

BIOGRAPHICAL SKETCH

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NAME Daniel Louis Minor, Jr., Ph.D.	POSITION TITLE Associate Professor, Departments of Biochemistry and Biophysics, & Cellular and Molecular Pharmacology Investigator, Cardiovascular Research Institute University of California Faculty Scientist/Biochemist, Physical Biosciences Division, Lawrence Berkeley National Laboratory, Berkeley		
eRA COMMONS USER NAME dminor			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Pennsylvania, Philadelphia, PA	B.A. <i>magna cum laude</i>	1989	Biochemistry (Honors) Biophysics (Honors)
Massachusetts Institute of Technology, Cambridge, MA	Ph.D.	1996	Chemistry
MRC Laboratory of Molecular Biology, Cambridge, UK	postdoc	1996	Ion channel structure
University of California, San Francisco, CA	postdoc	1996-2000	Ion channel structure and function

A. Positions and Honors.

Research and Professional experience:

- 1990-1996 Graduate Student, Department of Chemistry, Massachusetts Institute of Technology
 Advisor: Peter S. Kim, Ph.D.
- 1996 Postdoctoral Fellow, MRC-Laboratory of Molecular Biology Cambridge, England
 Advisor: Nigel Unwin, Ph.D.
- 1996-2000 Postdoctoral Fellow, Howard Hughes Medical Institute, Department of Physiology, University of California, San Francisco, Advisor: Lily Y. Jan, Ph.D.
- 2000-2006 Member, Graduate program in Biomedical Science
- 2000-2007 Assistant Professor, Department of Biochemistry and Biophysics, UCSF
- 2002-2007 Assistant Professor, Department of Cellular and Molecular Pharmacology, UCSF
- 2000- Investigator, Cardiovascular Research Institute, UCSF
- 2000- Member, Graduate Programs in Biological Sciences: Biochemistry, Biophysics, Chemistry and Chemical Biology, Neuroscience, Program in Molecular Medicine, UCSF
- 2007- Associate Professor (w/ tenure), Departments of Biochemistry and Biophysics & Cellular and Molecular Pharmacology, UCSF
- 2008- Member, Graduate program in Biomedical Science
- 2009- Biochemist, Faculty Scientist, Physical Biosciences Division, Lawrence Berkeley National Laboratory

Honors:

- 1985 ILGWU Scholarship
- 1986, 1987, 1988 Dean's list, University of Pennsylvania,
- 1988-89 Penn Student Agencies Scholarship, University of Pennsylvania
- 1989 Helix Prize in Biochemistry, University of Pennsylvania
- 1989 Phi Beta Kappa
- 1996 Burroughs Wellcome Hitchings-Elion Fellowship
- 2001-2004 McKnight Scholar in Neuroscience
- 2001-2005 Rita Allen Scholar
- 2002-2004 Alfred P. Sloan Research Fellow
- 2002-2005 Beckman Young Investigator
- 2002-2004 March of Dimes, Basil O'Connor Scholar
- 2002-2005 Searle Scholar
- 2004-2006 McKnight Technological Innovations in Neuroscience Award
- 2007 Established Investigator, American Heart Association

B. Selected peer-reviewed publications (in chronological order):

- Minor, D. L., Jr.** and Kim P. S. "Measurement of the β -sheet forming propensities of amino acids" *Nature* **367** 660-663 (1994) **PMID: 810785**
- Minor, D.L., Jr.** and Kim P.S. "Context is a major determinant of β -sheet propensity" *Nature* **371** 264-267 (1994) **PMID: 8078589**
- Schumacher, T.N.M., Mayr, L.M., **Minor, D.L., Jr.**, Milhollen, M.A., Burgess, M.W. and Kim, P.S. "Identification of (D)-peptide ligands through Mirror-Image phage display" *Science* **271** 1854-1857 (1996) **PMID: 8596952**
- Minor, D.L., Jr.** and Kim P.S. "Context-dependent secondary structure formation of a designed protein sequence" *Nature* **380** 730-734 (1996) **PMID: 8614471**
- Minor, D.L., Jr.**, Masseling, S.J., Jan, Y.N. and Jan, L.Y. "Transmembrane structure of an inwardly rectifying potassium channel" *Cell* **96** 879-891 (1999) **PMID: 10102275**
- Minor, D.L., Jr.**, Lin, Y.F, Mobley, B.C., Avelar, A., Jan, Y.N., Jan, L.Y. and Berger, J.M. "The polar T1 interface is linked to conformational changes that open the voltage-gated potassium channel" *Cell* **102** 657-670 (2000) **PMID: 11007484**
- Mosavi, L. K., **Minor, D.L., Jr.**, and Peng, Z.-y., "Consensus-derived structural determinants of the ankyrin repeat motif" *Proceedings of the National Academy of Sciences, USA* **99** 16029-16034 (2002) **PMID:12461176; PMCID: PMC138559**
- Walden, H., Podgorski, M.S., Huang, D.T., Miller, D.W., Howard, R.J., **Minor, D.L., Jr.**, Holton, J.M., and Schulman, B.A., "The structure of APPBP-1UBA3-NEDD8-ATP complex reveals the basis for selective ubiquitin-like protein activation by an E1" *Molecular Cell* **12** 1427-1437 (2003) **PMID: 14690597**
- Van Petegem, F., Clark, K.A., Chatelain, F.C., and **Minor, D.L., Jr.**, "Structure of a complex between a voltage-gated calcium channel β -subunit and an α -subunit domain" *Nature* **429** 671-675 (2004) **PMID:15141227** (*Research Highlight Nature Reviews Neuroscience* **5**:517, 2004; rated 'Exceptional' Faculty of 1000)
- Chatelain, F.C., Alagem, N., Xu, Q., Pancaroglu, R., Reuveny, E., and **Minor, D.L., Jr.**, "The pore helix dipole has a minor role in inward rectifier channel function" *Neuron* **47** 833-843 (2005) (Preview *Neuron* **47** 777-778, 2005) **PMID: 16157278**
- Van Petegem, F, Chatelain, F.C., **Minor, D.L., Jr.**, "Insights into voltage-gated calcium channel regulation from the structure of the $\text{Ca}_v1.2$ IQ domain- Ca^{2+} /calmodulin complex" *Nature Structural & Molecular Biology* **12** 1108-1115 (2005) **PMID: 16299511**
- Michelsen, K., Mrowiec, T., Duderstadt, K.E., Frey, S., **Minor, DL., Jr.**, Mayer, M.P., Schwappach, B., "A multimeric membrane protein reveals 14-3-3 isoform specificity in forward transport in yeast" *Traffic* **7** 903-916 (2006) **PMID: 16734667**
- Tsuruda, P., Julius, D., and **Minor, D.L., Jr.**, "Coiled-coils direct assembly of a cold-activated TRP channel" *Neuron* **51** 201-212 (2006) **PMID: 16846855**
- Pioletti, M., Findeisen, F., Hura, G.L., and **Minor, D.L., Jr.**, "Three-dimensional structure of the KChIP1/Kv4.3 T1 domain complex reveals a cross-shaped octamer" *Nature Structural & Molecular Biology* **13** 987-995 (2006) **PMID: 17057713**
- Howard, R.J., Clark, K.A., Holton, J.M., and **Minor, D.L., Jr.**, "Structural insight into KCNQ (Kv7) channel assembly and channelopathy" *Neuron* **53** 663-675 (2007) **PMID: 17329207**
- Van Petegem, F, Duderstadt, K.E., Clark, K.A., Wang, M., **Minor, D.L., Jr.**, "Alanine-scanning mutagenesis defines a conserved energetic hotspot in the $\text{Ca}_v\alpha_1$ AID- $\text{Ca}_v\beta$ interaction site that is critical for channel modulation" *Structure* **14** 280-294 (2008) **PMID: 18275819**
- Balss, J., Paptheodorou, P., Mehmel, M., Baumeister, D., Hertel, B., Delaroque, N., Chatelain, F. C., **Minor, D.L., Jr.**, Van Etten, J.L., Rassaw, J., Moroni, A., and Thiel, G. "Transmembrane Domain Length of Viral Potassium Ion Channels is a Signal for Mitochondria Targeting" *PNAS* **105** 12313-12318 (2008) **PMID: 18719119; PMCID: PMC2518832**
- Kim, E.Y., Rumpf, C.H., Fujiwara, Y., Cooley, E.S., Van Petegem, F., and **Minor, D.L., Jr.**, "Structures of Ca_v2 Ca^{2+} /CaM-IQ domain complexes reveal binding modes that underlie calcium-dependent inactivation and facilitation" *Structure* **16** 1455-1467 (2008) **PMID: 18940602; PMCID: PMC2701236** (Rated 'Must Read' by Faculty of 1000)
- Fujiwara, Y. and **Minor, D.L., Jr.**, 'X-ray crystal structure of a TRPM assembly domain reveals an antiparallel four-stranded coiled-coil' *Journal of Molecular Biology* **383** 854-870 (2008) **PMID: 18782578; PMCID: PMC2630241**

Hammon, J., Palanivelu, D.V., Chen, J., Patel, C., and **Minor, D.L., Jr.**, 'A green fluorescent protein screen for identification of well-expressed membrane proteins from a cohort of extremophilic organisms' *Protein Science* **18** 121-133 (2009) **PMID: 19177357** ; **PMCID : PMC2708023** (Rated 'Recommended' by Faculty of 1000)

Findeisen, F. and **Minor, D.L., Jr.**, 'Disruption of the IS6-AID linker affects voltage-gated calcium channel inactivation and facilitation' *Journal of General Physiology* **133** 327-343 (2009) **PMID: 19237593**: **PMCID : PMC2654080**

Xu, Q. and **Minor, D.L., Jr.**, 'Crystal structure of a trimeric form of the Kv7.1 (KCNQ1) A domain Tail coiled coil reveals structural plasticity and context dependent changes in a putative coiled-coil trimerization motif' *Protein Science* **18** 2100-2114 (2009) **PMID 19693805**

Reviews and commentaries (in chronological order):

Minor, D.L., Jr., "Potassium channels: life in the post-structural world" *Current Opinion in Structural Biology* **11** 403-407 (2001) **PMID: 11495731**

Yi, B.A, **Minor, D.L., Jr.**, Lin, Y.F., Jan, Y.N. and Jan, L.Y., "Controlling potassium channel activities: Interplay between the membrane and intracellular factors" *Proceedings of the National Academy of Sciences, USA* **98** 11016-11023 (2001) **PMID: 11572962**, **PMCID: PMC58676**

Minor, D.L., Jr., "Overview: Function and three-dimensional structures of ion channels" in Handbook of Cellular Signaling, Eds. R. Bradshaw and E. Dennis, Academic Press, San Diego (2004)

Minor, D.L., Jr., "Bend to open?" *Structure* **13** 1094-1095 (2005) **PMID: 16084381**

Minor, D.L., Jr., "A sensitive channel family replete with sense and motion" *Nature Structural & Molecular Biology* **13** 388-390 (2006) **PMID: 16738606**

Minor, D.L., Jr., "Wanting contact: how to pick up a channel" *Nature Chemical Biology* **2** 298-299 (2006) **PMID: 16710336**

Van Petegem, F. and **Minor, D.L., Jr.**, "The structural biology of voltage-gated calcium channel function and regulation" *Biochemical Society Transactions* **34** 887-893 (2006) **PMID: 17052221**

Minor, D.L., Jr., "Puzzle plugged by pore plasticity" *Molecular Cell* **26** 459-460 (2007) **PMID: 17531803**

Minor, D.L., Jr., "The neurobiologist's guide to structural biology: A Primer on why macromolecular structure matters and how to evaluate macromolecular structural data" *Neuron* **54** 511-533 (2007) **PMID: 17521566**

Stroud R.M., Choe, S., Holton, J., Kaback, H.R., Kwiatowski, W., **Minor, D.L., Jr.**, Reik, R., Sali, A., Stahlberg, H., Harries, W. "2007 Annual progress report synopsis of the Center for Structures of Membrane Proteins" *J. Struct. Funct. Genomics* **10** 193-208 (2009) **PMID: 19148774**; **PMCID : PMC2705707**

Minor, D.L., Jr., "An overview of ion channel structure" in Handbook of Cellular Signaling 2nd Edition, Eds. R. Bradshaw and E. Dennis, Academic Press, San Diego *In Press*

Minor, D.L., Jr., "Searching for interesting channels: Pairing selection and molecular evolution methods to study ion channel structure and function" *Molecular Biosystems* **5** 802-810 (2009) **PMID: 19603113**

C. Research Support.

Ongoing Research Support:

R01 NS49272 NIH/NINDS 7/1/04-6/30/08 (no cost extension to 6/30/10)

'Discovery and characterization of ion channel modulators'

The major goal of this project is to develop selection methods for discovering and characterizing small molecule modulators of Kir channels and to develop genetic methods to map channel-modulator interactions.

Role: PI

R01HL080050 NIH/NHLBI 5/1/05-3/31/10

Structure and function of voltage-gated calcium channels

The major goals of this project are to investigate the molecular origins of calcium channel function and regulation using a synthesis of x-ray crystallographic, biochemical, and functional methods.

Role: PI

R01DC007664 NIH/NIDCD 7/1/05-6/30/10

Structure and function of ion channel assembly and signaling complexes

The major goal of this project is to study the structural biology of potassium channel regulation.

Role: PI

U54GM074929 NIH/NIGMS 7/1/05-6/30/10

Specialized Center for Protein Structure Initiative

The major goals of this project are to solve the structures of intact membrane proteins and to develop methods for the high-throughput crystallization and structure determination of membrane proteins. Minor lab efforts are focused on determination of the structures of extremophilic membrane proteins.

Role: co-PI with R. Stroud, S. Choe, R. Kaback, J. Holton, R. Riek, H. Stahlberg, A. Sali

0740019N American Heart Association

01/01/07-12/31/11

Established Investigator Award

Role: PI

This award supports the general efforts of the lab.

09-0051

7/1/2009 - 6/30/2012

American Asthma Foundation

Structural studies of calcium-activated chloride channel modulation and function

(SPAR Early Excellence Award)

The goal of this project is to develop a structural understanding of calcium activated chloride channels.

Role: PI

R21 NS065448 NIH/NINDS

9/1/2009 – 8/31/2011

'Structural studies of CaV alpha2delta subunits and interaction with antinociceptive drugs'

The major goal of this project is to study the structural basis of CaV α 2 δ with drugs.

Role: PI

Completed Research Support:

PhRMA Foundation Research Starter Grant

1/1/01-12/31/01

'Molecular Evolution of Ion Channel Modulators' Role: PI

W. M. Keck Foundation – Young Scholars Program

7/1/02-6/30/03

Role: PI

Basil O'Connor Starter Scholar Award – March of Dimes

2/1/02-1/31/04

'Structural and Mechanistic Studies of Voltage-gated Potassium Channel Complexes'

Role: PI

PRF# 37682-G4

American Chemical Society-Petroleum Research Fund Type G Grant 1/1/02-12/31/03

'Evolution of Membrane Proteins with Enhanced Properties for Biochemical and Crystallographic Study'

Role: PI

Grant-in-Aid 0255898Y

7/1/02-6/30/04

American Heart Association –California Affiliate

'Structural and Functional Studies of a Viral Potassium Channel' Role: PI

Sloan Research Fellow Award – Alfred P. Sloan Foundation

9/1/02-8/31/04

Role: PI

Rita Allen Scholar Award – Rita Allen Foundation

10/01/01-9/30/04

'Molecular Evolution of Novel Modulators of Electrical Signaling'

Role: PI

Searle Scholar Award ,Searle Scholars Program

7/1/02-6/30/05

'Molecular Evolution of Novel Ion Channel Inhibitors and Activators'

Role: PI

McKnight Scholar Award McKnight Endowment Fund for Neuroscience 7/1/01-06/30/05

'High Resolution Studies of Ion Channel Regulation'

Role: PI

Grant-in-Aid 0455095Y

7/1/04-4/30/06

American Heart Association –California Affiliate

'Structural and Functional Studies of Calcium Channel Regulation' Role: PI

Beckman Young Investigator Award, Arnold and Mabel Beckman Foundation 9/1/02-8/31/05

'Discovery of Novel Potassium Channel Modulators by Molecular Evolution' Role: PI

R21 NS47299 NIH/NINDS

1/1/04-12/31/06

'Eukaryotic ion channel expression for structural study' Role: PI

McKnight Technological Innovations in Neuroscience Award

8/1/04-7/31/07

McKnight Endowment Fund for Neuroscience Role: PI

U.S.-Israel Binational Science Foundation Grant 2003209

9/1/04-8/31/08

'Structural and Functional Studies of Ion-Channel Interactions'

Role: Co-PI with E. Reuveny, Weizmann Institute

5P50GM073210 NIH/NIGMS

9/24/04-7/31/09

Center for Innovation in Membrane Protein Production

Role: Co-PI with R. Stroud, D. Julius, R. Edwards, P. Walter, R. Kaback, J. Van Etten