitization in toad rod outer segments. *J. Physiol*., **319** : 463-496.

Yau, K.-W., McNaughton, P.A. and Hodgkin, A.L. (1981). Effect of ions on the light-sensitive current in retinal rods. *Nature,* **292** : 502-505.

Yau, K.-W., Lamb, T.D. and McNaughton, P.A. (1981). Spread of excitation and background adaptation in the rod outer segment. In: **Current Topics in Membranes and Transport**, ed. W.H. Miller. Academic Press: New York.

Hodgkin, A.L., McNaughton, P.A., Nunn, B.J. and Yau, K.-W. (1984). Effect of ions on retinal rods from Bufo marinus. *J. Physiol.*, **350** : 649-680.

McNaughton, P.A. (1984). How does the retina transform light? **Trans. Ophthal. Soc. U.K.**, a103 : 366-372.

Hodgkin, A.L., McNaughton, P.A. and Nunn, B.J. (1985). The ionic selectivity and calcium dependence of light-sensitive channels in retinal rods from Bufo marinus. *J. Physiol.*, **358** : 447-468.

Cervetto, L., McNaughton, P.A., Rispoli, G. and Torre, V. (1985). A possible role for calcium and cGMP in the rod photoresponse. In: **The Visual System**, pp. 11-26. A.R. Liss: New York.

Cervetto, L. and McNaughton, P.A. (1986). The effects of phosphodiesterase inhibitors and lanthanum ions on the light-sensitive current of toad retinal rods. *J. Physiol.*, **370** : 91-109.

McNaughton, P.A., Cervetto, L. and Nunn, B.J. (1986). Measurement of the intracellular free calcium concentration in salamander rods. *Nature*, **322** : 261-263.

McNaughton, P.A., Nunn, B.J. and Hodgkin, A.L. (1986). Evaluation of internal transmitter candidates: Ca. In: **The Molecular Mechanism of Phototransduction**, ed. H. Stieve, pp. 79-92. Dahlem Konferenzen 1986. Berlin, Heidelberg, N.Y., Tokyo: Springer-Verlag.

McNaughton, P.A., Cervetto, L. and Nunn, B.J. (1986). Measurement of intracellular calcium levels in vertebrate photoreceptors. In: **Progress in Zoology Volume 33: Membrane Control of Cellular Activity**, ed. H.C. Luttgau, pp. 333-342, Gustav Fischer, Stuttgart.

McNaughton, P.A. and Cervetto, L. (1986). The role of calcium in the light response. In: **Photobiochemistry and photobiophysics, 13** : 399-313.

Hodgkin, A.L., McNaughton, P.A. and Nunn, B.J. (1987). Measurement of sodium-calcium exchange in salamander rods. *J. Physiol.*, **391** : 347-370.

Lagnado, L., Cervetto, L. and McNaughton, P.A. (1988). Ion transport by the Na:Ca exchange in isolated rod outer segments. *PNAS* **85** : 4548-4552.

Fine, A., Amos, W.B., Durbin, R.M. & McNaughton, P.A. (1988) Confocal microscopy: applications in neurobiology. *Trends in Neurosciences* **11**, 346-351.

Cervetto, L., Lagnado, L., Perry, R.J., Robinson, D.W. and McNaughton, P.A. (1989). Extrusion of calcium from rod outer segments is driven by both sodium and potassium gradients. *Nature* **337** : 740-743.

Lagnado, L. & McNaughton, P.A. (1989). The sodium:calcium exchange in photoreceptors. In: **The Sodium -Calcium Exchange**, ed. T.J.A. Allen, D. Noble and H. Reuter. Oxford University Press.

McNaughton, P.A., Cervetto, L., Lagnado, L., Perry, R.J. & Robinson, D.W. (1989) Control of intracellular calcium in vertebrate photoreceptors. *Neuroscience Research* **10** S23-36.

Lagnado, L. & McNaughton, P.A. (1990) The electrogenic properties of the Na:Ca exchange. *J. Memb. Biol.* **113**, 177-191.

McNaughton, P.A. (1990). The light response of vertebrate photoreceptors. *Physiol. Rev.* **70**, 847-883.

Lagnado, L. & McNaughton, P.A. (1990) The effects of quinidine on the sodium-dependent calcium efflux in isolated rod photoreceptors of the salamander retina. *Eur. J. Physiol.* **417**, 168-173.

Fargon, F., McNaughton, P.A. & Sepulveda, F.V. (1990) GTP-binding proteins cause deactivation of an inwardly rectifying K^+ current in enterocytes isolated from guinea-pig small intestine. *Eur. J. Physiol.* **417**, 243-245.

McNaughton, P.A. (1990). The light response of photoreceptors. In: **Vision - Coding and Efficiency**, ed. C.B. Blakemore, pp 65-73. Cambridge: Cambridge University Press.

McNaughton, P.A. (1990) An appreciation of the scientific work of Brian Nunn. In: **Sensory Transduction**, ed A. Borsellino, L. Cervetto & V. Torre. Plenum Press.

