

BIOGRAPHICAL SKETCH

NAME Marianne Bronner-Fraser		POSITION TITLE Albert Billings Ruddock Professor of Biology	
eRA COMMONS USER NAME			
EDUCATION/TRAINING (<i>Begin with baccalaureate or other initial professional education, such as nursing, & include postdoctoral training.</i>)			
INSTITUTION & LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Brown University, Providence, RI	Sc.B	1975	Biophysics
Johns Hopkins University, Baltimore, MD	Ph.D.	1979	Biophysics

Professional Experience

1980-1995	Assistant Professor in Residence, Dept. of Physiology & Biophysics, University of California, Irvine
1985-1987	Assistant Professor, Developmental & Cell Biology, University of California, Irvine
1987-1990	Associate Professor, Developmental & Cell Biology, University of California, Irvine
1990-1995	Professor, Developmental & Cell Biology, University of California, Irvine
1996-present	Professor, Division of Biology, California Institute of Technology
2000-present	Albert Billings Ruddock Chair, Division of Biology, California Institute of Technology

Honors and Awards

2006	Board of Directors, Gordon Research Conferences	1993-9	Scientific Advisory Bd. - Muscular Dystrophy Assn.
2006	NIDCR Council	1995-9	Scientific Advisory Board - Searle Foundation
Editor:	Developmental Biology, Journal of Cell Biology, Molecular Biology of the Cell	1999	Forbes Lecturer, Marine Biological Laboratory
2005	Viktor Hamburger Lecturer, Wash. Univ.	1997-01	Co-Dir., Embryology Course, Marine Biological Lab
2005	Board of Directors, Society for Devel. Biology	1997-8	ASCIT Award for Excellence in Teaching
2001&5	BUSAC Award for Excellence in Teaching	1998-02	Member of the Corporation Marine Biological Lab
2004-6	Scientific Advisory Board - March of Dimes	1994	Distinguished Research Award - UC Irvine
2004-	Joint Genome Center Sequencing Review	1994	Chair, Gordon Conference on Neural Development
2004	Harvey Lecturer, Rockefeller University	1990	Co-Chair, Gordon Conference on Neural Devel.
2004-	NHGRI Comparative Genome Evolution Review	1994-7	Member of Council – Amer. Society for Cell Biology
2001-3	Chair of the Faculty, Caltech	1994	Program Comm. - Amer. Society for Cell Biology
2002-9	Javits Award, NINDS	1992-6	Publication Comm. – Amer. Society for Cell Biology
2001	Chair, Developmental Biology Gordon Conference	1989-90	Member - Cell Biology 1 Study Section
1999-05	NASA Life Sciences Panel for Develop. Biology	1986-90	Alfred P. Sloan Foundation Research

Recent Publications (of 201 total)

- Gammill, L., Gonzalez, C., Gu, C. and Bronner-Fraser, M. (2006) Guidance of trunk neural crest migration requires Neuropilin-2/Semaphorin3F signaling. *Development* (in press).
- Coles, E.G., Gammill, L.S., Miner J.H. and Bronner-Fraser M. (2005) Abnormalities in neural crest cell migration in laminin $\alpha 5$ mutant mice. *Dev. Biol.* (in press).
- Lwigale, P., and Bronner-Fraser, M. (2005) Corneal keratocytes retain neural crest progenitor cell properties. *Dev. Biol.* (in press).
- Moreno, M. & Bronner-Fraser, M. (2005) Noelin modulate the timing of neuronal differentiation during development *Dev. Biol.* (in press).
- Taneyhill, L. & Bronner-Fraser, M. (2005) Dynamic alterations in gene expression after Wnt-mediated neural crest induction. *Mol. Biol. Cell.* (in press).
- Barembaum M, Bronner-Fraser M. (2005) Early steps in neural crest specification. *Semin Cell Dev Biol.* 16, 642-646.
- Bok J, Bronner-Fraser M, Wu DK.(2005) Role of the hindbrain in dorsoventral but not anteroposterior axial specification of the inner ear. *Development.* 132, 2115-2124.
- Kee, Y., & Bronner-Fraser, M. (2005) To proliferate or to die: role of Id3 in cell cycle progression & survival of neural crest progenitors. *Genes & Development* 19, 744-55
- Meulemans, D & Bronner-Fraser M. (2005) Central role of gene cooption in neural crest evolution. *J Exp Zool.*
- McKeown SJ, Lee VM, Bronner-Fraser M, Newgreen DF, Farlie PG. (2005) Sox10 overexpression induces neural crest-like cells from all dorsoventral levels of the neural tube but inhibits differentiation. *Dev Dyn.* 233(2):430-444.
- deBellard, ME, Bronner-Fraser M. (2005) Neural crest migration methods in the chicken embryo. *Methods Mol Biol.* 294, 247-67.
- Lee, V., Bronner-Fraser, M., & Baker, C.V. (2005) Restricted response of mesencephalic neural crest to sympathetic differentiation signals in the trunk. *Dev. Biol.* 278, 175-92.

- McCabe, K., Manzo, A., Gammill, L. & Bronner-Fraser, M. (2004) Discovery of genes implicated in placode formation. *Dev. Biol.* 24, 462-477.
- Bhattacharyya, S. & Bronner-Fraser, M. (2004) Hierarchy of regulatory events in sensory placode development *Current Opinions in Development & Genetics* 14, 520-526.
- Meulemans, D. & Bronner-Fraser, M. (2004). Gene-Regulatory Interactions in Neural Crest Development & Evolution *Developmental Cell* 7, 291-299.
- Coles, E., Christiansen, J, Economou, A, Bronner-Fraser, M & Wilkinson, D.G. (2004) A vertebrate crossveinless-2 homologue modulates BMP activity & neural crest cell migration *Development* 131, 5309-5317.
- Cerny, R., Lwigale, P., Ericsson, R., Meulemans, D., Epperlein, H.H. & Bronner-Fraser, M. (2004) Developmental origins & evolution of jaws: new interpretation of "maxillary" & "mandibular" *Dev. Biol.* 276, 225-236.
- McCauley, D. & Bronner-Fraser, M. (2004) Conservation & Divergence of BMP24 Genes in the Lamprey: Expression & Phylogenetic Analysis Suggest a Single Ancestral Gene. *Evolution & Development* 6, 411-422.
- Bhattacharyya, S., Bailey, AP, Bronner-Fraser, M, & Streit, A. (2004) Pax6, Dlx5 & cell sorting during olfactory & lens placode development: parallels between vertebrates & Drosophila *Dev. Biol.* 271, 403-414.
- Lwigale, P.Y., Conrad, G. & Bronner-Fraser, M., (2004) Graded potential of neural crest to form cornea, sensory neurons & cartilage along the rostrocaudal axis. *Development* 131, 1979-1991.
- Barembaum, M. & Bronner-Fraser, M. (2004) A novel chicken spalt gene expressed in branchial arches reduces neurogenic potential of the cranial neural crest. *Neuron Glia* 1, 57-63.
- Cerny, R. Meulemans, M., Berger, J. Wilsch-Brauminger, M., Kurth, T., Bronner-Fraser, M. & Epperlein, H.H. (2004) Cranial neural crest migration & pharyngeal arch morphogenesis in axolotl. *Dev. Biol.* 266, 252-69.
- Venters, S.J., Argent, R.E., Deegan, F.M., Wong, T.S., Tidyman, W.E., Marcelle, C., Bronner-Fraser, M., Ordahl, C.P. (2004) Limb muscle precursor cells do not undergo precocious terminal differentiation when isolated from lateral inhibitory signals *Dev. Dynamics* 229, 591-9.
- Chen, Y., Gutmann, C., Haipek, B., Martinsen, B., Bronner-Fraser, M. & Krull, C. (2004) Characterization of chicken Nf2/merlin indicates potential roles in growth regulation & cell migration. *Dev. Dynamics* 229, 541-54.
- Hemmati, HD, Nakano, Lazareff, Masterman, Geschwind, Bronner-Fraser, M. Kornblum, H. (2003) Cancerous stem cells can arise from human pediatric brain tumors. *Proc. Natl. Acad. Sci. USA* 100, 15178-83.
- Meulemans, D., D. McCauley, & M. Bronner-Fraser (2003) Id gene expression in amphioxus & lamprey highlights the role of genetic co-option during neural crest evolution. *Dev. Biol.* 264, 430-42.
- Gammill, L. & Bronner-Fraser, M. (2003) Neural crest specification: migrating into genomics. (2003) *Nature Reviews Neurosci.* 4, 795-805.
- Ahlgren, S., Vogt, P. & Bronner-Fraser, M. (2003) Excess FoxG1 causes overgrowth of the neural tube. *J. Neurobiology* 57, 337-349.
- Lee, V., Sechrist, J., Luetolf, S. & Bronner-Fraser, M. (2003) Both neural crest & placode contribute to the ciliary ganglion & oculomotor nerve. *Dev. Biol.* 263, 176-190
- DeBellard, M., Rao, Y. & Bronner-Fraser, M. (2003) Dual function of Slit2 in repulsion & enhanced migration of trunk neural crest cells. *J. Cell Biol.* 162, 269-280.
- McCauley, D. & Bronner-Fraser, M. (2003) Neural crest contributions to the lamprey head. *Development* 130, 2317-27.
- Peters, J., Sechrist, J., Luetolf, S., Lored, G. & Bronner-Fraser, M. (2003) Spatial expression of the alternatively spliced EIIIB & EIIIA segments of fibronectin in the early chicken embryo. *Cell Communication & Adhesion* 9, 221-38.
- Gammill, L. & Bronner-Fraser, M. (2002) A genomic analysis of neural crest induction. *Development* 129, 5731-41.
- García-Castro, M., Marcelle, C. & Bronner-Fraser, M. (2002) Ectodermal Wnt function as a neural crest inducer. *Science* 297, 848-51.
- Meulemans, D. & Bronner-Fraser, M. (2002) Amphioxus & lamprey AP-2 genes: implications for neural crest evolution & migration patterns. *Development* 129, 4953-62
- Lee, V., Sechrist, J., Bronner-Fraser, M. & Nishi, R. (2002) Neuronal differentiation from post-mitotic precursors in the ciliary ganglion *Devel. Biol.* 252, 312-23.
- Ahlgren, S., Thakur, V. & Bronner-Fraser, M. (2002) Sonic hedgehog rescues neural crest cell death induced by fetal alcohol syndrome. *Proc. Natl. Acad. Sci.* 99, 10476-81.
- Schubert, M., Meulemans, D. Bronner-Fraser, M., Holland, L.Z. & Holland, N.D. (2003) Differential mesodermal expression of two amphioxus MyoD family members (AmphiMRF1 & AmphiMRF2) *Mech. of Devel: Gene Exp. Patterns.* 3, 199-202.
- Baker, C., Stark, M., & Bronner-Fraser, M. (2002) Pax3-expressing ophthalmic trigeminal placode cells are committed to a cutaneous sensory neuron fate. *Dev. Biol.* 249, 219-236.
- Moreno, T. & Bronner-Fraser, M. (2002) Neural expression of mouse Noelin-1/2 & comparison with other vertebrates. *Mechanisms of Development* 199, 121-125.
- DeBellard, M.E., Ching, W., Gossler, A. & Bronner-Fraser, M. (2002) Disruption of segmental neural crest migration & ephrin expression in Delta-1 null mice. *Devel. Biol.* 249, 121-130.
- Knecht, A. & Bronner-Fraser, M. (2002) Induction of the neural crest: a multigene process. *Nat. Rev. Genetics* 3, 453-461.
- McCauley, D. & Bronner-Fraser, M. (2002) Conservation of Pax gene expression in ectodermal placodes of the lamprey. *Gene* 287, 129-139.

