CURRICULUM VITAE

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EDUCATION

1987-1991	Postgraduate	University of California San Diego
1981-86	Ph. D.	Department of Pharmacological Sciences Stony Brook University
1979-81	M. S.	Pharmacological Institute National Taiwan University
1975-79	B. S.	National Taiwan University School of Pharmacy

APPOINTMENTS

7/1999-present	Associate Professor
8/1991-6/1999	Assistant Professor Department of Pharmacology Vanderbilt University
1/1990-7/1991	Howard Hughes Research Associate (Department of Biology, University of California, San Diego)

HONORS AND AWARDS

1981	Phi Tau Phi Honor Society (National Taiwan University)
1987-88	Fight for Sight Postdoctoral Fellowship (Fight for Sight, Inc.)
1993-95	Faculty Development Award (Pharmaceutical Research and Manufacturers of America Foundation)
1997-2000	Established Investigator Award (American Heart Association)

AREAS OF RESEARCH INTEREST

Regulation of actin cytoskeleton by protein kinase C

Regulation of rhodopsin trafficking

Regulation of rhodopsin phosphatase in retinal degeneration

Regulation of G-protein Coupled Phospholipase C Signaling

Drosophila Neurogenetics

TEACHING

Participation of the following graduate courses:

Developmental Biology Boot camp (15%) (2022-23)

Fundamentals Pharmacology (5%) (2021-23)

Pharmacology 324
(Receptor Theory and Receptor-Mediated Signal Transduction)

(30%) (1999-02)
(10%) (2003-2010)
serves as course director (40 %) (2011-2019)

Pharmacology and Drug Discovery (5%) (2020)

Pharmacology 321
(Medical Pharmacology) (5%) (1995-00)

Pharmacology 324-5
(Pharmacological Targets and Mechanisms) (10%) (1997-98)

Cellular and Integrative Neuroscience	(5%)	(1998-99)
Molecular Neurobiology	(10%)	(1998-2010)
Cell regulation	(5%)	(1992-06)

Participation of the following undergraduate course:

Introduction to the Visual System	(5%)	(1997, 1999-01)

GRADUATE STUDENT MENTORING

Lisan Parker
Daniela Popescu

POSTDOCTORAL FELLOW TRAINING

Frances Adamski
John Lee
Junyu Li
Ning Wang
Haiqin Lu

GRADUATE STUDENT THESIS COMMITTEE

Matt Kennedy
Amy Pong
Brian Ceresa
Brian Keplinger (Department of Molecular Biology)
Sareina C-Y Wu (Department of Cell Biology)
Nicki Fox (Department of Biological Sciences)
Elaine Merril (Neurocience)
Hilary Highfield
Xiaoyan Yin
Kellie Reece
Jennifer Ray (Department of Biological Sciences)
Nicole Garbarini (Neuroscience)
Xiaohui Yan
Luyan Pan (Biological Sciences)

UNDERGRADUATE RESEARCH MENTORING
Fru Bahiraehi
Sean Park
Ingrid Kelly
Roli Kumar

Vanessa Saunders
Ezell MacDonald
Courtney Frederick
Clayton Patrick
Amanda Chi
Joshua Lee
Bryan Mainhardt
Wesley Sun
Darwin Ferng
Jorge Antunez
Erin Chatman (Tennesse State University) TSU-NERVE
Lucinda Nuzum (Mount Holyoke)
Carolyn Yee

DEPARTMENTAL COMMITTEE

Organizer, 2001 Meharry/Vanderbilt Joint Pharmacology Retreat
Coordinator, Postdoctor/Graduate Student Research Seminar Series (01-03)
Curriculum Committee (2017-)

UNIVERSITY COMMITTEE

Faculty Senate (1998-2001)

PROFESSIONAL ACTIVITIES

Member, NIH Neurology C study section (1996-1997)
Ad hoc, NIH Neurology C study section (Nov. 1997)
Reviewer for: National Science Foundation, The Wellcome Trust (U.K.), The Israel Science Foundation, International Retinal Foundation

PROFESSIONAL AFFILIATIONS

Genetics Society of America (GSA)
American Society for Pharmacology and Experimental Therapeutics (ASPET)
American Society for Biochemistry and Molecular Biology (ASBMB)
Society for Neuroscience (SFN)

GRANTS AND RESEARCH SUPPORT

PREVIOUS FUNDING
R01 EY019519
Regulation of *Drosophila* arrestins in light adaptation
04/01/2009-03/31/2013 (Total direct cost: 1,000,000)

Molecular Genetics of Phototransduction
4/1/02-3/31/07 (Total direct cost: 1,125,000)

NIH 2 R01 EY09743
Molecular Genetics of Phototransduction
4/1/97-3/31/01 (Total direct cost: $742,952)

NIH 1 R01 EY09743
Molecular Genetics of Phototransduction
4/1/93-3/31/97 (Total direct cost: $ 536,642)

ESTABLISHED INVESTIGATOR GRANT (American Heart Association)
Regulation of the TRP Calcium Channel in a G-protein Coupled Signal Transduction
1/1/97-12/31/00 (Total direct cost: $272,728)