McNaughton, P.A., Cervetto, L., Lagnado, L., Perry, R.J. & Robinson, D.W. (1990) Control of intracellular calcium in vertebrate photoreceptors. In: **Sensory Transduction**, ed A. Borsellino, L. Cervetto & V. Torre. Plenum Press.

Perry, R.J., Craig, A.J. & McNaughton, P.A. (1990) Differences in response kinetics and absolute sensitivity between red-, blue- and ultraviolet-sensitive cones of the tiger salamander. In: **Sensory Transduction**, ed A. Borsellino, L. Cervetto & V. Torre. Plenum Press.

Perry, R.J. & McNaughton, P.A. (1991). Response properties of cones from the retina of the tiger salamander. *Journal of Physiology* **433**, 561-587.

Sepulveda, F.V., Fargon, F. & McNaughton, P.A. (1991) K^+ and Cl^- currents in enterocytes isolated from the guinea pig small intestinal villi. *J.Physiol.* **434**, 351-367.

Ratto, G.M., Robinson, D.W., Yan, B. & McNaughton, P.A. (1991) Development of the light response in neonatal photoreceptors. *Nature* **351**, 654-657.

Lagnado, L. & McNaughton, P.A. (1991) Net charge transport during sodium-dependent calcium extrusion in isolated salamander rod outer segments. *Journal of General Physiology* **98**, 479-495.

Perry, R.J. & McNaughton,P.A. (1991) Calcium regulation in neurones: transport processes. *Current Opinion in Neurobiology* **1**, 98-104.

McNaughton, P.A. (1991) Fundamental properties of the Na:Ca exchange: an overview. In: Sodium-Calcium Exchange, eds M.P. Blaustein, R. DiPolo & J.P. Reeves. *Annals of the New York Academy of Sciences* Vol. 639, 2-9.

Lagnado, L., Cervetto, L. and McNaughton, P.A. (1992). Calcium homeostasis in the outer segments of retinal rods from the tiger salamander. *J. Physiol.* **455**, 111-142.

Robinson, D.W., Ratto, G.M., Lagnado, L. & McNaughton, P.A. (1993) Temperature dependence of the light response in rat rods. *Journal of Physiology* **462**, 465-481.

Perry, R.J. and McNaughton, P.A. (1993). The mechanism of ion transport by Na:Ca,K exchange in rods isolated from the salamander retina. *J. Physiol.* **466**, 443-480.

McNaughton, P.A. (1993) Visual Transduction. In: **Encyclopaedia of Molecular Biology**, pp1123-11277, ed. J. Kendrew. Blackwell, Oxford.

Sardini, A., Mintenig, G.M., Valverde, M.A., Sepulveda, F.V., Gill, D.R., Hyde, S.C., Higgins, C.F. & McNaughton, P.A. (1994) Drug efflux mediated by the human multidrug resistance P-glycoprotein is inhibited by cell swelling. *J. Cell Sci.* **107**, 3281-3290.

Nadal, A., Fuentes, E., Pastor, J. & McNaughton, P.A. (1995) Plasma albumin is a potent trigger of calcium signals and DNA synthesis in cortical astrocytes. *Proc. Natl. Acad. Sci. U.S.A.* . **92,** 1426-1430.

McNaughton, P.A. (1995) Rods, cones and calcium. *Cell Calcium* **18**, 275-283.

Nadal, A., Fuentes, E. & McNaughton, P.A. (1996) Albumin stimulates uptake of calcium into subcellular stores in cortical astrocytes *J. Physiol.* **492**, 737-750

Goodfellow, H.R., Sardini, A., Ruetz, S., Callaghan, R., Gros, P., McNaughton, P.A. & Higgins, C.F. (1996) Protein kinase C-mediated phosphorylation does not regulate drug transport by the human multidrug resistance P-glycoprotein. *J. Biol. Chem.* **271**, 13668-74.

Cesare, P. & McNaughton, P.A. (1996) A novel heat-activated current in nociceptive neurones and its sensitization by bradykinin. *Proc Natl. Acad Sci. USA* **93**, 15435 - 15439.
(NB This paper was featured in a commentary article in PNAS:
Kress, M. & Reeh, P.W. (1996) More sensory competence for nociceptive neurones in culture. *Proc. Natl. Acad Sci. USA* **93**, 14995 - 14997.)

Gilabert, R. & McNaughton, P.A. (1997) Enrichment of nociceptive neurones in cultures of primary sensory neurones. *J. Neurosci Meth.* **71**, 193-200.

Nadal, A., Fuentes, E., Pastor, J. & McNaughton, P.A. (1997) Plasma albumin induces calcium waves in rat cortical astrocytes. *Glia* **19**, 343-351.

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Fuentes, E., Nadal, A., Jacob, R. & McNaughton, P.A. (1997) Actions of serum and plasma albumin on $[Ca^{2+}]_i$ in human endothelial cells. *J. Physiol.* **504,** 315-326.

Nadal, A., Sul, J.-Y., Valdeolmillos, M. & McNaughton, P.A. (1998) Albumin elicits calcium signals from single cells in rat cortical brain slices. *J. Physiol.* **509**, 711-716.

