



Faculty of Medicine Wayne State University

(Total: 90 pages)

Name: Bhanu P. Jena
Office Address: Department of Physiology
5245 Scott Hall
Wayne State University School of Medicine
540E Canfield Avenue
Detroit, MI 48201-1928

Work Phone: (313) 577-1532

Work Email: bjena@med.wayne.edu

Work FAX: (313) 993-4177

Place of Birth: Odisha, INDIA

Education:

1975	B.Sc. First Class Honors & Highest Distinction National Merit Award	Chemistry, Zoology, Botany	B.J.B. College, Utkal University
1978	M.Sc. Ranked First (First Class First) University Gold Medal Prashant Ku. Prize	Zoology (Hypothalamic- Pituitary Hormone Control) D. R. Naik	Utkal University
1988	Ph.D. Research Excellence Award	Zoology (GTP binding G- Protein Signaling) Joel Abramowitz	Iowa State University

Postdoctoral Training:

Dec. 1988- June 1990	Post Doctoral Fellow	Biochemistry (Protein Tyrosine Phosphatases & Kinases) T. S. Ingebritsen	Iowa State University
-------------------------	----------------------	--	-----------------------

June 1990-1992	Post Doctoral Fellow (Swebilius Fellow)	Cell Biology (Rab's on cell secretion) James D. Jamieson	Yale University School of Medicine
1992-1993	Associate Research Scientist	Cell Biology (Rab's on cell secretion) James D. Jamieson	Yale University School of Medicine

Faculty Academic Appointments:

1994-2000	Assistant Professor	Surgery & Bioengineering Program	Yale University School of Medicine
2000-pr	Professor	Department of Physiology	Wayne State University School of Medicine
2004-pr	Distinguished Professor	University-Wide	Wayne State University
2004-pr	George E. Palade University Professor	University-Wide	Wayne State University
2006-pr	Adjunct Professor	Department of Chemical Engineering & Materials Science	Wayne State University College of Engineering Science
2014-pr	Adjunct Professor	Department of Physics & Astronomy	Wayne State University College of Liberal Arts & Science

Appointments at Hospitals/Affiliated Institutions (Selected):

1998-2000	Founding Director	Drug Delivery & Discovery Center	Yale University School of Medicine
1999-2000	Full Member	Yale Cancer Center	Yale University School of Medicine
2001-pr	Founding Director	NanoBioScience Institute	Wayne State University School of Medicine
2001-pr	Full Member	Karmanos Cancer Center	Wayne State University School of Medicine
2002-2006	Co-Founding Director	Asian & Korean Institute of Nanoscience & Technology	Pusan National University
2002	Distinguished Visiting Professor	Cell Biology	Vasile Goldis University
2002-2005	Distinguished Visiting Professor	Molecular Biology	Pusan National University

2002	Distinguished Visiting Professor	Physics	Vinca Research Institute
2003	Distinguished Visiting Professor	Biology	Babes-Bolyai University
2006	Distinguished Visiting Professor	Nanoscience	Agharkar Research Institute
2014	Honorary Professor	University-Wide	Târgu Mureş University
2016	Visiting Professor	University-Wide	Aligarh Muslim University
2016	Distinguished GIAN Visiting Professor	Life Sciences	Jawaharlal Nehru University
2016-pr	Member	Advisory Board	Vedanta University (In Progress)
2016-pr	Advisor	Doctoral Program Development in Cellular Neuroscience	Iliia State University
2017-pr	Honorary Scientist	Victor Babes National Research Institute	Bucharest, Romania
2018-pr	Academic President & Co-Founder	QPathology LLC	Boston, MA
2020-pr	Academic Chairman & Co-Founder	Viron Therapeutics Inc.	Boston, MA
2020-pr	President & Co-Founder	Foundation for the Advancement of Children's Education (F.A.C.E)	Bloomfield Hills, MI
2021-pr	President & Director	Viron Molecular Medicine Institute (MMI)	Boston, MA

Other Professional Positions (Selected):

2002	Foreign Member	Korean Academy of Science and Technology
2006	Foreign Member	Romania Academy of Medical Sciences
2007	Member	Academy of Scholars, Wayne State University
2011	Fellow	AAAS
2012	Foreign Member	Georgian National Academy of Science
2018	Foreign Member	European Union Academy of Science
2019	Fellow	Society for Experimental Biology and Medicine

Major Administrative Leadership Positions (Selected):**Local**

1987&1988	Student Mayor	Iowa State University, Overlooked University Police Force, Housing, and Transport
1986-1988	Executive Member	Student Body Council, Iowa State University
1998-2000	Co-Founding Director	Yale Drug Delivery & Discovery Center
2001-pr	Co-Founding Director	NanoBioScience Institute, Wayne State University
2020-	Founding President & Director [Invited]	Institute of Molecular Medicine, Cambridge, MA
2018-pr	President & Co-Founder	QPathology LLC, Boston, MA
2020-pr	President & Co-Founder	Viron Therapeutics LLC, Boston, MA

International

2002-2006	Co-Founding Director	Asian & Korean Institute of Nanoscience & Technology
2016-pr	Advisory Board Member	Vedanta University
2016-pr	Academic Program Director	Establishment of Colleges,

		Departments & Institutes, for the Vedanta University, India
2017-pr	Advisory Board Member	Victor Babes National Research Institute, Bucharest, Romania
2018-pr	Advisor & Consultant	Neuroscience Research Program, Georgia National Science Foundation, Ilia State University, Tbilisi, Georgia

Professional Societies (Selected):

1989	Sigma Xi Scientific Society	Full Member
1984-1988	Endocrine Society	Member
1991-2000	Cell Biology Society	Member
2002	Korean Academy of Science and Technology	Foreign Member
2002	America Physiological Society	Member
2006	Romania Academy of Medical Sciences	Foreign Member
2007	Academy of Scholars, WSU	Member
2011	AAAS	Fellow
2012	Georgian National Academy of Science	Foreign Member
2012	Experimental Biology & Medicine Society	Member
2014	American Chemical Society	Member
2018	European Union Academy of Science	Foreign Member
2019	Society for Experimental Biology and Medicine	Fellow

Honors and Prizes (Selected):

1976	National Merit Scholarship	Government of India	One of top 3 students in the Bachelor of Science Program
1978	University Gold Medal	Utkal University	First-Class-First in the Masters of Science

			Program
1978	Prasant Ku. Memorial Prize	Utkal University	Top Student & established new grade record in the Masters of Science Exam
1988	Research Excellence Award	Iowa State University	Award Winning Research & Thesis in the Doctoral Program
1988	Humanitarian Award	Iowa State University	Dedicated contribution to the general welfare of students and being the first international student to be elected to serve as Mayor
1992	Swebelius Cancer Research Award	Swebelius Foundation	Role of phosphatases in cell secretion
1993	Swebelius Cancer Research Award	Swebelius Foundation	Role of GTP-binding proteins in cell secretion
1995	OHSE Award	Yale University School of Medicine	Monomeric GTP-binding proteins on cell secretion
1996	OHSE Award	Yale University School of Medicine	Monomeric GTP-binding proteins on cell secretion
2002	Foreign Member	Korean Academy of Science & Technology, Seoul, S. Korea	“for the discovery of a new cellular structure the porosome and for dedicated service to science and education”
2002	Hallim Distinguished Award (Shared with Prof. Ahmed H. Zewail)	Korean Academy of Science & Technology, Seoul, S. Korea	“for the discovery of a new cellular structure the porosome”
2003	Wise & Hellen Burroughs Foundation Distinguished Lecture	Iowa State University	“porosome discovery”
2004	Distinguished Professor	Wayne State University	“for outstanding contribution to science and education”
2004	George E. Palade University Professor	Wayne State University	“for the discovery of a new cellular structure the ‘porosome’ and for his

			pioneering contributions to the understanding of cell secretion and membrane fusion”
2005	Sir Aaron Klug Distinguished Award	Mississippi State University	“pioneering discoveries on the molecular machinery and mechanism of cell secretion”
2005	George E. Palade Distinguished Award	Wayne State University	“for his pioneering discovery of the porosome, the universal secretory machinery in cells”
2006	Award & Felicitation (Chader Presented)	Maharashtra Association for the Cultivation of Science, Pune, India	“for contribution to science, education, and society”
2006	Foreign Member	Romania Academy of Medical Sciences	“for pioneering contribution to science and education”
2006	George E. Palade Distinction Gold Medal	Carol Davila University Romania	Excellence in Medicine
2007	Academy of Scholars Member	Wayne State University	“for pioneering contribution to science and education”
2007	Basic Biological Science Award	American Society of Animal Science	“for the monumental and pioneering discovery of a new cellular structure called the porosome, the universal secretory machinery in cells, and elucidation of its structure, chemistry, and function.”
2009	Ranbaxy Basic Research in Medical Sciences Award	Ranbaxy Science Foundation	“for his pioneering discovery of a new cellular structure -the “porosome”, the universal secretory machinery in cells, and for the general molecular mechanism underlying cell secretion”
2011	Fellow	AAAS	“You are being honored for your pioneering discovery of the ‘porosome’ –the universal secretory machinery in cells”

2012	Foreign Member	Georgian National Academy of Science, Tbilisi, Georgia	“Pioneering contribution to science and education”
2014	Honorary Professor	Târgu Mureş University Romania	“Pioneering contribution to science”
2015	Distinguished Scientist Award	Society for Experimental Biology and Medicine	Contribution to science
2017-	Honorary Professor	University of Delhi, India	“remarkable achievements in the area of basic and applied biology”
2017	Teaching Excellence Award	Wayne State University School of Medicine	“excellence in teaching”
2017	“Research Warrior”	Wayne State University Undergraduate Student Organization	Support and involvement in Undergraduate Research
2017	Honorary Scientist Award	Victor Babes National Research Institute, Romania	“for creativity and inventiveness invested in the discovery of the porosome, the universal portal for cell secretion”
2018	Foreign Member	European Union Academy of Science	“pioneering contributions to Science”
2019	Fellow	Society for Experimental Biology and Medicine	Scientific contributions
2021	Teaching Excellence Award	Wayne State University School of Medicine	“excellence in teaching”

HONORARY DOCTORATE DEGREES

2002 Honorary Doctor of Philosophy, Vasile Goldis University, Romania

2002 Honorary Doctor of Philosophy, Pusan National University, Korea.

2003 Honorary Doctor of Philosophy, “Iuliu Hatieganu” University of Medicine & Pharmacy, Romania.

2003 Honorary Doctor of Medicine, 'Babes-Bolyai' University, Romania, May 26, 2003,

jointly with Professors George E. Palade, and Günter Blobel.

2003 Honorary Doctorate in Philosophy, Institute of Physiology, Georgian Academy of Sciences, Georgia

2005 Honorary Doctorate in Medicine, 'Carol Davila' University, Bucharest, Romania

SERVICE (Summary followed by Selected Details)

Wayne State University

2001-pr Founding Director, NanoBioScience Institute, Wayne State University (200h)

•Advisory Board Member in a number of committees, Wayne State University (50h)

•Presented a number of scientific lectures within campus (20h)

2008-pr Co-Chair, Ahmed H. Zewail Award & Distinguished Lecture (20h)

2006-pr Member Selection Committee, George E. Palade Award (20h)

2007-pr Member, Review Committee, Academy of Scholars Research Award (20h/year)

2013 Committee Member Selected by the Provost Office to review the Academic Program of the Department of Chemical Engineering & Materials Science WSU, 2013 (100h)

2014 Committee Member Selected by the Provost Office to review the Academic Program of the Department of Bioengineering, WSU

School of Medicine (Summary)

2015-pr Member, MD-Ph.D. Advisory & Review Committee (**50h/year**)

[[Interviewed 15 MD-Ph.D. candidates in 2019](#)]

2015 Chair, Cardio Vascular Research Institute (CVRI) Review Committee [**50h**]

2001-pr Director, NanoBioScience Institute. Programs: Coordinate and teach a nanobioscience course, undertake, facilitate, and coordinate research collaborations across campus and within the school in nanobioscience, participate in joint research publications, and coordinate the writing and submission of both intramural and extramural research grants. (**250h/year**).

Professional (e.g., medical or scientific organizations and societies)

• Member, American Association for the Advancement of Science

- Full Member of Sigma Xi Scientific Society
- Member of the American Society for Cell Biology
- Member of the American Physiological Society
- Member of the Society for Experimental Biology and Medicine
- Member of the American Chemical Society
- Foreign Member, Korean Academy of Science and Technology.
- Foreign Member National Academy of Medical Sciences, Romania
- Fellow, American Association for the Advancement of Science
- Foreign Member of the Georgian National Academy of Science
- Honorary Scientist, Victor Babes National Research Institute
- Foreign Member of the European Union Academy of Science

Scholarly Service:

Grant Review Committees

2018-pr • Medical Research Council, UK, Scientific Review Panel

2015 • NSF IDBR Study Panel Member

2015 • NIH Neuroscience Study Section Mail Review

2003-2009 • NSF Site Visit Team Member, Cornell University, Nano Science Institute.

2003-pr • European Research Commission.

2007-pr • Israel Science Foundation.

2003-pr • Wellcome Trust.

2008-pr • American Air Force.

2000-pr • Human Frontier Science Program.

2004-pr • Netherlands Organization for Scientific Research.

2008-pr • Ministry of Education & Science, Russian Federation.

2006-pr • Austrian Science Fund.

2012-pr • US Naval Research.

2005-pr • Henry Ford Health System Internal Research Grants.

2008 • University of Wisconsin, Internal Research Grant review

2004-pr • Lawrence Berkeley National Laboratory Review Panel

National/International

- Founding Director, Asian Institute of Nanoscience & Technology, Pusan National University, S. Korea.
- Founding Director, NanoCellBiology Institute, University of Medicine & Pharmacy, Tg. Mures, Romania.
- Associate Secretary General, International Federation of Cell Biology
- Distinguished Visiting Professor, Vasile Goldis University, Romania.
- Distinguished Visiting Professor, Pusan National University, Korea.
- Distinguished Visiting Professor, “Iuliu Hatieganu” University of Medicine & Pharmacy, Romania, March.
- Distinguished Visiting Professor, “Babes-Bolyai” University, Romania
- Distinguished Visiting Professor, Agharkar Research Institute, Govt. of India, Pune, India
- Honorary Professor, University of Medicine & Pharmacy, Tirgu Mures, Romania
- Honorary Scientist, Victor Babes National Research Institute, Bucharest, Romania
- Member, Advisory Board, Vedanta University, Odisha, India

Regional/Local

- Co-Director, Institute of NanoBioScience, Wayne State University
- Co-Chair, Ahmed H. Zewail Award & Distinguished Lecture (20h)
- Member Selection Committee, George E. Palade Award (20h)
- Member, Review Committee, Academy of Scholars Research Award (20h/year)
- Committee Member Selected by the Provost Office to review the Academic Program of the Department of Chemical Engineering & Materials Science WSU, 2013 (100h)
- Committee Member Selected by the Provost Office to review the Academic Program of the Department of Bioengineering, WSU, 2018

Committee Service (Selected):

Local

2002-2007	Presidents Committee on International Collaboration & Affiliations	Member, Wayne State University
-----------	--	--------------------------------

2007-	George E. Palade Award Selection Committee	Member, Wayne State University
2007-	Academy of Scholars Research Award Review Committee	Member
2008-	Ahmed H. Zewail Award Selection Committee	Co-Chair, Wayne State University
2013	Provost's Committee on Department Performance Review: Chemical Engineering & Material Sciences	Member, Wayne State University
2014	University Academic Program Review	Member
2015	Dean's Committee, Cardiovascular Research Institute Review	Chair, Wayne State University School of Medicine
2015-	MD-Ph.D. Program	Member Selection Committee & Advisory Board Member, Wayne State University School of Medicine
2000-	Various Departmental Committees: Salary Committee, P&T Committee; Faculty Recruitment Committee; Junior Faculty Mentoring	Member, Physiology, Wayne State University School of Medicine

International

2002	Organizing Chair, ' <i>International Nanoscience Symposium</i> '	Wayne State University School of Medicine
2002	Co-Chair, International Nanoscience Symposium	Asian Institute of Nanoscience & Technology, Foundation Ceremony, Pusan, S. Korea
2005	Chair, Conference on ' <i>Nanoscience in the Understanding of Nature</i> '	World Expo, Aichi, Japan
2008-	Co-Chair, Selection Committee, Ahmed H. Zewail Award	Wayne State University
2016-	Doctoral Neuroscience Program Foreign Advisor	Iliia State University, Tbilisi, Georgia
2017-	Advisory Board Member	Vedanta University, Odisha, India
2017-	Member Advisory Board	Victor Babes National Research

Service for Peer-Reviewed Journals

Editorship (SIX BOOKS)

1. **Jena, B. P.** (2020) Cellular Nanomachines: *Natures Engineered Marvels*. Springer Nature Switzerland. **[Cover: Porosome Complex]**. ISBN 978-3-030-44495-2.
2. **Jena, B. P.**, Taatjes, D.J. (2013) NanoCellBiology: Multimodal Imaging in Biology & Medicine *Pan Sanford Publishing Pte. Ltd*. ISBN: 9789814411790 **[Cover: Neuronal Porosome Complex]**.
3. **Jena, B.P.** (2012) NanoCellBiology of Secretion: Imaging its Cellular and Molecular Underpinnings. *Springer Briefs in Biological Imaging* 1:1-70.
4. **Jena, B. P.** (2008) Methods in nano cell biology. *Methods in Cell Biology, Academic Press* 90:1-505. **(Cover: Porosome Complex)**.
5. **Jena, B. P.**, Hoerber, J.K.H. (2006). Force microscopy: application in biology and medicine. *Wiley & Sons, Inc.* 1-300. **[Cover: Porosome Complex]**.
6. **Jena, B. P.**, Horber, J.K.H. (2002) Atomic force microscopy in cell biology. *Methods in Cell Biology, Academic Press* 68:1-409. **[Cover: Porosome Complex]**.

Editorial Board Membership

- Guest Editor: '*Seminars in Cell and Developmental Biology*'.
- Member, Editorial Board: '*Journal of Cellular & Molecular Medicine*'.
- Member, Editorial Board: '*Micron*'.
- Assistant Editor: '*Cell Biology International*'.
- Senior Editor: '*Discoveries Journal*'.
- Senior Editor: '*Discoveries Reports*'.
- Member, Editorial Board: '*Biomedical Reviews*'.
- Member, Editorial Board: '*Journal of Proteomics, Bioinformatics & Genomics*'.
- Member, Editorial Board: '*The Scientific World Journal: Physiology*'.
- Member, Editorial Board: Austin, '*Proteomics*'.

Review of Manuscripts

- Peer Review: Nature Reports
- Peer Review: JMIC MICRON
- Peer Review: Neurotoxicity Research
- Peer Review: Cell Biology International
- Peer Review: Journal of Physics D
- Peer Review: J. Physiobiol. Rev.
- Peer Review: Nature Protocols
- Peer Review: Biochemistry
- Peer Review: Microscopy
- Peer Review: Journal of Royal Society Interface
- Peer Review: Neuroscience Lett.
- Peer Review: Experimental Biology & Medicine
- Peer Review: Theranostics
- Peer Review: F1000
- Peer Review: JoVE
- Peer Review: Journal of Histochemistry and Cell Biology
- Peer Review: Int. J. Dev. Neurosci.

Grant Review Activities (Recent):

2003-2009	NSF Nano Biotechnology Center Site Visit Team	Member
2008	Israel Science Foundation Grants	Expert Reviewer
2008-pr	Henry Ford Research Grants	Reviewer
2009	Human Frontier Science Program	Reviewer
2009	Wellcome Trust Proposals	Reviewer
2010	Air Force Office of Scientific Research Grant	Reviewer
2011	Israel Science Foundation Grants	Expert Reviewer
2013	Netherlands Organization for Scientific Research Grants	Expert Reviewer
2013, 2014	Russian Research Foundation Proposals	Expert Examiner
2013	Australian Scientific Fund Grants	Reviewer

2015	University of Wisconsin Internally Funded Research Proposals	Reviewer
2015	NSF IDBR Panel	Member
2015	NIH Grants	Reviewer
2016-2017	German-Israeli Foundation for Scientific Research and Development Grants	Expert Reviewer
2018-	MRC UK	Expert Reviewer

Editorial Activities (Recent):

Ad hoc Reviewer (Selected)

Reviewer for a number of international scientific journals including, *Nature*; *Science*; *PNAS*; *JACS*; *JBC*; *CBI*; *Langmuir*; *J. Royal Society*; *Biochemistry*; *Journal of Cell Research*; *J. of Theoretical Biology*; *Microscopy*; *Mol. Cell. Biol.*; *Exp. Biol. And Med.*; *Physiological Reviews*; *Exp. Cell Res.*; *J. Animal Reprod.*; *J. Proteom Res.*; *Mol. Cell Biol.*; *Micron*, *J. Phys. D.*; *JCMM*; among others.

Other Editorial Roles (Selected)

2000-2010	Editorial Board Member	Cell Biology International
2005-pr	Editorial Board Member	Journal of Cellular & Molecular Medicine
2010-2014	Editorial Board Member	Cell Biology International Reports
2014-pr	Senior Editor	Discoveries Journal
2014-pr	Senior Editor	Discoveries Report
2010-2016	Assistant Editor	Cell Biology International
2010-pr	Editorial Board Member	Biomedical Reviews
2014-pr	Editorial Board Member	Journal of Proteomics, Bioinformatics, and Genomics
2014-pr	Editorial Board Member	Scientific World Journal: Physiology
2014-pr	Editorial Board Member	Austin, Proteomics
2015-pr	Editorial Board Member	Micron
2017-pr	Advisor	Cell Biology International

2019-pr Guest Editor Seminars in Cell & Development
Biology

Report of Local Teaching and Training (Recent)

Teaching of Students in Courses:

2006-pr	General Endocrinology Graduate/Undergraduate Seniors PSL5680; 3 Credit	Course Director (50 students) Wayne State University School of Medicine [Student Evaluation:4.7/5]
2006-pr	NanoBioScience (Interdisciplinary) Graduate PSL7215; 3 Credit	Course Director (25-30 students) Course Developer Wayne State University School of Medicine
2016-pr	Graduate Physiology PSL7010/PSL7011; 4 Credit	Course Director [2016-2019] Three Lectures (100-110 students) Wayne State University School of Medicine [Student Evaluation:4.7/5]
2014-pr	Medical Physiology (Pituitary, Hypothalamus, Thyroid) MD1 Students	Three 1h Lectures (300 students) Wayne State University School of Medicine
2014-pr	Biotechnology Graduate PSL6300; 2 Credit PSL6010; 1 Credit	One 2h Lecture Wayne State University School of Medicine Laboratory Mentoring [Student Evaluation:4.8/5]
2006-pr	Physiology Lab. Graduate PSL7020; 2 Credit	One 5h Hands-on Laboratory Exercise Wayne State University School of Medicine [Student Evaluation:4.3/5]
2004-pr	Advanced Neurophysiology Graduate PSL7660; 3 Credit	One 3h Lecture on Molecular Mechanism of Neurotransmitter Release Wayne State University School of Medicine

2020-pr	Cellular & Molecular Physiology Graduate PSL7640; 3 Credit	Two 3h Contact hour didactic course Cell & Mol. Physiol. Wayne State University School of Medicine
2020-pr	Advanced Endocrinology Graduate PSL7680; 4 Credit	One 2h Lecture on Thyroid Wayne State University School of Medicine
2016-pr	Membrane Physiology Graduate PSL7825; 2 Credit	One 2h Lecture on Membrane Fusion Wayne State University School of Medicine
2015-16	Current Literature Graduate PSL7060; 1 Credit	Co-Director Wayne State University School of Medicine
2015-pr	Research Methods in Biomedical Physics Graduate PHY6780; 3 Credit	One 3h Lecture Department of Physics Wayne State University
2018-19	Medical Neuroscience (Presynaptic and Postsynaptic Transmission) MD1 Students	Two 1.5h Lectures (300 Students) Wayne State University School of Medicine
2019-pr	M1 Endocrine-Reproductive System	1h Lecture (300 Students) Wayne State University School of Medicine
2019-pr	M2 Research Elective	10h Preparation, Research Paper Discussion & Critical Review (20 Students)
2019-pr	Mi Research Elective	10h Preparation, Research Paper Discussion & Critical Review (20 Students)

Formal Teaching of Residents, Clinical Fellows and Research Fellows:

1995-2000	Mentor Surgical Residents Research Fellows	Yale University School of Medicine
2000-pr	Mentor Residents Research MD Students Research MD. Ph.D. Research Research Fellows	Wayne State University School of Medicine

Curriculum Development and Administration

2000-pr Founding-Director NanoBioScience Institute, Wayne State University School of Medicine. [Selected as one of the top 4 Nano Institutes in the USA by Reid Academic Publishing].

2006-pr Developed the PSL7215 NanoBioScience Course, serving as Director of this multidisciplinary course taught by faculty from all four colleges: School of Medicine, School of Pharmacy, College of Engineering and College of Liberal Arts & Sciences), Wayne State University School of Medicine.

2019: Developed a Ph.D. Concentration in “Biophysics and Biomaterials Science, serving as Director and Coordinator of this multidisciplinary, multi-departmental and multi-college program (Participating Colleges: School of Medicine, School of Pharmacy, College of Engineering and College of Liberal Arts & Sciences), Wayne State University.

Laboratory and Research Supervisory and Training Responsibilities (Recent):

2000-pr	Mentor Graduate (Doctoral Students) PSL7886	Research & Thesis Advisor
2000-pr	Mentor Graduate (Masters Students) PSL7996	Research & Thesis Advisor
2000-pr	Mentor Undergraduate Student Research PSL7010	Research Advisor
2000-pr	Mentor Undergraduate Thesis PSY4991; BIO6999	-Thesis Advisor -National Conference on Undergraduate Research (NCUR) Presentations -Amgen Scholar Competition

2000-pr Mentor
High School Research

-Detroit Science Fair Competition
-INTEL Science Competition
-NASA Science Competition
-SIEMENS Competition in Math,
Science & Technology

[Students at every level have competed and won prizes in all categories listed above at the National and International level]

A. Successful Doctoral Thesis Mentored (Recent):

Year: 2019

Candidate: Akshata R. Naik

Citation: "Molecular Machinery for the 'Kiss and Run' Mechanism of Insulin Secretion"

Degree: Ph.D. in Physiology, School of Medicine, Wayne State University

Year: 2017

Candidate: Kenneth T. Lewis

Citation: "Understanding the Molecular Structure, Composition, and Regulation of the Neuronal Porosome Complex"

Degree: Ph.D. in Physiology, School of Medicine, Wayne State University

Year: 2016

Candidate: Maheshika P. Arachchige

Citation: "Fe₃O₄ Nanoparticles for Magnetic Hyperthermia and Drug Delivery, Synthesis, Characterization, and Cellular Studies"

Degree: Ph.D. in Physics, College of Liberal Arts & Science, Wayne State University

Year: 2015

Candidate: Suvra S. Laha

Citation: "Understanding the Physics of Magnetic Nanoparticles and their Application in the Biomedical Field"

Degree: Ph.D. in Physics, College of Liberal Arts & Science, Wayne State University

Year: 2013

Candidate: Amanda Flack

Citation: "Altered Morphology and Composition of Zymogen Granules in Acute Pancreatitis"

Degree: Ph.D. in Physiology, School of Medicine, Wayne State University

Year: 2010

Candidate: Leah J. Zhang

Citation: "Molecular Mechanism of SNARE Assembly and Expulsion of Intravesicular Contents in Cell Secretion"

Degree: Ph.D. in Physiology, School of Medicine, Wayne State University

Year: 2006

Candidate: Rania Abu-Hamdah

Citation: “Regulation of the Water Channel Aquaporin 1 and Aquaporin 6: Isolation and Reconstitution of the Regulatory Complex”

Degree: Ph.D. in Physiology, School of Medicine, Wayne State University

Ph.D. Rotation Students:

Year: 2018-2018 (One Semester)

Candidate: Monazza Shahab

Citation: “Cellular Imaging Modalities”

Degree: Ph.D. Student in Physiology, School of Medicine, Wayne State University

MD-Ph.D. Rotation Students:

Year: 2019-2020

Candidate: Sebastian P. Pernal

Citation: “Differential Expansion Microscopy”

Degree: MD. Ph.D. Student, School of Medicine, Wayne State University

Year: 2019-pr

Candidate: Rafael Ramos

Citation: “Differential Expansion Microscopy”

Degree: MD. Ph.D. Student, School of Medicine, Wayne State University

MD-Ph.D. Students:

Year: 2019-pr

Candidate: Rafael Ramos

Citation: “Differential Expansion Microscopy”

Degree: MD. Ph.D. Student, School of Medicine, Wayne State University

MD Student Research:

Year: 2018-2020

Candidate: Kathleen George

Citation: “Differential Expansion Microscopy”

Degree: MD Student, School of Medicine, Wayne State University

Doctoral Thesis Committee Member (Recent):

Year: 2020-pr

Candidate: Umit Ozer

Citation: “**Role of Calcium-Bilayer Interactions in Membrane Fusion: Insights from Molecular Dynamics Simulations**”

Degree: Ph.D. in Chemical Engineering & Materials Science, College of Engineering, Wayne State University

Year: 2016-pr

Candidate: Stephanie Gladysck

Citation: "Understanding the role of a novel mitochondrial-nuclear regulator"

Degree: Ph.D., CMMG, School of Medicine, Wayne State University

Year: 2018-pr

Candidate: Zhenjie Liu

Citation: "The role of biomaterial in stem cell fate determination"

Degree: Ph.D., School of Medicine, Wayne State University

Year: 2019 (Graduated)

Candidate: Carthic Rajgopalan

Citation: "MOLECULAR MECHANISMS IN CFTR-F508DEL DEGRADATION AND THE FUNCTIONAL DEFECT OF CFTR ABSENCE IN RABBITS"

Degree: Ph.D., Physiology, School of Medicine, Wayne State University

Year: 2018

Candidate: Abir Kabani (Graduated)

Citation: "Polarized Localization Microscopy (plm) Detects Nanoscale Membrane Curvature and Induced Budding by Cholera Toxin Subunit B (ctxb)"

Degree: Ph.D. in Physics, Liberal Arts & Sciences, Wayne State University

Year: 2017 (Graduated)

Candidate: William Close

Citation: "NAVIGATING HUMAN CYTOMEGALOVIRUS (HCMV) ENVELOPMENT AND EGRESS"

Degree: Ph.D., Immunology, School of Medicine, Wayne State University

Year: 2016 (Graduated)

Candidate: Jason R. Mick

Citation: "Force Field Development with Gmcs A Fast New Monte Carlo" Molecular Simulation Code"

Degree: Ph.D. in Chemical Engineering & Materials Science, College of Engineering, Wayne State University

B. Recent Master's Thesis Successfully Mentored & or In-Progress:

Year: 2018-pr

Candidate: Brent Formosa
Citation: “Differential Expansion Microscopy & its Application to Human Skeletal Muscle Pathophysiology”
Degree: MS in Physiology, School of Medicine, Wayne State University

Year: 2018-2020 (Graduated)
Candidate: Asiri Liyanaarachchi
Citation: “Differential Expansion: Quantifying Protein Loss with Optimized Expansion”
Degree: MS in Physiology, School of Medicine, Wayne State University

Year: 2019-pr
Candidate: Samantha Silvers
Citation: “Machine Learning Application for Differential Expansion Microscopy”
Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019-pr
Candidate: Maranda Saigh
Citation: “Differential Expansion Microscopy of Drosophila Neural Network”
Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019-pr
Candidate: Christina A. Minna
Citation: “Nanothermometry of Actin-Myosin-Ion Interactions”
Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019-pr
Candidate: Ranya Aziz
Citation: “Role of HSP70 on Insulin Secretion”
Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2018-19 (Graduated)
Candidate: Katherine Thomashow
Citation: “Differential Expansion Microscopy of Rat Liver Tissue”
Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2018-2019 (Graduated)
Candidate: Rishika Pulvender
Citation: “Nanoscale thermometry”
Degree: MS from CMMG, School of Medicine, Wayne State University

Year: 2016-2018 (Graduated)
Candidate: Eric R. Kuhn
Citation: “Nanoscale thermometry”

Degree: MS in Physiology, School of Medicine, Wayne State University

Year: 2017-2019 (Graduated)

Candidate: Keith M. Kokotovich

Citation: “Immunocytochemistry in the study of cellular structure-function”

Degree: MS in Physiology, School of Medicine, Wayne State University

Year: 2007-2009 (Graduated)

Candidate: Zhui H. Chen

Citation: “Involvement of beta-adrenergic receptor in synaptic vesicle swelling and implication in neurotransmitter release”

Degree: MS in Physiology, School of Medicine, Wayne State University

Recent Master’s BMS Essay Mentored & or In-Progress:

Year: 2020 (Graduated)

Candidate: Safa Mahbuba

Citation: “Cancer Detection and Overcoming Antibiotic Resistance Using Nanothermometry”

Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2020 (Graduated)

Candidate: Yunis Dhalai

Citation: “Reconstitution of Insulin-Secreting Porosomes Complex as a Viable Alternative to Islet Transplant”

Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019 (Graduated)

Candidate: Samantha Silvers

Citation: “Machine Learning Application for Differential Expansion Microscopy”

Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019 (Graduated)

Candidate: Megan Crawford

Citation: “The Discovery & Function of the Porosome”

Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019 (Graduated)

Candidate: Sherif Hussanein

Citation: “The Insulin-Secreting Beta Cell Porosome Proteins Implicated In Diabetes”

Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019 (Graduated)

Candidate: Kathleen Jahnke

Citation: "The Neuronal Porosome Complex and Its Associated Proteins – Implications in Health, Disease and Neurological Disorders"

Degree: MS in BMS, School of Medicine, Wayne State University

Recent Master's BMS Essay Reader/Co-Advisor:

Year: 2020 (Graduated)

Candidate: Shauna Treib

Citation: "Thalamocortical Loops and Psychedelic Drug Experiences"

Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019 (Graduated)

Candidate: Natalie Hardy

Citation: "Thalamocortical Loops and Consciousness"

Degree: MS in BMS, School of Medicine, Wayne State University

Year: 2019 (Graduated)

Candidate: Neena Singhal

Citation: "T Peroxisome-generated oxidative stress contributes to compromised beta cell integrity and Type 2 Diabetes"

Degree: MS in BMS, School of Medicine, Wayne State University

C. Recent Undergraduate Thesis Mentored:

Year: 2016-19 (Graduated)

Candidate: Ranya Aziz

Citation: "The Impact of HSP70 on insulin secretion in Min6 cells"

Degree: BS Chemistry Honors, Wayne State University

Currently 1st Year BMS Student WSU SOM]

Year: 2014-19 (Graduated)

Candidate: Nikhil Yedulla

Citation: "Valproate inhibits glucose-stimulated insulin secretion in beta cells"

Degree: BS Biology Honors, Wayne State University

Currently 1st Year MD Student WSU SOM]

Year: 2014-16 (Graduated)

Candidate: Sanjana Kulkarni

Citation: "Porosome-mediated insulin secreting from beta cells"

Degree: BS Psychology Honors, Wayne State University
[Currently 4th Year MD Student WSU SOM]

Year: 2014-15 (Graduated)

Candidate: Amulya Rajgopal

Citation: "Proteome of the insulin-secreting Min6 cell porosome complex: Involvement of Hsp90 in its assembly and function"

Degree: BS Biophysics Honors, Wayne State University

[MD WSU SOM, Currently doing Residency at Henry Ford after MD degree from WSU SOM]

D. Recent Post-Doctoral Fellows [4 Fellows]:

- 1. Meishan Li, Ph.D. [2017, Supported by Karolinska Visiting Scholar Program].**
- 2. Suvra S. Laha, Ph.D. [2015-2016 K99 Grant submitted; and 1 research papers completed and published].**
- 3. Nino Kotaria, Ph.D. [2010-2011; Supported by Georgian National Science Foundation].**
- 4. Vera Okuneva, Ph.D. [2011-2012; Supported by Georgian National Science Foundation].**

E. Recent Graduate Students [29 students]:

- 1. Akshata Naik (Physiology Ph.D. Student, 2015-19) [12 research papers published, once recipient of Dept. of Physiology Graduate Student Research Award]**
- 2. Kenneth Lewis (Physiology Ph.D. Student, 2013-17) [12 research papers published; twice recipient of Dept. of Physiology Graduate Student Research Award]**
- 3. Sebastian Parnel (MD2, Ph.D. Student, 2018-pr) [3 research papers published]**
- 4. Rafael Ramos (MD2, Ph.D. Student, 2018-pr) [1 research papers published]**
- 5. Samia Jaffar (MD2 Student, 2018-19)**
- 6. Kathleen George (MD3 Student, 2018-20) [1 research papers published]**
- 7. Rishika Pulvender (MS, BMS Student, 2018-19) [PSL7996 research] [2**

research papers published]

- 8. Asiri Liyanaarachchi** (MS Physiology Student, 2018-pr) [**PSL7996 research**] [**2 research papers published**]
- 9. Brent Formosa** (MS Physiology Student, 2018-pr) [**PSL7996 research**] [**3 research papers published**]
- 10. Katherine Thomashow** (MS, BMS Student, 2018-19) [**PSL7996 research**]
- 11. Samantha Silvers** (MS, BMS Student, 2018-pr) [**PSL7996 research**]
- 12. Maranda Saigh** (MS, BMS Student, 2019-pr) [**PSL7996 research**]
- 13. Christina A. Minna** (MS, BMS Student, 2019-pr) [**PSL7996 research**]
- 14. Ranya Aziz** (MS, BMS Student, 2019-pr) [**PSL7996 research**]
- 15. Megan Crawford** (MS, BMS Student, 2019-pr)
- 16. Kathleen Jahnke** (MS, BMS Student, 2018-19) [**PSL7996 research**]
- 17. Yunis Dhalai** (MS, BMS Student, 2020-pr)
- 18. Safa Mahbuba** (MS, BMS Student, 2020-pr)
- 19. Maheshika Perera**, Physics Ph.D. candidate (2011-2016) [**2 research papers published & Recipient of the Summer 2016 Dissertation Fellowship; Graduated Aug. 2016**].
- 20. Suvra Laha**, Physics Ph.D. candidate (2012-15) [**6 research papers published & Recipient of the Summer 2015 Dissertation Fellowship; Graduated Aug. 2015**].
- 21. Sherif Hassanien** (MS Student, 2015-16) [**PSL7996 research**]
- 22. Eric Kuhn** (MS Physiology Student, 2016-2018) [**PSL7996 research**] [**3 research papers published, Received Dept. of Physiology Graduate Student Research Award, Received 3rd Prize in the 2018 Wayne State University Graduate & Postdoctoral Research Symposium.**]
- 23. Kathleen Kolinko** (MS Student, 2016-19) [**PSL7996 research & BMS Essay, 2019**]
- 24. Keith Kokotovich** (MS Physiology Student, 2016-18) [**PSL7996 research**]

25. **Bharat Kotha** (MS Student, 2016-17) [**PSL7996 research**]
26. **Monazza Shahab** (Ph.D. Physiology Student 2nd Rotation, 2018 Winter)
27. **Dennis Smythe** (BMS Essay, 2018)
28. **Sherif Hassanein** (BMS Essay, 2018)
29. **Stephanie Gladych** (Co-Mentoring CMMG Ph.D. Student with Prof. Lawrence Grossman, 2017-pr) [**Received Dept. of Physiology Graduate Student Research Award, Received 1st Prize in the 2018 Wayne State University Graduate & Postdoctoral Research Symposium.**]

F. Recent Medical Students [9 students]:

1. **Steven Mekar** (MD3. Student, 2015-16) [**Review papers**]
2. **Amulya Rajgopal** (MD4 Student, 2015-pr) [**Ongoing Research Project since Year 1**]
3. **Leah Shin** (4th year MD. Student, 2015-16) [**Research Project**]
4. **Leah Shin** (Beaumont Hospital Resident, 2017-20) [**Ongoing Research Project**]
5. **Michel Zhao** (MD1 Student, 2017) [**Honors Prospectus**]
6. **Kathleen George** (MD1 Student, 2018-20) [**Research Project**] [**1 research papers published**]
7. **Sebastian Parnel** (MD, Ph.D. Student, 2018-pr) [**3 research papers published**]
8. **Rafael Ramos** (MD, Ph.D. Student, 2018-pr) [**1 research papers published**]
9. **Samia Jaffar** (MD Student, 2018-pr)

G. Recent Undergraduate Students [9 students]:

1. **Nikhil Reddy Yedulla (Med Start Freshman) (2015-2018)**
 - (a) Title of Research: Role of Valporate on insulin secretion in Min6 cells.
 - (b) Received the prestigious **2018 Amgen Scholar Award** to work with my collaborator at Harvard Medical School.
 - (c) Received **1st Place** in the 2018 Wayne State Undergraduate Research Fair.

(d) One **1st author** research paper published.

2. Sanjana Kulkarni (Senior; 2012-2016): Molecular mechanism of porosome-mediated insulin secretion.

a. Two research papers published.

b. Senior Thesis (Honors Directed Study in Psychology/PSY4991): "Hsp70 in the assembly and function of the Min6 cell porosome complex", implication in neurological disorders, learning and memory.

c. 2015 WSU Undergraduate Research Day, Best Poster Award.

-Selected for Poster Presentation at the 2016 NCUR North Carolina Conference:

Insulin Secretion in Min6 Cells Reconstituted with the Porosome Complex.

d. PSL5010: Title of Research & Presentation: Insulin Secretion in MIN-6 Cells Reconstituted with the Porosome Complex (2015; secured A in presentation)

e. Selected for Poster Presentation at the 2015 NCUR Kentucky Conference:

Molecular mechanism of regulated insulin release from β -cells.

f. Selected for Poster Presentation at the 2014 NCUR Washington, D.C.

Conference: Insulin Secretion in MIN-6 Cells Reconstituted with the Porosome Complex.

g. PSL5010: Title of Research & Presentation: Insulin Secretion in MIN-6 Cells (2014; secured A in presentation)

3. Amulya Rajgopal (Senior) (2013-2015)

a. One research papers published.

b. PSL5010: Title of Research & Presentation: The role of chaperonins in the assembly of Porosome in insulin secreting Min6 cells (secured A in presentation)

Poster Presentation: WSU Department of Physics, Undergraduate Research Conference Received the 2014 **"George B. & Eveline R. Beard Endowed Student Prize"**

c. Selected for Poster Presentation at the NCUR Kentucky Conference : Molecular mechanism of regulated insulin release from β -cells.

d. Selected for Poster Presentation at the NCUR Washington, D.C. Conference : "Proteome of the insulin-secreting Min6 cell porosome complex: Involvement of Hsp90 in its assembly and function"

e. Senior Thesis: "Implication of Hsp90 in the assembly and function of the Min6 cell porosome complex"

4. Malek Ghandour (Senior) (2014-2016)

-PSL5010: Title of Research & Presentation: Half a century of total and transient membrane fusion: A paradigm-shift in our understanding of the process (2015; secured A in presentation)

-PSL5010: Title of Research & Presentation: Protein-Protein Interactions Within the Neuronal Porosome Complex (2014; secured A in presentation).

5. Samia Mazumdar (Junior) (2015-2016)

- (a) PSL5010: Title of Research & Presentation: Role of membrane composition in membrane biogenesis.
- (b) PSL5010: Title of Research & Presentation: Role of membrane curvature on lipid recruitment following membrane stretch (2015; secured A in presentation)

6. Alina Safikova (Pre-med Freshman) (2015-2018)

- (a) PSL5010: Title of Research & Presentation: Effect of valproate on insulin secretion in Min6 cells.

7. Brandon Laethem (Senior) (2014-2015)

- (a) Title of Research: CFTR Channel in Mucin Secretion from Human Airways Epithelial Cell Line Calu-3.
- (b) Participated in the SURF Program and conducted studies on “Role of CFTR Channel in Mucin Secretion from Human Airways Epithelial Cell Line Calu-3”. **[A manuscript is in preparation from this study].**

8. Palak Joshi (Med Start Freshman) (2017-2017)

- (a) Title of Research: Role of heterotrimeric GTP-binding proteins on insulin secretory granules.

9. Ranya Aziz (Junior & Senior Years) (2016-2018)

- PSL5010: Title of Research & Presentation: HSP70 on Insulin Secretion from Min6 Cells (Manuscript in preparation)

H. Recent High School Students [5 students]:

1. Naveen Karthik (Senior; 2014): CFTR Project Using Calu-3 Cells.

- a. Finalist in the SIEMENS Competition in Math, Science & Technology.**
- b. Currently attending Medical School at Case Western University**

2. Cara Skrzycki (Senior; 2014): Iron oxide nanoparticles for therapeutic applications.

- a. Received admission to Yale University and University of Michigan.**
- b. Currently pursuing BS at the University of Michigan**

3. Alina Shafikova (Senior; 2014): Iron oxide nanoparticles for therapeutic applications.

- a. Wayne State University Pre-Med Student.**
- b. Currently working in the Jena Lab. in Physiology at WSU.**

4. Priyanka G. Pulvender (Senior; 2017-18): Nano thermometry.

a. Genes in Space Award Finalist (NASA).

b. Participated in Detroit Science Fair

5. Renee Liu (Senior; 2018-19): Skeletal Muscle Physiology.

a. Participated in Detroit Science Fair

b. Admitted to John's Hopkins University

H. Recent Doctoral Program Thesis Committee Member (WSU)

- 1. Jason Mick**, Ph.D. candidate Chemical Engineering & Material Sciences (2011-2016) Successfully defended.
- 2. Haihui Wang**, Ph.D. candidate Physiology (2011-2014) Successfully defended.
- 3. Abir Maarouf**, Ph.D. candidate Physics (2013-2018) Successfully defended.
- 4. William Close**, Ph.D. candidate Immunology (2014-2017) Successfully defended.
- 5. Olesya Plazyo**, Ph.D. candidate Ob Gyn (2014-2016) Successfully defended.
- 6. Stephanie Gladych** (Co-Mentoring CMMG Ph.D. Student with Prof. Lawrence Grossman, 2016-pr)
- 7. Carthic Rajagopalan** (Ph.D. Thesis Committee Member, Physiology, Student with Prof. Xuequn Chen & Fei Sun, 2017-19) Successfully defended.
- 8. Farhan Chaudhury** (MD Ph.D., Thesis Committee 2018-pr)
- 9. Jhenjie Liu** (Ph.D. Thesis Committee Member 2018-pr)

Other Mentored Trainees and Faculty:

1995-1997 E-H Jeong, MD

Professor & Physician, S. Korea

Research Associate, Jena Lab., Yale University School of Medicine

Publications:

1. [The native membrane fusion machinery in cells.](#)

Jeong EH, Webster P, Khuong CQ, Abdus Sattar AK, Satchi M, Jena BP. Cell Biol Int. 1998;22(9-10):657-70.

PMID: 10452836

2. [Aquaporin 1 regulates GTP-induced rapid gating of water in secretory vesicles.](#)

Cho SJ, Sattar AK, **Jeong EH**, Satchi M, Cho JA, Dash S, Mayes MS, Stromer MH, Jena BP.

Proc Natl Acad Sci U S A. 2002 Apr 2;99(7):4720-4.

Erratum in: Proc Natl Acad Sci U S A 2002 Oct 1;99(20):13357.

PMID: 11917120

1995-1997

S. W. Schneider, MD.

Professor & Physician, University of Hamburg, Germany

Research Associate, Jena & Geibel Lab., Yale University School of Medicine

Publications:

1. [Surface dynamics in living acinar cells imaged by atomic force microscopy: identification of plasma membrane structures involved in exocytosis.](#) **Schneider SW**, Sritharan KC, Geibel JP, Oberleithner H, Jena BP. Proc Natl Acad Sci U S A. 1997 Jan 7;94(1):316-21.

PMID: 8990206

2. [Gi regulation of secretory vesicle swelling examined by atomic force microscopy.](#)

Jena BP, **Schneider SW**, Geibel JP, Webster P, Oberleithner H, Sritharan KC.

Proc Natl Acad Sci U S A. 1997 Nov 25;94(24):13317-22.

PMID: 9371843

3. [Rapid aldosterone-induced cell volume increase of endothelial cells measured by the atomic force microscope.](#)

Schneider SW, Yano Y, Sumpio BE, Jena BP, Geibel JP, Gekle M, Oberleithner H.

Cell Biol Int. 1997 Nov;21(11):759-68.

PMID: 9768474

4. [Continuous detection of extracellular ATP on living cells by using atomic force microscopy.](#)

Schneider SW, Egan ME, Jena BP, Guggino WB, Oberleithner H, Geibel JP.

Proc Natl Acad Sci U S A. 1999 Oct 12;96(21):12180-5.

PMID: 10518596

1996-1997

G. Aspelund, MD.

Assistant Professor & Physician, Surgery, Columbia University

Research Associate, Jena & Andersen Lab., Yale University School of Medicine

Publications:

1. [Impaired hepatocyte glucose transport protein \(GLUT2\) internalization in chronic pancreatitis.](#) Nathan JD, Zdankiewicz PD, Wang J, Spector SA,

Aspelund G, Jena BP, Seymour NE, Geibel JP, Andersen DK. Pancreas.

2001 Mar;22(2):172-8. PMID: 11249072

1996-1998 M. R. Satchi, MD.

Physician, NY

Research Associate, Jena Lab., Yale University School of Medicine

Publications:

1. [The native membrane fusion machinery in cells.](#)

Jeong EH, Webster P, Khuong CQ, Abdus Sattar AK, **Satchi M**, Jena BP. Cell Biol Int. 1998;22(9-10):657-70.

PMID: 10452836

2. [Aquaporin 1 regulates GTP-induced rapid gating of water in secretory vesicles.](#)

Cho SJ, Sattar AK, Jeong EH, **Satchi M**, Cho JA, Dash S, Mayes MS, Stromer MH, Jena BP.

Proc Natl Acad Sci U S A. 2002 Apr 2;99(7):4720-4.

Erratum in: Proc Natl Acad Sci U S A 2002 Oct 1;99(20):13357.

PMID: 11917120

1998-2000 A.V. Maker, MD.

Associate Professor & Physician, Surgery, UIC

Research Associate, Jena & Andersen Lab., Yale University School of Medicine

Publications:

1. [Insulin receptor \(IR\) and glucose transporter 2 \(GLUT2\) proteins form a complex on the rat hepatocyte membrane.](#)

Eisenberg ML, **Maker AV**, Slezak LA, Nathan JD, Sritharan KC, Jena BP, Geibel JP, Andersen DK.

Cell Physiol Biochem. 2005;15(1-4):51-8.

PMID: 15665515

1997-1999 J.D. Nathan, MD.

Physician, Surgery, Cincinnati Children Hospital, OH

Research Assistant, Jena & Andersen Lab., Yale University School of Medicine

Publications:

1. [Impaired hepatocyte glucose transport protein \(GLUT2\) internalization in chronic pancreatitis.](#) **Nathan JD**, Zdankiewicz PD, Wang J, Spector SA,

Aspelund G, Jena BP, Seymour NE, Geibel JP, Andersen DK. Pancreas.

2001 Mar;22(2):172-8. PMID: 11249072

2. [Insulin receptor \(IR\) and glucose transporter 2 \(GLUT2\) proteins form a complex on the rat hepatocyte membrane.](#)

Eisenberg ML, Maker AV, Slezak LA, **Nathan JD**, Sritharan KC, Jena BP, Geibel JP, Andersen DK.

Cell Physiol Biochem. 2005;15(1-4):51-8.

PMID: 15665515

1998-2000 L.A. Slezak, MD.

Physician, Surgery, Tampa, FL

Research Associate, Jena & Andersen Lab., Yale University School of Medicine

Publications:

1. [Insulin receptor \(IR\) and glucose transporter 2 \(GLUT2\) proteins form a complex on the rat hepatocyte membrane.](#)

Eisenberg ML, Maker AV, **Slezak LA**, Nathan JD, Sritharan KC, Jena BP, Geibel JP, Andersen DK.

Cell Physiol Biochem. 2005;15(1-4):51-8.

PMID: 15665515

2001-2002 R. Bonipally, Ph.D.

Senior Scientist, Forest Research Institute, NJ

Research Associate, Jena Lab., Wayne State University School of Medicine

Publications:

1. [G\(alpha\)\(i3\) in pancreatic zymogen granules participates in vesicular fusion.](#)

Sattar AA, **Boinpally R**, Stromer MH, Jena BP.

J Biochem. 2002 Jun;131(6):815-20.

PMID: 12038977

1998-2002 A.K.M Sattar, Ph.D.

Assistant Professor, Wayne State University

Research Associate/Research Assistant Professor, Jena Lab., Yale University &

Wayne State University School of Medicine

Publications:

1. [The native membrane fusion machinery in cells.](#)

Jeong EH, Webster P, Khuong CQ, **Abdus Sattar AK**, Satchi M, Jena BP.

Cell Biol Int. 1998;22(9-10):657-70.

PMID: 10452836

2. [Aquaporin 1 regulates GTP-induced rapid gating of water in secretory vesicles.](#)

Cho SJ, **Sattar AK**, Jeong EH, Satchi M, Cho JA, Dash S, Mayes MS, Stromer MH, Jena BP.

Proc Natl Acad Sci U S A. 2002 Apr 2;99(7):4720-4.

Erratum in: Proc Natl Acad Sci U S A 2002 Oct 1;99(20):13357.

PMID: 11917120

3. [G\(alpha\)\(i3\) in pancreatic zymogen granules participates in vesicular fusion.](#)

Sattar AA, Boinpally R, Stromer MH, Jena BP.

J Biochem. 2002 Jun;131(6):815-20.

PMID: 12038977

2000-2004 S.J. Cho, Ph.D.

Chief Scientist, Park Systems Corporation, S. Korea
Postdoctoral Fellow, Jena Lab., Wayne State University School of Medicine
Publications:

1. [Aquaporin 1 regulates GTP-induced rapid gating of water in secretory vesicles.](#)

Cho SJ, Sattar AK, Jeong EH, Satchi M, Cho JA, Dash S, Mayes MS, Stromer MH, Jena BP.

Proc Natl Acad Sci U S A. 2002 Apr 2;99(7):4720-4.

Erratum in: Proc Natl Acad Sci U S A 2002 Oct 1;99(20):13357.

PMID: 11917120

2. [Structure and dynamics of the fusion pores in live GH-secreting cells revealed using atomic force microscopy.](#)

Cho SJ, Jeftinija K, Glavaski A, Jeftinija S, Jena BP, Anderson LL.

Endocrinology. 2002 Mar;143(3):1144-8.

PMID: 11861542

3. [Structure and dynamics of the fusion pore in live cells.](#)

Cho SJ, Quinn AS, Stromer MH, Dash S, Cho J, Taatjes DJ, Jena BP.

Cell Biol Int. 2002;26(1):35-42.

PMID: 11779219

4. [The atomic force microscope in the study of membrane fusion and exocytosis.](#)

Jena BP, **Cho SJ**.

Methods Cell Biol. 2002;68:33-50. No abstract available.

PMID: 12053737

5. [SNAREs in opposing bilayers interact in a circular array to form conducting pores.](#)

Cho SJ, Kelly M, Rognlien KT, Cho JA, Hörber JK, Jena BP.

Biophys J. 2002 Nov;83(5):2522-7.

PMID: 12414686

6. [New structure involved in transient membrane fusion and exocytosis.](#)

Cho SJ, Wakade A, Pappas GD, Jena BP.

Ann N Y Acad Sci. 2002 Oct;971: 254-6. Review.

PMID: 12438127

7. [Structure and composition of the fusion pore.](#)

Jena BP, **Cho SJ**, Jeremic A, Stromer MH, Abu-Hamdah R.

Biophys J. 2003 Feb;84(2 Pt 1):1337-43.

PMID: 12547814

8. [Reconstituted fusion pore.](#)

Jeremic A, Kelly M, **Cho SJ**, Stromer MH, Jena BP.
Biophys J. 2003 Sep;85(3):2035-43.
PMID: 12944316

9. [Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex.](#)

Abu-Hamdah R, Cho WJ, **Cho SJ**, Jeremic A, Kelly M, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(1):7-17.
PMID: 14759764

10. [Calcium drives fusion of SNARE-apposed bilayers.](#)

Jeremic A, Kelly M, Cho JA, **Cho SJ**, Horber JK, Jena BP.
Cell Biol Int. 2004;28(1):19-31.
PMID: 14759765

11. [Addendum to "Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex" \[Cell Biol. Int. 2004\(1\):7-17\].](#)

Abu-Hamdah R, Cho WJ, **Cho SJ**, Jeremic A, Kelly M, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(5):421. No abstract available.
PMID: 15270024

12. [Patch clamped single pancreatic zymogen granules: direct measurements of ion channel activities at the granule membrane.](#)

Kelly ML, Abu-Hamdah R, Jeremic A, **Cho SJ**, Ilie AE, Jena BP.
Pancreatology. 2005;5(4-5):443-9.
PMID: 15985770

13. [Secretory vesicle swelling by atomic force microscopy.](#)

Cho SJ, Jena BP.
Methods Mol Biol. 2006;319:317-30.
PMID: 16719363

2001-2006

J.K. Hörber, Ph.D.

Professor, University of Bristol, UK
Research Professor, Physiology, Wayne State University School of Medicine
Publications:

1. [SNAREs in opposing bilayers interact in a circular array to form conducting pores.](#)

Cho SJ, Kelly M, Rognlien KT, Cho JA, **Hörber JK**, Jena BP.
Biophys J. 2002 Nov;83(5):2522-7.
PMID: 12414686

2. [Calcium drives fusion of SNARE-apposed bilayers.](#)

Jeremic A, Kelly M, Cho JA, Cho SJ, **Hörber JK**, Jena BP.
Cell Biol Int. 2004;28(1):19-31.
PMID: 14759765

3. [Secretory vesicles in live cells are not free-floating but tethered to filamentous structures: a study using photonic force microscopy.](#)

Abu-Hamdah R, Cho WJ, **Hörber JK**, Jena BP.
Ultramicroscopy. 2006 Jun-Jul;106(8-9):670-3.
PMID: 16713090

2001-2003

S. Dash, Ph.D.

Scientist, Iowa State University
Research Associate, Jena Lab., Wayne State University School of Medicine
Publications:

1. [Aquaporin 1 regulates GTP-induced rapid gating of water in secretory vesicles.](#)

Cho SJ, Sattar AK, Jeong EH, Satchi M, Cho JA, **Dash S**, Mayes MS, Stromer MH, Jena BP.
Proc Natl Acad Sci U S A. 2002 Apr 2;99(7):4720-4.
Erratum in: Proc Natl Acad Sci U S A 2002 Oct 1;99(20):13357.
PMID: 11917120

2. [Structure and dynamics of the fusion pore in live cells.](#)

Cho SJ, Quinn AS, Stromer MH, **Dash S**, Cho J, Taatjes DJ, Jena BP.
Cell Biol Int. 2002;26(1):35-42.
PMID: 11779219

2002-2005

M.L. Kelly, Ph.D.

Associate Professor, Ball State University
Research Associate, Jena Lab., Wayne State University School of Medicine
Publications:

1. [SNAREs in opposing bilayers interact in a circular array to form conducting pores.](#)

Cho SJ, **Kelly M**, Rognlien KT, Cho JA, Hörber JK, Jena BP.
Biophys J. 2002 Nov;83(5):2522-7.
PMID: 12414686

2. [Reconstituted fusion pore.](#)

Jeremic A, **Kelly M**, Cho SJ, Stromer MH, Jena BP.
Biophys J. 2003 Sep;85(3):2035-43.
PMID: 12944316

3. [Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex.](#)

Abu-Hamdah R, Cho WJ, Cho SJ, Jeremic A, **Kelly M**, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(1):7-17.
PMID: 14759764

4. [Calcium drives fusion of SNARE-apposed bilayers.](#)

Jeremic A, **Kelly M**, Cho JA, Cho SJ, Horber JK, Jena BP.
Cell Biol Int. 2004;28(1):19-31.
PMID: 14759765

5. [Addendum to "Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex" \[Cell Biol. Int. 2004\(1\):7-17\].](#)
Abu-Hamdah R, Cho WJ, Cho SJ, Jeremic A, **Kelly M**, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(5):421. No abstract available.
PMID: 15270024

6. [Vesicle swelling regulates content expulsion during secretion.](#)
Kelly ML, Cho WJ, Jeremic A, Abu-Hamdah R, Jena BP.
Cell Biol Int. 2004;28(10):709-16.
PMID: 15516329

7. [Patch clamped single pancreatic zymogen granules: direct measurements of ion channel activities at the granule membrane.](#)
Kelly ML, Abu-Hamdah R, Jeremic A, Cho SJ, Ilie AE, Jena BP.
Pancreatology. 2005;5(4-5):443-9.
PMID: 15985770

2002-2006

A. Jeremic, Ph.D.

Associate Professor, George Washington University
Postdoctoral Fellow, Jena Lab., Wayne State University School of Medicine
Publications:

1. [Reconstituted fusion pore.](#)

Jeremic A, Kelly M, Cho SJ, Stromer MH, Jena BP.
Biophys J. 2003 Sep;85(3):2035-43.
PMID: 12944316

2. [Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex.](#)

Abu-Hamdah R, Cho WJ, Cho SJ, **Jeremic A**, Kelly M, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(1):7-17.
PMID: 14759764

3. [Calcium drives fusion of SNARE-apposed bilayers.](#)

Jeremic A, Kelly M, Cho JA, Cho SJ, Horber JK, Jena BP.
Cell Biol Int. 2004;28(1):19-31.
PMID: 14759765

4. [Addendum to "Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex" \[Cell Biol. Int. 2004\(1\):7-17\].](#)

Abu-Hamdah R, Cho WJ, Cho SJ, **Jeremic A**, Kelly M, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(5):421. No abstract available.
PMID: 15270024

5. [Vesicle swelling regulates content expulsion during secretion.](#)
Kelly ML, Cho WJ, **Jeremic A**, Abu-Hamdah R, Jena BP.
Cell Biol Int. 2004;28(10):709-16.
PMID: 15516329
6. [Patch clamped single pancreatic zymogen granules: direct measurements of ion channel activities at the granule membrane.](#)
Kelly ML, Abu-Hamdah R, **Jeremic A**, Cho SJ, Ilie AE, Jena BP.
Pancreatology. 2005;5(4-5):443-9.
PMID: 15985770
7. [Involvement of water channels in synaptic vesicle swelling.](#)
Jeremic A, Cho WJ, Jena BP.
Exp Biol Med (Maywood). 2005 Oct;230(9):674-80.
PMID: 16179736
8. [Size of supramolecular SNARE complex: membrane-directed self-assembly.](#)
Cho WJ, **Jeremic A**, Jena BP.
J Am Chem Soc. 2005 Jul 27;127(29):10156-7.
PMID: 16028912
9. [Cholesterol is critical to the integrity of neuronal porosome/fusion pore.](#)
Jeremic A, Jin Cho W, Jena BP.
Ultramicroscopy. 2006 Jun-Jul;106(8-9):674-7.
PMID: 16709444
10. [Energy-dependent disassembly of self-assembled SNARE complex: observation at nanometer resolution using atomic force microscopy.](#)
Jeremic A, Quinn AS, Cho WJ, Taatjes DJ, Jena BP.
J Am Chem Soc. 2006 Jan 11;128(1):26-7.
PMID: 16390104
11. [Neuronal fusion pore assembly requires membrane cholesterol.](#)
Cho WJ, **Jeremic A**, Jin H, Ren G, Jena BP.
Cell Biol Int. 2007 Nov;31(11):1301-8.
PMID: 17703958
12. [Nano-scale imaging and dynamics of amylin-membrane interactions and its implication in type II diabetes mellitus.](#)
Cho WJ, Jena BP, **Jeremic A**.
Methods Cell Biol. 2008;90:267-86. doi: 10.1016/S0091-679X(08)00813-3.
PMID: 19195555
13. [Involvement of vH\(+\)-ATPase in synaptic vesicle swelling.](#)
Shin L, Basi N, **Jeremic A**, Lee JS, Cho WJ, Chen Z, Abu-Hamdah R, Oupicky D, Jena BP.

J Neurosci Res. 2010 Jan;88(1):95-101. doi: 10.1002/jnr.22180.
PMID: 19610106

14. [3D organization and function of the cell: Golgi budding and vesicle biogenesis to docking at the porosome complex.](#)

Wang S, Lee JS, Bishop N, **Jeremic A**, Cho WJ, Chen X, Mao G, Taatjes DJ, Jena BP.

Histochem Cell Biol. 2012 Jun;137(6):703-18. doi: 10.1007/s00418-012-0948-x.

PMID: 22527693

2004-2009

W-J. Cho, Ph.D.

Scientist, Wayne State University

Research Associate, Jena Lab., Wayne State University School of Medicine

Publications:

1. [Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex.](#)

Abu-Hamdah R, **Cho WJ**, Cho SJ, Jeremic A, Kelly M, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(1):7-17.

PMID: 14759764

2. [Addendum to "Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex" \[Cell Biol. Int. 2004\(1\):7-17\].](#)

Abu-Hamdah R, **Cho WJ**, Cho SJ, Jeremic A, Kelly M, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(5):421. No abstract available.

PMID: 15270024

3. [Vesicle swelling regulates content expulsion during secretion.](#)

Kelly ML, **Cho WJ**, Jeremic A, Abu-Hamdah R, Jena BP.

Cell Biol Int. 2004;28(10):709-16.

PMID: 15516329

4. [Involvement of water channels in synaptic vesicle swelling.](#)

Jeremic A, **Cho WJ**, Jena BP.

Exp Biol Med (Maywood). 2005 Oct;230(9):674-80.

PMID: 16179736

5. [Size of supramolecular SNARE complex: membrane-directed self-assembly.](#)

Cho WJ, Jeremic A, Jena BP.

J Am Chem Soc. 2005 Jul 27;127(29):10156-7.

PMID: 16028912

6. [Cholesterol is critical to the integrity of neuronal porosome/fusion pore.](#)

Jeremic A, **Cho WJ**, Jena BP.

Ultramicroscopy. 2006 Jun-Jul;106(8-9):674-7.

PMID: 16709444

7. [Secretory vesicles in live cells are not free-floating but tethered to filamentous structures: a study using photonic force microscopy.](#)

Abu-Hamdah R, **Cho WJ**, Hörber JK, Jena BP.
Ultramicroscopy. 2006 Jun-Jul;106(8-9):670-3.
PMID: 16713090

8. [Energy-dependent disassembly of self-assembled SNARE complex: observation at nanometer resolution using atomic force microscopy.](#)

Jeremic A, Quinn AS, **Cho WJ**, Taatjes DJ, Jena BP.
J Am Chem Soc. 2006 Jan 11;128(1):26-7.
PMID: 16390104

9. [Neuronal fusion pore assembly requires membrane cholesterol.](#)

Cho WJ, Jeremic A, Jin H, Ren G, Jena BP.
Cell Biol Int. 2007 Nov;31(11):1301-8.
PMID: 17703958

10. [Nano-scale imaging and dynamics of amylin-membrane interactions and its implication in type II diabetes mellitus.](#)

Cho WJ, Jena BP, Jeremic A.
Methods Cell Biol. 2008;90:267-86. doi: 10.1016/S0091-679X(08)00813-3.
PMID: 19195555

11. [EM 3D contour maps provide protein assembly at the nanoscale within the neuronal porosome complex.](#)

Cho WJ, Ren G, Jena BP.
J Microsc. 2008 Oct;232(1):106-11. doi: 10.1111/j.1365-2818.2008.02088.x.
PMID: 19017207

12. [Circular dichroism \(CD\) spectroscopy of the assembly and disassembly of SNAREs: The proteins involved in membrane fusion in cells.](#)

Cook JD, **Cho WJ**, Stemmler TL, Jena BP.
Chem Phys Lett. 2008 Sep 1;462(1-3):6-9.
PMID: 19412345

13. [Porosome in astrocytes.](#)

Lee JS, **Cho WJ**, Jeftinija K, Jeftinija S, Jena BP.
J Cell Mol Med. 2009 Feb;13(2):365-72. doi: 10.1111/j.1582-4934.2008.00334.x.
PMID: 18400049

14. [Structure of membrane-associated neuronal SNARE complex: implication in neurotransmitter release.](#)

Cho WJ, Shin L, Ren G, Jena BP.

J Cell Mol Med. 2009 Oct;13(10):4161-5. doi: 10.1111/j.1582-4934.2009.00895.x.
PMID: 19737333

15. [Nanoscale 3D contour map of protein assembly within the astrocyte porosome complex.](#)

Cho WJ, Ren G, Lee JS, Jeftinija K, Jeftinija S, Jena BP.
Cell Biol Int. 2009 Feb;33(2):224-9. doi: 10.1016/j.cellbi.2008.11.008.
PMID: 19084606

16. [Involvement of cholesterol in synaptic vesicle swelling.](#)

Lee JS, **Cho WJ**, Shin L, Jena BP.
Exp Biol Med (Maywood). 2010 Apr;235(4):470-7. doi:
10.1258/ebm.2010.009259.
PMID: 20407079

17. [Membrane lipids influence protein complex assembly-disassembly.](#)

Shin L, **Cho WJ**, Cook JD, Stemmler TL, Jena BP.
J Am Chem Soc. 2010 Apr 28;132(16):5596-7. doi: 10.1021/ja101574d.
PMID: 20373736

18. [Conformation states of the neuronal porosome complex.](#)

Cho WJ, Lee JS, Jena BP.
Cell Biol Int. 2010 Nov;34(11):1129-32. doi: 10.1042/CBI20100510.
PMID: 20939833

19. [Involvement of vH\(+\)-ATPase in synaptic vesicle swelling.](#)

Shin L, Basi N, Jeremic A, Lee JS, **Cho WJ**, Chen Z, Abu-Hamdah R, Oupicky D, Jena BP.
J Neurosci Res. 2010 Jan;88(1):95-101. doi: 10.1002/jnr.22180.
PMID: 19610106

20. [Involvement of \$\beta\$ -adrenergic receptor in synaptic vesicle swelling and implication in neurotransmitter release.](#)

Chen ZH, Lee JS, Shin L, **Cho WJ**, Jena BP.
J Cell Mol Med. 2011 Mar;15(3):572-6. doi: 10.1111/j.1582-4934.2010.01026.x.
PMID: 20132410

21. [Membrane-directed molecular assembly of the neuronal SNARE complex.](#)

Cho WJ, Lee JS, Zhang L, Ren G, Shin L, Manke CW, Potoff J, Kotaria N, Zhvania MG, Jena BP.
J Cell Mol Med. 2011 Jan;15(1):31-7. doi: 10.1111/j.1582-4934.2010.01152.x.
PMID: 20716122

22. [3D organization and function of the cell: Golgi budding and vesicle](#)

[biogenesis to docking at the porosome complex.](#)

Wang S, Lee JS, Bishop N, Jeremic A, **Cho WJ**, Chen X, Mao G, Taatjes DJ, Jena BP.

Histochem Cell Biol. 2012 Jun;137(6):703-18. doi: 10.1007/s00418-012-0948-x.

PMID: 22527693

23. [Aquaporin-assisted and ER-mediated mitochondrial fission: a hypothesis.](#)

Lee JS, Hou X, Bishop N, Wang S, Flack A, **Cho WJ**, Chen X, Mao G, Taatjes DJ, Sun F, Zhang K, Jena BP.

Micron. 2013 Apr;47:50-8. doi: 10.1016/j.micron.2013.01.005.

PMID: 23416165

24. [X-ray solution structure of the native neuronal porosome-synaptic vesicle complex: Implication in neurotransmitter release.](#)

Kovari LC, Brunzelle JS, Lewis KT, **Cho WJ**, Lee JS, Taatjes DJ, Jena BP.

Micron. 2014 Jan;56:37-43. doi: 10.1016/j.micron.2013.10.002.

PMID: 24176623

2007-2010

J-S. Lee, Ph.D.

Sr. Research Associate, UT Southwestern Medical Center
Postdoctoral Fellow, Jena Lab., Wayne State University School of Medicine
Publications:

1. [Porosome in astrocytes.](#)

Lee JS, Cho WJ, Jeftinija K, Jeftinija S, Jena BP.

J Cell Mol Med. 2009 Feb;13(2):365-72. doi: 10.1111/j.1582-4934.2008.00334.x.

PMID: 18400049

2. [Nanoscale 3D contour map of protein assembly within the astrocyte porosome complex.](#)

Cho WJ, Ren G, **Lee JS**, Jeftinija K, Jeftinija S, Jena BP.

Cell Biol Int. 2009 Feb;33(2):224-9. doi: 10.1016/j.cellbi.2008.11.008.

PMID: 19084606

3. [Involvement of cholesterol in synaptic vesicle swelling.](#)

Lee JS, Cho WJ, Shin L, Jena BP.

Exp Biol Med (Maywood). 2010 Apr;235(4):470-7. doi: 10.1258/ebm.2010.009259.

PMID: 20407079

4. [Conformation states of the neuronal porosome complex.](#)

Cho WJ, **Lee JS**, Jena BP.

Cell Biol Int. 2010 Nov;34(11):1129-32. doi: 10.1042/CBI20100510.

PMID: 20939833

5. [Involvement of vH\(+\)-ATPase in synaptic vesicle swelling.](#)

Shin L, Basi N, Jeremic A, **Lee JS**, Cho WJ, Chen Z, Abu-Hamdah R, Oupicky D, Jena BP.

J Neurosci Res. 2010 Jan;88(1):95-101. doi: 10.1002/jnr.22180.

PMID: 19610106

6. [Involvement of \$\beta\$ -adrenergic receptor in synaptic vesicle swelling and implication in neurotransmitter release.](#)

Chen ZH, **Lee JS**, Shin L, Cho WJ, Jena BP.

J Cell Mol Med. 2011 Mar;15(3):572-6. doi: 10.1111/j.1582-4934.2010.01026.x.

PMID: 20132410

7. [Membrane-directed molecular assembly of the neuronal SNARE complex.](#)

Cho WJ, **Lee JS**, Zhang L, Ren G, Shin L, Manke CW, Potoff J, Kotaria N, Zhvania MG, Jena BP.

J Cell Mol Med. 2011 Jan;15(1):31-7. doi: 10.1111/j.1582-4934.2010.01152.x.

PMID: 20716122

8. [3D organization and function of the cell: Golgi budding and vesicle biogenesis to docking at the porosome complex.](#)

Wang S, **Lee JS**, Bishop N, Jeremic A, Cho WJ, Chen X, Mao G, Taatjes DJ, Jena BP.

Histochem Cell Biol. 2012 Jun;137(6):703-18. doi: 10.1007/s00418-012-0948-x.

PMID: 22527693

9. [Aquaporin-assisted and ER-mediated mitochondrial fission: a hypothesis.](#)

Lee JS, Hou X, Bishop N, Wang S, Flack A, Cho WJ, Chen X, Mao G, Taatjes DJ, Sun F, Zhang K, Jena BP.

Micron. 2013 Apr;47:50-8. doi: 10.1016/j.micron.2013.01.005.

PMID: 23416165

10. [X-ray solution structure of the native neuronal porosome-synaptic vesicle complex: Implication in neurotransmitter release.](#)

Kovari LC, Brunzelle JS, Lewis KT, Cho WJ, **Lee JS**, Taatjes DJ, Jena BP.

Micron. 2014 Jan;56:37-43. doi: 10.1016/j.micron.2013.10.002.

PMID: 24176623

Faculty Mentored (Recent):

2013-2014 **G. Lawes**, Associate Professor of Physics, Wayne State University.

Promoted to Professor of Physics in 2015
Sabbatical in the Jena Group: Gain experience on various molecular, cellular, and biophysical approaches.

2011-2016 **X. Chen**, Assistant Professor of Physiology, Wayne State University School of Medicine

Received first NIH R01 Grant in 2016

Collaborative Publications:

1. [3D organization and function of the cell: Golgi budding and vesicle biogenesis to docking at the porosome complex.](#)

Wang S, Lee JS, Bishop N, Jeremic A, Cho WJ, **Chen X**, Mao G, Taatjes DJ, Jena BP. Histochem Cell Biol. 2012 Jun;137(6):703-18. doi: 10.1007/s00418-012-0948-x. PMID: 22527693

2. [Neuronal porosome proteome: Molecular dynamics and architecture.](#)

Lee JS, Jeremic A, Shin L, Cho WJ, **Chen X**, Jena BP. J Proteomics. 2012 Jul 16;75(13):3952-62. doi: 10.1016/j.jprot.2012.05.017. PMID: 22659300

3. [Aquaporin-assisted and ER-mediated mitochondrial fission: a hypothesis.](#)

Lee JS, Hou X, Bishop N, Wang S, Flack A, Cho WJ, **Chen X**, Mao G, Taatjes DJ, Sun F, Zhang K, Jena BP. Micron. 2013 Apr;47:50-8. doi: 10.1016/j.micron.2013.01.005. PMID: 23416165

4. [CXCR2 macromolecular complex in pancreatic cancer: a potential therapeutic target in tumor growth.](#)

Wang S, Wu Y, Hou Y, Guan X, Castelveter MP, Oblak JJ, Banerjee S, Filtz TM, Sarkar FH, **Chen X**, Jena BP, Li C. Transl Oncol. 2013 Apr;6(2):216-25. Erratum in: Transl Oncol. 2013 Dec;6(6):erratum. PMID: 23544174

5. [Proteome of the porosome complex in human airway epithelia: interaction with the cystic fibrosis transmembrane conductance regulator \(CFTR\).](#)

Hou X, Lewis KT, Wu Q, Wang S, **Chen X**, Flack A, Mao G, Taatjes DJ, Sun F, Jena BP. J Proteomics. 2014 Jan 16;96:82-91. doi: 10.1016/j.jprot.2013.10.041. PMID: 24220302

6. [Proteome of the insulin-secreting Min6 cell porosome complex: involvement of Hsp90 in its assembly and function.](#)

Rajagopal A, Kulkarni S, Lewis KT, **Chen X**, Maarouf A, Kelly CV, Taatjes DJ, Jena BP. J Proteomics. 2015 Jan 30;114:83-92. doi: 10.1016/j.jprot.2014.11.010. PMID: 25464371

7. [COPII-Dependent ER Export: A Critical Component of Insulin Biogenesis and \$\beta\$ -Cell ER Homeostasis.](#)

Fang J, Liu M, Zhang X, Sakamoto T, Taatjes DJ, Jena BP, Sun F, Woods J, Bryson T, Kowluru A, Zhang K, **Chen X**.

Mol Endocrinol. 2015 Aug;29(8):1156-69. doi: 10.1210/me.2015-1012.

PMID: 26083833

2012-2016 **Christopher V. Kelly**, Assistant Professor of Physics & Astronomy, Wayne State University

Received NSF Career Award in 2016

Collaborative Publications:

1. [Proteome of the insulin-secreting Min6 cell porosome complex: involvement of Hsp90 in its assembly and function.](#)

Rajagopal A, Kulkarni S, Lewis KT, Chen X, Maarouf A, **Kelly CV**, Taatjes DJ, Jena BP. J Proteomics. 2015 Jan 30;114:83-92. doi: 10.1016/j.jprot.2014.11.010.

PMID: 25464371

2015-18 **Robert J. Wessells**, Assistant Professor of Physiology, Wayne State University School of Medicine

Joint Submission of one NIH and NSF Grant

Collaborative Publications:

1. [Nano thermometry measure of muscle efficiency.](#)

Laha SS, Naik AR, Kuhn ER, Alvarez M, Sujkowsky A, **Wessells RJ**, Jena BP.

ACS Nano Letters 2017 Jan 23. **DOI:** 10.1021/acs.nanolett.6b05092.

2016-17 **Korosh Torabi**, Assistant Professor of Chemical Engineering & Materials Science, Wayne State University

Joint NSF Grant Submitted (2017)

2018-pr **Suzan Arslanturk**, Assistant Professor of Computer Science, Wayne State University College of Engineering

Joint Submission of one NIH and one Chan-Zuckerberg Grant

Collaborative Publications:

1. [Skeletal muscle remodeling in immobilized patients: Determined using a parameter estimation histomorphometric approach.](#)

Gatti DL, Larsson L, **Arslanturk S**, Jena BP.

[bioRxiv.2020.06.17.157438](#); doi: <https://doi.org/10.1101/2020.06.17.157438>.

2. [Cystic fibrosis transmembrane conductance regulator \(CFTR\) inhibition results in mucus accumulation in human airway epithelia Calu-3 cells: Experimental and machine learning studies.](#)

Laethem BS, Lewis KT, Ramos R, Hou X, Sun F, Taatjes DJ, Jena BP, **Arslanturk, S.**

[bioRxiv.2020.06.17.157438](#); doi: <https://doi.org/10.1101/2020.06.17.157438>.

3. [Nanoscale imaging using differential expansion microscopy.](#)

Pernal, S.P., Liyanaarachchi, A., Gatti, D.L., Formosa, B., Pulvender, R., Kuhn, E.R., Ramos, R., Naik, A.R., George, K., **Arslanturk, S.**, Taatjes, D.J., Jena BP.

Histochem Cell Biol. (2020)153: 469-480. **(Cover Illustration & Editorial).**

4. [Res-CR-Net, a residual network with a novel architecture optimized for the semantic segmentation of microscopy images.](#)

Hassan Abdallah, H., Liyanaarachchi, A., Saigh, M., Silvers, S., **Arslanturk, S.**, Taatjes, D.J., Larsson, L., Jena, B.P., Gatti, D.L.

aRxiv (2020)<http://arxiv.org/licenses/nonexclusive-distrib/1.0/>.

5. [Human Skeletal Muscle Cell Atlas: Unraveling Cellular Secrets Utilizing ‘Muscle-on-a-Chip’, Differential Expansion Microscopy, Mass Spectrometry, Nanothermometry and Machine Learning.](#)

Jena BP, Gatti DL, **Arslanturk S**, Pernal S, Taatjes DJ.

Micron <https://doi.org/10.1016/j.micron.2018.11.002>

6. [Differential expansion microscopy.](#)

Pernal, S.P., Liyanaarachchi, A., Gatti, D.L., Formosa, B., Pulvender,

R., Kuhn, E.R., Ramos, R., Naik, A.R., George, K., **Arslanturk, S.**, Taatjes, D.J., Jena BP. (2019) *bioRxiv* 699579; doi: <https://doi.org/10.1101/699579>

7. [Deep learning strategies for differential expansion microscopy.](#)

Gatti, D.L., **Arslanturk, S.**, Lal, S., Jena BP. (2019) DOI:

bioRxiv 743682; doi: <https://doi.org/10.1101/74368>

Report of Teaching and Education Innovations

2000 Founder-Director, NanoBioScience Institute, Wayne State University.

NBSI was established in 2000 at the School of Medicine immediately after my arrival from Yale University School of Medicine. The primary objective of the institute was to establish a strong interdisciplinary program in the Nano Sciences & Nano Medicine at the Medical School and the University. In summary, NBSI has made the following contributions to Wayne State University and the School of Medicine: **(1)** Continues to bring together a large group of cross-campus interdisciplinary faculty and student groups to study Nano Science, Nano Medicine, & Nano Technology. **(2)** Has resulted in joint grant applications and funding from the NSF and NIH. **(3)** Developed a NanoBioScience Course (PSL7215), which is in its 10th year of offering. **(4)** NBSI has been selected as one of the top four Nano Institutes in the US.

<http://www2.med.wayne.edu/physiology/nanobioscience/pdfs/Nanotechnology%20Standing.pdf>. **(5)** Has helped establish the \$150 million Asian NanoScience Institute in South Korea and the NBSI Director has served as its Co-Director (2002-2006). **(6)** The NBSI Director has recently been invited to help in the establishment of a \$6 billion Vedanta University in India, and to establish a “Named Molecular Medicine Institute” in the US. **(7)** NBSI has fostered the establishment of several national and international scientific collaborations. **(8)** NBSI has published five books on Nano Science and scores of scientific

papers in the field involving over 50 national and international investigators.

- 2002 Co-Founding Director, Asian & Korean Institute of Nanoscience & Technology, Pusan, Korea.** The institute was established in 2002 in Pusan National University, involving 100 scientists from 25 academic institutions from Korea and overseas [http://macdiarmid.ac.nz/interface_article/new-nanobioscience-institute/]. The South Korean Government partially financed the institute with additional funding from private industrial sector. A major focus was to train students in nano science and technology, by first developing courses and research projects in the field. Korea greatly benefited from this nano stimulus project both academically and economically. Within a decade of the establishment of the Asia Nano Institute, research and teaching in nanoscience began to be performed in every major academic institution in South Korea.
- 2006 Developed the PSL7215 NaboBioScience Course,** serving as Course Director of this multidisciplinary course, Wayne State University School of Medicine. The course is offered once a year, and each year, 12-15 students register for the course. New and tools and technologies used in the study of NanoBioScience, and new discoveries and developments made in the field, are the focus of this course.
- 2019 Developed a “Biophysics and Biomaterials Concentration”,** serving as Director of this multidisciplinary and multi departmental program, Wayne State University. The objective of this integrated *Biophysics & Biomaterial Sciences Concentration* is to bring together researchers in the field to closely collaborate and submit joint research and training proposals. Students with backgrounds in biomedical sciences, physics, chemical engineering, and computational sciences and with interest in utilizing physical sciences to solve fundamental and medically relevant problems in biology and medicine will be attracted into this program. Wayne State University faculty from the departments of Physiology, Physics, and Chemical Engineering & Materials Sciences, with a long history of productivity in research, course development, and teaching accomplishments in this field, will participate in the program. The initial phase of development will focus on establishing a new joint concentration in *Biophysics and Biomaterial Sciences* in the PhD programs between the participating departments.
- 2016 Advisory Board Member, & Academic Program Director,** Vedanta University, India. Establishment of Colleges, Departments & Institutes, for the University.
- 2016 Advisor,** Development of new Neuroscience Ph.D. Program, Tbilisi State University, Georgia.
- 2018 Founding President & Director, “Molecular Medicine Institute”** Cambridge, MA, USA.

Teaching Strategy and Philosophy: My involvement in teaching is multi-faceted and takes place in several settings. Laboratory mentorship and thesis advisor, research seminar organizer and moderator and class lecturer are my primary teaching responsibilities. Most of my formal classroom teaching is aimed primarily at medical and graduate students. As an organizer and moderator of a research seminar, I have the opportunity to interact with a number of students, postdoctoral fellows and faculty from different departments having similar research interests. As a laboratory mentor, I have worked with students starting from high school through undergraduate, graduate and postdoctoral levels. To achieve perfection in these activities are part of my career

academic goals. In view of the unique requirements of each of the above mentioned, teaching venues, necessitates the following teaching plan which I have adopted.

As a laboratory mentor, my emphasis is on teaching students how to think objectively, critically question and analyze results. The greatest challenge in scientific research is identifying interesting research problems and formulating meaningful ways to examine them. I believe that the best way for students to develop the attributes to address these challenges is through the process of reasoning by design and interpretation of their own research. Through discussions, I guide them to arrive at their own effective problem-solving approach rather than mine. An extremely interactive and didactic journal club, which I have instituted in the laboratory, helps to provide students with insight into the tools they need to design and execute their research projects. Participation in seminars, lectures and multi-group laboratory meetings besides enabling my students develop their presentation and communication skills, help in fostering collaborations. Collaborative effort between multidisciplinary research groups, further the success of a project by pulling together both intellectual and material resources.

My participation in lecture classes encompasses topics in general cell biology, both general and clinical endocrinology, neuroendocrinology, nanobioscience and nanomedicine, signal recognition and transduction, and the biochemistry and biophysics of intracellular vesicle transport and fusion. My teaching plan emphasizes the structure-function relationship, and therefore my lectures are designed to elucidate the relationship between cellular function and cellular and sub-cellular structure.

National and international collaborative efforts and cooperative arrangements

(2014-present): My laboratory has established strong on campus, national and international collaborations and partnerships, which has helped provide an enriched education, research, and training experience for student and faculty alike. In the past decade at WSU, my laboratory has published research papers and obtained joint research funding and team-taught with more than 10 on campus collaborators. With ***Prof. J. Potoff*** and ***Prof. C. Manke*** in Chem. Engineering at WSU, our collaboration has resulted in the publication of several research papers and succeeded in obtaining one internal and two NSF grants (one continuing). My group has collaborated with the groups of ***Prof. T. Stemmler*** and ***Prof. L. Kovari*** in Pharmacy and in the Dept. of Biochemistry at WSU, resulting in several publications. Research grant applications are in progress with the Kovari group. With ***Prof. Gary Ren*** formerly at UCSF and currently at the Lawrence Berkeley Laboratory, we have collaborated in research resulting in the publication of several papers, succeeded in obtaining a DOE user grant, and have recently applied for an NIH grant. Our continuing collaboration with ***Prof. Douglas J. Taatjes*** at the University of Vermont has similarly resulted in a large number of collaborations and successful obtaining of a NIH grant. Similarly, we continue to collaborate with ***Prof. Mzia G. Zhvania*** of the I.Beritashvili Institute of Physiology, Georgian Academy of Science, Tbilisi, Republic of Georgia, and with whom we recently submitted a proposal to the Georgian National Science Foundation to establish a doctoral program in Neuroscience at Ilia State University in Tbilisi, Georgia, which was funded. This funding will allow doctoral students in Neuroscience to visit my research group at Wayne State University and our NanoBioScience Institute, to carry our joint

research funded by the Georgian National Science Foundation. We have published several papers and obtained two Georgian grants for her students to do research for a period of 4-6 months in my laboratory at WSU. Additionally, my laboratory has collaborations with the laboratory of **Prof. Phil Andrews** at the University of Michigan School of Medicine. Similarly, within the Dept. of Physiology here at WSU, my laboratory has actively engaged in collaborative research with the laboratories of **Prof's. Chen, Wessells, and Sun**, and plan joint R01's to NIH in the near future. We have established strong and long standing collaborations with Prof. Potoff and Prof. Manke in Chemical Engineering & Materials Science, resulting in several publications and more in preparation; with **Prof. Chris Kelly** in Physics, with whom we have published a research paper and two more are in preparation, and with whom we have received the Richard Barber Research Award; with **Prof. Pancharatnam Jayasuria** and **Prof. Jenifer Condon** at the C. S. Mott Center for Human Growth & Development; and with **Prof. Hyeong-Reh Kim** of Pathology, with whom we have published a paper and plan in submitting joint NIH proposals shortly. These inter- and intra-department collaborations have resulted in joint research publications and the application for both intramural and extramural funding. These are just a few examples of the extent of collaboration and interaction of my group, both within campus, as well as nationally and internationally in the past three years.

After nearly 25 years of studies focused on understanding various aspects of secretion and membrane fusion in cells, it has become increasingly clear that besides the conventional secretory apparatus and process involved in secretion from eukaryotes, intra-luminal vesicles in cells called 'exosomes' containing proteins and nucleic acids present within multi-vesicular bodies are released into the extracellular fluid and have also been implicated in cell-cell communication. Exosome chemistry, its cellular distribution and release mechanisms, and its role in health and disease is the subject of one of the current focus in the laboratory, in collaboration with **Professors Alan Dombkowski, Joyce A. Benjamins and Robert P. Lisak** in the School of Medicine at Wayne State University [Benjamins JA, Nedelkoska L, Touil H, Stemmer, Carruthers NJ, Jena BP, Naik AR, Bar-Or A, Lisak RP. (2019) *Neurology(R) Neuroimmunology & Neuroinflammation*. 6: e550. PMID [31044144](https://pubmed.ncbi.nlm.nih.gov/31044144/) DOI: [10.1212/NXI.0000000000000550](https://doi.org/10.1212/NXI.0000000000000550)]. The other focus in the laboratory is to understand the structure and energetics associated with protein-protein and protein-ion interactions, and the ratio of the various components comprising a supramolecular complex, its assembly and stability in cells, dictate numerous life processes. Among such process is the assembly and dynamics of the thick filament in skeletal muscles, composed of different myosin isoforms, whose chemistry and interactions are in dynamic flux, and is influenced in-part, by age, exercise, and disuse, of which much remains to be understood. Since muscle disuse-induced myopathy is of frequent occurrence in the intensive care unit (ICU) resulting in approximately 5% increase in health care costs, a staggering \$180 billion in the US alone, there is urgency in the development of new treatment and management modalities. We have therefore focused our attention in the past two years, to understand the molecular mechanism of myosin remodeling in muscle disuse myopathy, and the consequence of this remodeling on muscle structure-function. To be able to accomplish this goal, we have established close collaborations with the leading

human muscle biology group of **Prof. Lars Larsson** in the Department of Physiology, at the Karolinska Institute, in Sweden [Kuhn ER, Naik AR, Lewis BE, Kokotovich KM, Li M, Stemmler TM, Larsson L, Jena BP. *ACS Nano Letters* October 22, 2018, DOI: 10.1021/acs.nanolett.8b02989; Cacciani N, Salah H, Li M, Akkad H, Backeus A, Hedstrom Y, Jena BP, Bergquist J, Larsson L. (2019) *Acta Physiologica (Oxford, England)*. e13425. PMID [31799784](https://pubmed.ncbi.nlm.nih.gov/31799784/) DOI: [10.1111/apha.13425](https://doi.org/10.1111/apha.13425)]. Prof. Larsson has been working on muscle wasting in humans, especially in ICU patients for the past 40 years, and out joint groups have pooled our resources, experience, and expertise, to study disuse-induced myopathy in skeletal muscle. Additionally, we have established collaborative studies with **Prof. R.J. Wessells** with Drosophila genetics and exercise physiology expertise [Laha, S.S., Naik, A.R., Kuhn, E.R., Alvarez, M., Sujkowsky, A., Wessells, R.J., Jena, B.P. (2017), and a human skeletal muscle-on-a-chip platform. Nano thermometry measure of muscle efficiency. *ACS Nano Letters* 17 (2):1262-1268], and powerful proteomics approaches [Naik AR, Pernal S, Lewis KT, Wu Y, Wu H, Carruthers NJ, Stemmer PM, Jena BP. (2019) *ACS Biomaterials Science & Engineering* 2019 DOI: 10.1021/acsbiomaterials.8b01338.] to study muscle disuse-induced myopathy. We have further established collaborative ties with a number of laboratories, for example with **Prof. Howard Matthews** in Chemical Engineering at WSU for the biogenesis of human bone tissue in therapy.

A comprehensive understanding of different cells that constitute the human body and their various dynamic states is required to provide a reference map for the early diagnosis and treatment of various disease, and in the development of precision therapeutics. Skeletal muscles being the most abundant tissue and the largest locomotor and metabolic organ in the human body, requires a global understanding of its native structure, composition, and function in the sedentary and exercised states, to establish a 'Human Skeletal Muscle Cell Atlas'. To achieve this long-term objective, we have initiated collaborative studies to determine the remodeling of myosin motor proteins, and the energy-producing organelle the mitochondria in human skeletal muscle cells during development and growth, under conditions of activity and inactivity. This objective has necessitated the use and development of precise yet rapid and cost-effective approach of combined multimodal imaging, including our new and novel 'Differential Expansion Microscopy', our 'Nanoscale Thermometry', combined with 'Mass Spectrometry', 'Motility Assay' and 'Machine Learning'. We have achieved the first iteration of this objective by utilizing our stretchable micropatterned 3D human skeletal muscle platform that recapitulates organized and parallel growth of muscle fibers and cells expressing key myogenic proteins such as myoferlin for myoblast fusion required in muscle tissue formation, and proteins involved in biogenesis of the mitochondrial. We have begun utilizing this initial information to train our neural network. These studies involving machine learning and neural network, are in collaboration with the laboratories of **Prof. Domenico L. Gatti** in the School of Medicine at Wayne State University, and **Prof. Suzan Arslanturk** in the Dept. of Computer Science at Wayne State University [Jena BP, Gatti DL, Arslanturk S, Pernal S, Taatjes DJ. *Micron* <https://doi.org/10.1016/j.micron.2018.11.002>; Pernal, S.P., Liyanaarachchi, A., Gatti, D.L., Formosa, B., Pulvender, R., Kuhn, E.R., Ramos, R., Naik, A.R., George, K., Arslanturk, S., Taatjes, D.J., Jena BP. (2019)

bioRxiv 699579; doi: <https://doi.org/10.1101/699579>; Gatti, D.L., Arslanturk, S., Lal, S., Jena BP. (2019) DOI: [bioRxiv 743682](https://doi.org/10.1101/743682); doi: <https://doi.org/10.1101/743682>].

Our published studies have successfully utilized atomic force microscopy, electron microscopy, differential expansion microscopy, immunofluorescence confocal and TIRF microscopy, optical tweezers, small angle X-ray solution scattering, mass spectrometry, molecular biology, membrane electrophysiology, computational modeling, simulations and machine learning and neural network.

Other Educational Activities Beneficial to both Faculty & Students (2014-2016): Co-organizer with Prof. Charles Manke (Chair, Chemical Eng., WSU), the annual Zewail Award & Lecture. Attended by 400-500 students and faculty. Award recipients have always been Nobel Laureates or distinguished scholars worthy of receiving the Nobel Prize.

Report of Technological and Other Scientific Innovations

- 2016** **Title:** Nanometer scale thermometry of cells and biomolecules
Contribution: PI
Innovation Description: Despite recent advances in thermometry, determination of temperature at the nanometer scale in single molecules to live cells **remains** a challenge that holds great promise in disease detection among others. In a recent study [**ACS Nano Letters 2017 Jan 23. DOI: 10.1021/acs.nanolett.6b05092**], we use a new approach to nanometer scale thermometry with a spatial and thermal resolution of 80 nm and 1 mK respectively, capable of determining muscle efficiency, cancer, and with promise for early diagnosis and treatment of various metabolic disorders.
- 2016** **Title:** Potentiation of gas transport in red blood cells
Contribution: PI
Innovation Description: Existing drug formulation for treatment of a different disease has been identified to potentiate gas transport in red blood cells, with promise for the treatment of various cardiovascular disorders and for potential use in high altitude and space flights. [**Patent Protection Filed**].
- 2017** **Title:** “Human Muscle-on-a-Chip” stretchable 3D microphysiological platform
Contribution: PI
Innovation Description: Improvements in modern critical care have led to improved survival, leading to a growing need for intensive care units (ICUs). It is predicted that ICUs will occupy one third of hospital beds by 2020, with staggering rehabilitation costs. No treatments are currently available for skeletal muscle atrophy and metabolic disorders as a consequence of disuse in ICU patients

and in microgravity during extended space flights, and in diabetes. While animal models of disease and drug testing for use in treatment and therapy in human have provided a wealth of information, over 75% of drugs with stellar results in animals demonstrate alarmingly low efficacy in human trials. Since drug testing on humans is prohibitory, we have developed a stretchable microphysiological 3D platform replicating native skeletal muscle, to test how sedentary and exercised muscles respond to the overexpression of the exercise-induced PGC-1 α gene (peroxisome proliferator-activated receptor coactivator 1 α), an important regulator of mitochondrial biogenesis, to drugs identified to stimulate the PGC-1 α gene product, and to insulin.

GRANTS, CONTRACTS, AND OTHER FUNDING

Indicate role (PI, Co-PI, Co-I, etc.), title, source, total period of support, total direct costs.

RECENT BRIEF GRANT HISTORY: JENA, Bhanu P. (PI & Co-PI)

ACTIVE

1. "Viron Charitable Foundation" Jena (PI: Founding President & Director) 2021-2031
80% effort [MMI allocated \$100 million]

TITLE: Viron Molecular Medicine Institute, Cambridge, MA

[\[https://www.vironinstitute.com\]](https://www.vironinstitute.com).

2. NIH 2R56 NS079429-04A1 Jena (Co-I) 08/15/19-07/31/21 5% effort [\$539,000]

TITLE: The role of non-coding RNAs in epilepsy of tuberous sclerosis complex and focal cortical dysplasia type 2B.

3. Received the 2018-2019 Graduate Research Assistant Competition (GRA)

4. Shota Rustaveli National Science Foundation Jena (Collaborator) 09/01/2017 - 08/31/2027; Ph.D. Program in Neuroscience, Ilia State University, Tbilisi, Georgia (Co-Mentor Two Doctoral Students/year).

PENDING

NIH R01 Jena (Co-I) 08/15/22-07/31/26 10% effort **[\$4,000,000]**

TITLE: The role of non-coding RNAs in epilepsy of focal malformations of cortical development.

RECENT COMPLETED

1. NSF CBET Jena (Co-PI) 09/01/2011 - 08/31/2017 2.5% effort [\$330,000]
TITLE: Elucidation of Membrane Fusion Mechanisms Using a Combined Stimulation and Experimental Approach

2. Richard Barber Foundation; Jena (Co-PI) 05/2015 - 08/2017 [\$23,500]
TITLE: Determining the Macromolecular Structure of the Porosome complex in insulin-secreting cells.

3. OVPR Post-Doctoral Fellow Support; Jena (PI) 09/2015 - 08/2016 [\$47,000]
TITLE: Single molecular thermometry.

4. DOE 1194 Jena (PI) 06/01/11 – 05/31/12
TITLE: Electron crystallography and X-ray determination of t-/v-SNARE structures

This proposal support is from the Molecular Foundry of DOE at the Lawrence Berkeley National Laboratory, CA. The overall objective of the study is to determine the chemistry of $[Ca^{+2}]$ -lipid interactions underlying membrane fusion, and the molecular assembly of SNARE proteins enabling this process. This project is renewable.

5. WSU Bridge Funding Jena (PI) 09/01/11 - 08/31/12

6. NSF EB00303 Jena (Co-PI) 09/11/07 – 08/31/11
TITLE: Bioengineering and molecular simulation studies to understand membrane fusion

Results from experiments suggest that in presence of calcium, t-SNARE vesicles are able to interact with v-SNARE vesicles allowing formation of calcium-phosphate bridges between the opposing bilayers, resulting in the expulsion of water due to disruption of the water shell around the calcium ion. This removal of water leads to lipid mixing and membrane fusion. The objective of this application is to test this hypothesis using molecular simulation. Graduate and undergraduate students are actively participating in this project.

7. WSU Presidential Award Jena (PI) 08/01/07 - 07/31/10

8. WSU Deans Award Jena (PI) 04/01/08 - 03/31/11

9. NIH NS-39918 Jena (PI) 09/16/00 - 02/31/07
TITLE: Understanding Membrane Fusion: A Bioengineering Approach.

Percent Effort (PI): 30%

Objective: The objective of our application was to (1) determine the role of coiling and super-coiling in membrane fusion, (2) determine the nature of coiling of SNAREs, (3) determine the role of the 'new structure' in membrane fusion, and (4) determine the biochemical composition of the 'new structure'.

Results from the study: Six post doctoral students (Sang Joon Cho, Aleksander Jeremic, Marie Kelly, Sudhansu Dash, A.K.M. Abdus Sattar, and Won-Jin Cho) and five graduate students participated 50% to full time in the project. Additionally, six undergraduate students received their summer fellowship working on various aspects of the project. All proposed specific aims in the grant were addressed during the specified funding period, except for the determination of the biochemical composition of the 'new structure'. During the course of the study, more than 50 papers, reviews, and abstracts were published.

CURRENT ACTIVITY: In preparation for submission as a new proposal.

10. NIH DK-56212 Jena (PI) 09/16/00 - 07/31/06

Percent Effort (PI): 30%

Objective: Our goal was to determine the function and composition of the porosome structure.

Results from the study: Five post doctoral students (Sang Joon Cho, Aleksander Jeremic, Marie Kelly, Sudhansu Dash, and A.K.M. Abdus Sattar) and two graduate students participated 50% to full time in the project. All proposed specific aims in the proposal were addressed during the specified funding period.

Funding Information Detail:

Funded Projects Completed in the Recent Past

1999-2006 **Grant Title:** Exocytosis: Using Nanosurgery and Bioengineering

Grant type and number: NIH R01 DK56212

Role in Project: PI

Description of the major goal: The long-term goal of our research plan is to understand the molecular mechanism of exocytosis. Using atomic force microscopy (AFM), a new group of plasma membrane structures called 'pits' and 'depressions', have been identified and implicated in exocytosis in live pancreatic acinar cells. Our immediate research goal is to characterize and determine the involvement of these structures in the exocytotic process.

2000-2007 **Grant Title:** Understanding Membrane Fusion: A Bioengineering Approach

Grant type and number: NIH R01 NS39918

Role in Project: PI

Description of the major goal: The long-term goal of this research plan is to understand the molecular mechanism of exocytosis. Using electron microscopy, atomic force microscopy and immunoisolation procedures of a "new structure" associated with the neuronal fusion machinery.

2007-2011 **Grant Title:** Bioengineering and molecular simulation studies to understand membrane fusion

Grant type and number: NSF EB00303

Role in Project: Co-PI

Description of the major goal: Utilize both experimental and simulation studies, to determine the molecular mechanism of membrane fusion in cells.

(1) Determine if there is direct interaction between hydrated $[Ca^{+2}]$ and $[PO^{-4}]$ -lipid head groups in the same and opposing bilayers.

(2) Determine if divalent cations especially $[Ca^{+2}]$, alter interaction between

opposing bilayers.

(3) