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EDUCATION:

Postdoctoral Fellow, University of California at San Francisco, 1996-2000. Advisor: Dr. Louis Reichardt

Doctor of Philosophy in Biology, Department of Biology, California Institute of Technology (Caltech), Pasadena, CA, 1990-1996. Advisor: Dr. Barbara Wold

Bachelors of Science, Magna Cum Laude, Molecular, Cellular and Developmental Biology, University of California, Los Angeles (UCLA), 1987-1990. Advisor: Dr. Judy A. Lengyel

POSITIONS HELD:

Department of Cell Biology, Dorris Neuroscience Center, The Scripps Research Institute, La Jolla, CA, 2000-present. Professor, 2008-present; Associate Professor, 2005-2008; Assistant Professor, 2000-2005

Genomics Institute of the Novartis Research Foundation, San Diego, CA, 2000-present. Director of Discovery Research, 2006-present; Head of Neuroscience, 2002-2005; Staff Scientist, 2000-2003

Adjunct Professor, Neuroscience program, University of California, San Diego, La Jolla, CA 2001-present

AWARDS:

Young Investigator Award, Society for Neuroscience, 2006

Damon Runyon Scholar Award, 2003-2005

Basil O'Connor Starter Scholar Research Award, March of Dimes Birth Defects Foundation, 2001-2003

Damon Runyon-Walter Winchell Cancer Research Foundation, Postdoctoral Fellowship 1996-1999

BIBLIOGRAPHY:

Research Articles:

1. Coste B, Xiao B, Santos JS, Syeda R, Grandl J, Spencer KS, Kim SE, Schmidt M, Mathur J, Dubin AE, Montal M, **Patapoutian A** (2012) Piezos are pore-

- forming subunits of mechanically activated channels. Nature, Feb 19. doi: 10.1038/nature10812.
2. Kim SE, Coste B, Chadha A, Cook B, **Patapoutian A** (2012) The role of Drosophila Piezo in mechanical nociception. Nature, Feb 19. doi: 10.1038/nature10801.
 3. Blasius AL, Dubin AE, Petrus MJ, Lim BK, Narezkina A, Criado JR, Wills DN, Xia Y, Moresco EM, Ehlers C, Knowlton KU, **Patapoutian A***, Beutler B* (2011) Hypermorphic mutation of the voltage-gated sodium channel encoding gene Scn10a causes a dramatic stimulus-dependent neurobehavioral phenotype. PNAS 108:19413-8
 4. Miyamoto T, Petrus MJ, Dubin AE, **Patapoutian A**. (2011) TRPV3 regulates nitric oxide synthase-independent nitric oxide synthesis in the skin. Nature Communications, 2:369
 5. Xiao B, Coste B, Mathur J, **Patapoutian A**. (2011) Temperature-dependent STIM1 activation induces Ca(2+) influx and modulates gene expression. Nature Chemical Biology, 7:351-8
 6. del Camino D., Murphy S., Heiry M., Barrett L.B., Earley T.J., Cook C.A., Petrus M.J., Zhao M., D'Amours M., Deering N., Brenner G.J., Costigan M., Hayward N.J., Chong J.A., Fanger C.M., Woolf C.J., **Patapoutian A.**, Moran M.M. (2010) TRPA1 contributes to cold hypersensitivity. Journal of Neuroscience, 30:15165-74
 7. Coste B., Mathur J., Schmidt M., Earley T.J., Ranade S., Petrus M.J., Dubin A.E., **Patapoutian, A**. (2010) Piezo1 and Piezo2 are essential components of distinct mechanically-activated cation channels. Science, 330: 55-6
 8. Grandl J, Kim SE, Uzzell V, Bursulaya B, Petrus M, Bandell M, **Patapoutian A**. (2010) Temperature-induced opening of TRPV1 ion channel is stabilized by the pore domain. Nature Neuroscience, 13: 708-14
 9. Schmidt M., Dubin A., Petrus M., Earley T., **Patapoutian A**. (2009) Nociceptive signals induce trafficking of TRPA1 to the plasma membrane. Neuron, 64:498-509
 10. Miyamoto T., Dubin A. E., Petrus M., **Patapoutian, A**. (2009) TRPV1 and TRPA1 Mediate Peripheral Nitric Oxide-Induced Nociception in Mice. PLoS Biology, 4(10):e7596
 11. Mandadi S, Sokabe T, Shibasaki K, Katanosaka K, Mizuno A, Moqrich A, **Patapoutian A**, Fukumi-Tominaga T, Mizumura K, Tominaga M. (2009) TRPV3 in keratinocytes transmits temperature information to sensory neurons via ATP. Pflugers Archiv 458:1093-102

12. Mandadi S, Nakanishi ST, Takashima Y, Dhaka A, **Patapoutian A**, McKemy DD, Whelan PJ. (2009) Locomotor networks are targets of modulation by sensory transient receptor potential vanilloid 1 and transient receptor potential melastatin 8 channels. Neuroscience. 162:1377-97
13. Hu H, Bandell M, Petrus MJ, Zhu MX, **Patapoutian A**. (2009) Zinc activates damage-sensing TRPA1 ion channels. Nature Chemical Biolology 5:183-90
14. Hu H, Grandl J, Bandell M, Petrus M, **Patapoutian A**. (2009) Two amino acid residues determine 2-APB sensitivity of the ion channels TRPV3 and TRPV4. PNAS 106:1626-31
15. Dhaka A, Uzzell V, Dubin AE, Mathur J, Petrus M, Bandell M, **Patapoutian A**.(2009) TRPV1 is activated by both acidic and basic pH. Journal of Neuroscience, 29: 153-8
16. Xiao B., Dubin A.E., Bursulaya B., Viswanath V., Jegla T.J., **Patapoutian A**. (2008) Identification of transmembrane domain 5 as a critical molecular determinant of menthol sensitivity in mammalian TRPA1 channels. Journal of Neuroscience, 28:9640-51
17. Grandl J., Hu H., Bandell M., Bursulaya B., Schmidt M., Petrus M, and **Patapoutian A**. (2008) Pore region of TRPV3 ion channel is specifically required for heat-activation. Nature Neuroscience, 11: 1007-13
18. Dhaka A., Earley T.E., Watson J., and **Patapoutian A**. (2008) Visualizing cold spots: TRPM8-expressing sensory neurons and their projections. Journal of Neuroscience, 28:566-75
19. Petrus M., Peier A.M., Bandell M., Hwang S.W., Huynh T., Olney N., Jegla T., **Patapoutian A**. (2007) A role of TRPA1 in mechanical hyperalgesia is revealed by pharmacological inhibition. Molecular Pain, 3: 40
20. Macpherson L.J., Xiao B., Kwan K.Y., Petrus M.J., Dubin A.E., Hwang S.W., Cravatt B., Corey D.P., **Patapoutian A**. (2007) An ion channel essential for sensing chemical damage. Journal of Neuroscience, 27:11412-5
21. Dhaka A., Murray A.N., Mathur J., Earley T.J., Petrus M.J., **Patapoutian A**. (2007) TRPM8 is Required for Cold Sensation in Mice. Neuron, 54: 371-8
22. Kindt K.S., Viswanath V., Macpherson L.J., Quast K., Hu H, **Patapoutian A**. Schafer W.R. (2007) Caenorhabditis elegans TRPA1 functions in mechanosensation. Nature Neuroscience, 10: 568-77
23. Macpherson L.J., Dubin A.E., Evans M.J., Marr F., Schultz P.G., Cravatt B.F., **Patapoutian A**. (2007) Noxious compounds activate TRPA1 ion channels through covalent modification of cysteines. Nature 445:541-5