Cesare, P., Moriondo, A., Vellani, V. & McNaughton, P.A. (1999) Ion channels gated by heat. *Proc. Natl. Acad. Sci. USA* **96,** 7658-7663.

Cesare, P., Dekker, L.V., Sardini, A., Parker, P. & McNaughton, P.A. (1999) Specific involvement of PKC-ε in sensitization of the neuronal response to painful heat. *Neuron* **23,** 617-624.

Fuentes, E., Nadal, A. & McNaughton, P.A. (1999) Lysophospholipids trigger calcium signals but not DNA synthesis in cortical astrocytes. *Glia* **28**, 272-276.

Piccolino, M., Vellani, V., Rakotobe, L.A., Pignatelli, A., Barnes, S. & McNaughton. P.A. (1999) Manipulation of synaptic sign and strength with divalent cations in the vertebrate retina: pushing the limits of tonic chemical neurotransmission. *Eur. J. Neurosci.* **11**, 4134 – 4138.

Vellani, V., Reynolds, M.R. & McNaughton, P.A. (2000). Modulation of the synaptic Ca^{2+} current in salamander rod photoreceptors by polyunsaturated fatty acids and retinoids. *J. Physiol.* **529**, 333 - 344.

Blackmore, C.B., McNaughton, P.A. & van Veen, H.W. (2001) Multidrug transporters in prokaryotic and eukaryotic cells: physiological functions and transport mechanisms. *Molecular Membrane Biology* **18**, 97 – 103.

Vellani, V., Mapplebeck, S., Moriondo, A., Davis, J.B. & McNaughton, P.A. (2001) Protein kinase C activation potentiates gating of the vanilloid receptor, VR1, by capsaicin, protons, heat and anandamide. *J. Physiol.* **534**, 813 – 825.

Nadal, A., Fuentes, E. & McNaughton, P.A. (2001). Glial cell responses to lipids bound to albumin in serum and plasma. *Progress in Brain Research* **132**, 367 – 374.

Lee, Y.-J., Zachrisson, O., Tonge, D.A. & McNaughton, P.A. (2002). NGF, GDNF and nerve crush injury upregulate bradykinin B2 receptor mRNA and protein expression in mouse sensory neurones. *Molecular and Cellular Neuroscience* **19**, 186 – 200.

Bonnington, J.K., Robinson, D.R., Vellani, V. & McNaughton, P.A. (2002) The cellular and molecular basis of the detection of pain. In: **Cell and Molecular Responses to Stress** eds. Storey, K.B. and Storey, J.M. Vol. 3: Sensing, Signaling and Cell Adaptation. Elsevier Press, Amsterdam.

Bonnington, J.K. & McNaughton, P.A. (2003). Signalling pathways involved in the sensitisation of mouse nociceptive neurones by nerve growth factor. *J. Physiol.* **551**, 433 – 446.

Vellani, V. & McNaughton, P.A. (2003) Involvement of protein kinase C in the sensation of pain. In: **Protein Kinase C (PKC)**, 2nd edition. Ed. Dekker, L.V. Landes Bioscience, Georgetown, Texas.

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McNaughton, P.A. (2004) Pain transduction: gating and modulation of ion channels. In: **Transduction channels in sensory cells.** Ed. Frings, S. & Bradley, J. Wiley-VCH, Germany.

Vellani,V., Zachrisson,O. & McNaughton,P.A. (2004) Functional bradykinin B1 receptors are expressed in nociceptive neurones and are upregulated by the neurotrophin GDNF. *J. Physiol* **560**, 391-401.

Jones, N.G., Slater, R., Cadiou, H., McNaughton, P., and McMahon, S.B. (2004). Acid-induced pain and its modulation in humans. *J. Neurosci.* **24,** 10974-10979.

Van der Stelt, M., Trevisani, M., Vellani, V., De Petrocellis, L., Schiano, M.A., Campi, B., McNaughton, P.A., Geppetti, P., and Di Marzo, V. (2005). Anandamide acts as an intracellular messenger amplifying Ca2+ influx via TRPV1 channels. *EMBO Journal,* **24,** 3026-3037.

Zhang, X, Huang, J. & McNaughton, P.A. (2005). NGF rapidly increases membrane expression of TRPV1 heat-gated ion channels. *EMBO Journal* **24**, 4211 – 23
(N.B. This paper was featured in a Nature Research Highlights article in *Nature*, **438,** pg. 893, 2005)

Vellani, V., Colucci, M., Lattanzi, R., Giannini, E., Negri, L., Melchiorri, P. and McNaughton, P.A. (2006) Sensitization of TRPV1 by the prokineticin receptor agonist Bv8. *J. Neurosci.* **26**, 5109 – 16.

Huang, J., Zhang, X. and McNaughton, P.A. (2006) Inflammatory pain: the cellular basis of heat hyperalgesia. *Current Neuropharmacology* **4**, 197 – 206.

Zhang, X. and McNaughton, P.A. (2006) Why pain gets worse: the mechanism of heat hyperalgesia. *Journal of General Physiology* **128**, 491-493.

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