- Kious, B., Baker, C., Bronner-Fraser, M. & Knecht, A. (2002) Identification & characterization of a calcium channel gamma subunit expressed in differentiating neurons & myoblasts. *Devel. Biol.* 243, 249-259.
- Ahlgren, S., Bronner-Fraser, M. (2002) Recycling signaling molecules during development. *Nature Neurosci.* 5, 87-88.
- Bronner-Fraser, M. (2002) Molecular analysis of neural crest formation. *J Physiol.* 96, 3-8.
- Moreno, T. & Bronner-Fraser, M. (2001) The secreted glycoprotein Noelin promotes neurogenesis in *Xenopus*. *Devel. Biol.* 240, 340-360.

RESEARCH SUPPORT:**ONGOING**

R01 NS36585 (Bronner-Fraser, PI) 4/1/02-3/31/09

NIH

Induction of the Neural Crest

This project examines the nature of the inductive interactions that lead to formation of neural crest cells.

1 R01 NS42287-01A1 (Bronner-Fraser, PI), NIH 4/1/02-3/31/06

Analysis of Noelin, a Neural Crest Competence Factor

This proposal explores the function of a novel secreted molecule, Noelin, which renders neural tube cells competent to produce neural crest cells.

NAG 2-1585 (Bronner-Fraser, PI) 11/1/02-10/31/06

NASA

Evolution of Neural Crest & Its Contribution to the Inner Ear

This proposal examines how genes that are involved in neural crest formation may have been altered at the regulatory level & protein level to acquire new function in vertebrates. Particularly, the *Amphioxus* homologs of *Snail* & *FoxD3* & their regulatory regions have been isolated will be expressed in vertebrates.

R01 DE16459 (Bronner-Fraser, PI) 7/1/04-6/30/09

NIH

Ectodermal Placode Development into Sensory Structures

The major goal of this proposal is to explore the tissue & molecular interactions that lead to placode formation using molecular markers for specific placodes to assess their origin & differentiation.

R01 NS051051 (Bronner-Fraser, PI) 7/20/04-2/28/08

Molecular Analysis of Neural Crest Migration

Examines the roles of Semaphorins, Slits & Ephrins in controlling the pattern of neural crest migration.

Completed in the past three years

R01 DE13223-01A2 (Bronner-Fraser, PI) 7/1/00-6/30/05

NIH - NIDCR

Role of *Id2* in Craniofacial DevelopmentThe goal of this proposal is to understand the mechanisms underlying craniofacial development, with specific emphasis on the role of the transcriptional regulator, *Id2*, & its interacting proteins on cranial neural crest cells.

R01 NS41070 (Bronner-Fraser, PI) 6/1/00-5/31/04

NIH

Ectodermal Placode Development into Cranial Ganglia

The major goal of this proposal is to explore the tissue & molecular interactions that lead to placode formation using molecular markers for specific placodes to assess their origin & differentiation.

RG0146/2000-B103 (Krumlauf, R., PI) 9/1/00-8/31/03

Human Frontier Science Program (with Scott Fraser, Robb Krumlauf, David Wilkinson)

The dynamics of hindbrain patterning: coordinate analysis of cell fate, movement, & A-P identity.