24. McCleverty C.J., Koesema E, **Patapoutian A**, Lesley S.A., Kreusch A. (2006) Crystal structure of the human TRPV2 channel ankyrin repeat domain. Protein Science 15:2201-6
25. Saghatelian A., McKinney M.K., Bandell M., **Patapoutian A.**, Cravatt B.F. (2006) A FAAH-regulated class of N-acyl taurines that activates TRP ion channels. Biochemistry, 45:9007-15
26. Macpherson L.J., Hwang S.W., Miyamoto T., Dubin A.E., **Patapoutian A.**, Story G.M. (2006) More than cool: Promiscuous relationships of menthol and other sensory compounds. Molecular and Cellular Neuroscience, 32:335-43
27. Bandell M., Dubin A.E., Petrus M.J., Orth A., Mathur J., Hwang S.W., **Patapoutian A.** (2006) High-throughput random mutagenesis screen reveals TRPM8 residues specifically required for activation by menthol. Nature Neuroscience, 9:493-500
28. Macpherson L., Geierstanger B.H., Viswanath V., Bandell M., Eid S.R., Hwang SW., **Patapoutian A.** (2005) The pungency of garlic: activation of TRPA1 and TRPV1 in response to allicin. Current Biology, 15:929-1034
29. Moqrich A., Hwang S.W., Earley T.J., Petrus M.J., Murray A.N., Spencer K.S.R., Andahazy M., Story G., **Patapoutian A.** (2005) Impaired thermosensation in Mice Lacking TRPV3, a Heat-Sensing channel in skin. Science, 307: 1468-72
30. Rosenzweig M., Brennan K.M., Tayler T.D., Phelps P.O., **Patapoutian A.**, Garrity P.A. (2005) The *Drosophila* ortholog of vertebrate TRPA1 regulates thermotaxis. Genes & Development, 19: 419-24
31. Moqrich A., Earley T., Watson J., Andahazy M., Backus C., Martin-Zanca D., Wright D.E., Reichardt L.F., **Patapoutian A.**, (2004) Expressing TRKC from the TRKA locus causes a subset of DRG neurons to switch fate. Nature Neuroscience, 7: 812-8
32. Bandell M., Story G.M., Hwang S.W., Viswanath V., Eid S.R., Petrus M.J., Earley T.J., **Patapoutian A.** (2004) Noxious Cold Ion Channel TRPA1 Is Activated by Pungent Compounds and Bradykinin. Neuron, 41:849-57
33. Viswanath V., Story G.M., Peier A.M., Petrus M.J., Lee V.L., Hwang S.W., **Patapoutian A.*** and Jegla T.* (2003) Opposite thermosensor in fruitfly and mouse. Nature, 423: 822-3 (co-corresponding authors)
34. Story G.M., Peier A.M., Reeve A.J., Eid S.R., Mosbacher J., Hricik T.R., Earley T.J., Hergarden A.C., Andersson D.A., Hwang S.W., McIntyre P., Bevan S., and **Patapoutian A.** (2003) ANKTM1, a TRP-like channel expressed in nociceptive neurons, is activated by cold temperatures. Cell, 112: 819-829
35. Peier A.M., Reeve A.J., Andersson D.A., Moqrich A., Earley T.J., Hergarden A.C., Story G.M., Colley S., Hogenesch J.B., McIntyre P., Bevan S., and **Patapoutian A.** (2002) A novel heat-sensitive TRP channel expressed in keratinocytes. Science, 296: 2046-9

36. Su A.I., Cooke M.P., Ching K.A., Hakak Y., Walker J.R., Wiltshire, T., Orth A.P., Vega R.G., Sapinoso L.M., Moqrich A., **Patapoutian A.**, Hampton G.M., Schultz P.G., Hogenesch J.B. (2002) Large-scale analysis of the human and mouse transcriptomes. PNAS, 99 (7): 4465-70
37. Peier A.M., Moqrich A., Hergarden A.C., Reeve A.J., Andersson D.A., Story G.M., Earley T.J., Dragoni I., McIntyre P., Bevan S., and **Patapoutian A.** (2002) A Trp Channel that Senses Cold Stimuli and Menthol. Cell, 108: 705-715
38. **Patapoutian A.**, Backus C., Kispert A., and Reichardt L.F. (1999) Regulation of Neurotrophin-3 expression by epithelial-mesenchymal interactions: the role of Wnt factors. Science, 283: 1180-3
39. Fariñas I., Wilkinson A., Backus C., Reichardt L.F., and **Patapoutian A.** (1998) Characterization of neurotrophin and trk receptor functions in developing sensory ganglia: direct NT-3 activation of trkB neurons in vivo. Neuron, 21: 325-334
40. **Patapoutian A.**, Wold B., and Wagner R. (1995) Evidence for developmentally programmed transdifferentiation of smooth muscle to skeletal muscle in mouse esophagus. Science, 270: 1818-20
41. **Patapoutian A.**, Yoon J.K., Miner J.M., Wang S., Stark K., and Wold B. (1995) Disruption of the mouse *MRF4* gene identifies multiple waves of myogenesis in the myotome. Development, 121: 3347-58
42. **Patapoutian A.**, Miner J.H., Lyons G., and Wold B. (1993) Isolated sequences from the linked *Myf-5* and *MRF4* genes drive distinct patterns of muscle-specific expression in transgenic mice. Development, 118: 61-9
43. Verma R., **Patapoutian A.**, Gordon B.C., and Campbell J.L. (1991) Identification and purification of a factor that binds to the *MluI* cell cycle box of yeast DNA replication genes. PNAS, 88: 7155-9
44. Pignoni F., Baldarelli R.M., Steingrimsson E., Diaz R.J., **Patapoutian A.**, Merriam J.R., and Lengyel J.A. (1990) The *Drosophila* gene *tailless* is expressed at the embryonic termini and is a member of the steroid receptor superfamily. Cell, 62: 151-63

Review Articles:

1. Miyamoto T., **Patapoutian A.** (2011) Why Does Morphine Make you Itch? (2011) Cell, 147: 261-2
2. Xiao B, **Patapoutian A.** (2011) Scratching the surface: a role of pain-sensing TRPA1 in itch. Nature Neuroscience, 14:540-2
3. Dubin A.E., **Patapoutian A.** (2010) Nociceptors: the sensors of the pain pathway. Journal of Clinical Investigations, 120:3760-72

4. Macpherson L.J., **Patapoutian A.** (2010) Channels: flies feel your pain. Nature Chemical Biology, 6:252-3
5. Bandell M., **Patapoutian, A.** (2009) Itching for Insight. Cell, Dec. 24; 139: 1224-6
6. **Patapoutian, A.**, Tate, S., Woolf, C.J. (2009) Transient receptor potential channels: targeting pain at the source. Nature Reviews Drug Discovery, 8:55-68
7. Bandell M, Macpherson L.J., **Patapoutian A.** (2007) From chills to chilis: mechanisms for thermosensation and chemesthesis via thermoTRPs. Current Opinions in Neurobiology, 4: 490-7
8. **Patapoutian A**, Macpherson L.J. (2006) Channeling pain. Nature Medicine 2:506-7
9. Dhaka A., Viswanath V., **Patapoutian A.** (2006) TRP ion channels and temperature sensation. Annual Review in Neuroscience, 29: 135-61
10. **Patapoutian A.** and Wood J.N. (2004) Mechanisms of Nociception: molecules to behaviour. Journal of Neurobiology, 61: 1-2
11. **Patapoutian A.**, Peier A.M., Story G.M., and Viswanath V. (2003) ThermoTRP channels and beyond: Mechanisms of temperature sensation. Nature Reviews Neuroscience, 4: 529-39
12. **Patapoutian A.** and Reichardt L.F. (2001) Trk Receptors: Mediators of Neurotrophin Action. Current Opinion in Neurobiology, 11 (3): 272-80
13. **Patapoutian A.** and Reichardt L.F. (2000) Roles of Wnt proteins in neural development and maintenance. Current Opinion in Neurobiology, 10 (3): 392-9

ISSUED PATENTS:

- US 7,638,601 (2009) Transient receptor potential channel TRPM8 and its use
US 7,465,581 (2008) ANKTM1, a cold-activated TRP-like channel expressed in nociceptive neurons
US 7,396,910 (2008) Transient receptor potential channel TRPV3 and its use
US 7,115,414 (2006) Vanilloid receptor-related nucleic acids and polypeptides