FACULTY DEVELOPMENT AWARD (Pharmaceutical Research and Manufacturers of America Foundation)
Role of INAD in Visual Transduction: A Model for Examining the Phospholipase C/C-kinase Cascade Regulated by Neurotransmitters (Total direct cost: 60,000)

AMERICAN CANCER SOCIETY (Institutional Research Grant)
Regulation of Visual Transduction (Total direct cost: 7,100)

PRESENTATION

Shieh, B.-H., Ballivet, M. and Schmidt, J. Transcriptional Regulation of Acetylcholine Receptor in Chick Skeletal Muscle and in Cultured Chick Myotubes. Soc. Neurosci. Meeting, Dallas, TX, 1985

Shieh, B.-H., Ballivet, M. and Schmidt, J. Levels of mRNA for the Alpha-, Gamma- and Delta-subunit of Acetylcholine Receptor in Denervated Chick Muscle. Soc. Neurosci. Meeting, Washington D.C., 1986

Shieh, B.-H. and Zuker, C. S. Molecular Genetics of Visual Transduction in *Drosophila.* International Symposium on Signal Transduction in Photoreceptor Cells, Julich, FRG, 1990

Shieh, B.-H., Niemeyer, B., Kline, G. and Zuker, C. S. The *inactivation-no-afterpotential D (InaD)* gene encodes a novel polypeptide which is essential for the phototransduction process. 33rd Annual Drosophila Research Conference, Philadelphia, PA, 1992

Shieh, B.-H. Molecular characterization of INAD-interacting proteins in Drosophila Photoreceptors. 9th International conference on Second Messengers and Phosphoproteins, Nashville, TN, 1995

Shieh, B.-H., Adamski, F. M., Lee, J. and Bahiraei, F. Association of INAD with NORPA is essential for controlled activation and deactivation of visual transduction *in vivo*. Neurobiology of *Drosophila*, Cold Spring Harbor Laboratory, 1997

Shieh, B.-H., Adamski, F. M., and Bahiraei, F. Regulation of Drosophila visual transduction by a multivalent adaptor protein, The 19th Annual Meeting of the Southeastern Pharmacology Society, Nashville, TN, 1998

Shieh, B.-H. Regulation of visual transduction by a scaffolding protein. University of Maryland College Park, 2000

PUBLICATIONS

Shieh, B.-H., Pezzementi, L. and Schmidt, J. (1983) Extracellular Potassium and the Regulation of Acetylcholine Receptor Synthesis in Embryonic Chick Muscle Cells. Brain Research 263, 259-265

Schneider, M., **Shieh, B.-H.**, Pezzementi, L. and Schmidt, J. (1984) Trifluoperazine Stimulates Acetylcholine Receptor Synthesis in Cultured Chick Myotubes. J. Neurochemistry 42, 1395-1401

Chang, C. C., Su, M. J., Hong, S. J., **Shieh, B.-H.** and Chiou, L. C. (1986) A Comparison of Antagonisms by Neostigmine and Diaminopyridine against the Neuromuscular Block Caused by Cobrotoxin and (+)-Tubocurarine. J. Pharm. Pharmacol. 38, 153-155

Shieh, B.-H., Ballivet, M. and Schmidt, J. (1987) Quantitation of an Alpha Subunit Splice Intermediate. Evidence for Transcriptional Activation in the Control of Acetylcholine Receptor Expression in Denervated Chick Skeletal Muscle. J. Cell Biol. 104, 1337-1341

Shieh, B.-H., Ballivet, M., and Schmidt, J. (1988) Acetylcholine Receptor Synthesis Rate and Levels of Receptor Subunits mRNAs in Chick Muscle. Neuroscience 24, 178-188

Shieh, B.-H., Stamnes, M. A., Seavello, S., Harris, G. L., and Zuker, C. S. (1989) The *ninaA* Gene Required for Visual Transduction in *Drosophila* Encodes a Homolog of the Cyclosporin A Binding Protein. Nature 338, 67-70

Smith, D. P., **Shieh, B.-H.** and Zuker, C. S. (1990) Isolation and Structure of an Arrestin Gene from *Drosophila*. Proc. Natl. Acad. Sci. USA 87, 1003-1007

Stamnes, M. A., **Shieh, B-H.**, Harris, G. L., Chuman, L. and Zuker, C. S. (1991) The Cyclophilin Homolog *ninaA* is a Tissue-Specific Integral Membrane Protein Required for the Proper Synthesis of a Subset of *Drosophila* Rhodopsins. Cell 65, 219-227

Ondek, B., Hardy, R. W., Baker, E. K., Stamnes, M. A., **Shieh, B.-H.** and Zuker, C. S. (1992) Genetic Dissection of Cyclophilin Function: Saturation Mutagenesis of the *Drosophila* Homolog ninaA. J. Biol. Chem. 267, 16460-16466

Shieh, B.-H., Niemeyer, B. (1995) A Novel Protein Encoded by the *InaD* Gene Regulates Recovery of the Visual Transduction in *Drosophila* Neuron 14, 201-210

Shieh, B.-H. and Zhu, M.-Y. (1996) Regulation of the TRP Ca^{2+} Channel by INAD in *Drosophila* photoreceptors Neuron 16, 991-998

Brash, A. R., Boeglin, W. E., Chang, M. S. and **Shieh, B.-H.** (1996) Purification and Molecular Cloning of an 8R-Lipoxygenase from the Coral *Plexaura homomalla* Reveal the Related Primary Structures of R- and S-Lipoxygenases. J. Biol. Chem. 271, 20949-20957

Koljak, R., Boutaud, O., **Shieh, B.-H.**, Samel, N. and Brash, A.R. (1997) Identification of a Naturally Occurring Peroxidase-lipoxygenase Fusion Protein. Science 277, 1994-96

Shieh, B.-H., Zhu, M.-Y., Lee, J. K., Kelly, I. M., and Bahiraei, F. (1997) Association of INAD with NORPA is Essential for Controlled Activation and Deactivation of Phototransduction in *Drosophila*. Proc. Natl. Acad. Sci. USA **94**: 12682-12687

Adamski, F.M., Zhu, M.-Y, Bahiraei, F., and **Shieh, B.-H.** (1998) Interaction of Eye-Protein Kinase C and INAD in *Drosophila*: Localization of binding domains and electrophysiological characterization of a loss of association in transgenic flies. J. Biol. Chem. **273**: 17713-17719.

Brash, A. R., Koljak, R., Boutaud, O., **Shieh, B.-H.**, and Samel, N., (1999) Allene oxide synthesis by a naturally fusion protein with lipoxygenase and catalase-related domains. In Essential Fatty Acids and Eicosanoids, (Riemersma R. A., ed.) AOCS Press, Champaign, IL pp386389

Adamski, F.M.,. K., M. Timms, and **Shieh, B.-H.** (1999) A Unique Isoform of Phospholipase C-beta4 is Preferentially Expressed in the Eye and Cerebellum of the Rat. Biochimica et Biophysica Acta .**1444**, 55-60.

Liu, M., Parker, L.L. Wadzinski, B. E., and **Shieh B.-H.** (2000) Reversible phosphorylation of the signal transduction complex in *Drosophila* photoreceptors. J. Biol. Chem. **275**: 12194-12199

Kumar, R and **Shieh, B.-H.** (2001) The Second PDZ domain of INAD is a type I domain involved in binding to eye protein kinase C: mutational analysis and naturally occurring variants. J. Biol. Chem. **276**:24971-7

Shieh, B.-H., Parker, L. L. and Popescu, D. (2002) Protein kinase C isozymes in Drosophila. J.Biochem. **132**, 523-527

Parker L. L. Backstrom, J. R. Sanders-Bush, E. and **Shieh, B.-H**. (2003) Agonist-induced phosphorylation of the serotonin 5HT2c receptor regulates its interaction with multiple PDZ protein 1. J. Biol. Chem. **278**: 21576-83

Popescu, D. Ham, A, and **Shieh, B.-H.** Scaffolding protein INAD regulates deactivation of vision by promoting phosphorylation of transient receptor potential by eye protein kinase C in Drosophila (2006) J. Neurosci. 26, 8570-8577

Peng, L., Popescu, D. C., Wang, N., and **Shieh, B.-H.** (2008) Anchoring TRP to the INAD macromolecular complex requires the last 14 residues in its carboxyl terminus. J. Neurochem. 104, 1525-36

Wang, N., Leung, H.-T., Pak, W. L., Carl, Y. T., Wadzinski, B. E., **Shieh, B.-H.** (2008) Role of protein phosphatase 2A in regulating the visual signaling in Drosophila J. Neurosci 28, 1444-51

Lu, H., Leung, H-T, Wang, N., Pak, W.L., and **Shieh, B.-H.** (2009) Role of Ca^{2+}/calmodulin dependent protein kinase II in *Drosophila* photoreceptors. J. Biol. Chem. 284: 11100-9

Shieh, B.-H. (2011) Molecular Genetics of Retinal Degeneration: a *Drosophila* Perspective. Fly, 5:4 1-13.

Kristaponyte, I., Hong, Y., Lu, H. and **Shieh, B.-H.** (2012) Role of Rhodopsin and Arrestin Phosphorylation in Retinal Degeneration of *Drosophila.* J. Neurosci. 32, 10758-66

Shieh, B.-H., Kristaponyte, I., Hong, Y. (2014) Distinct Roles of Arrestin 1 in Photoreceptors During *Drosophila* Development. J. Biol. Chem. 289: 18526-34

Shieh, B-H., Nuzum, L., Kristaponyte, I. (2021) Exploring Excitotoxicity and Regulation of a Constitutively Active TRP Ca^{2+} Channel in Drosophila. Fly 15(1): 8-27

Shieh, B.-H., Sun, W., Ferng, D. (2023) A conventional PKC critical for both the light-dependent and the light-independent regulation of the actin cytoskeleton in *Drosophila* photoreceptors J. Biol. Chem. 299: 104822-33

Ferng, D., Sun, W., and **Shieh, B.-H.** (in preparation) Dynamin-dependent and dynamin-independent endocytic tracking of rhodopsin in vivo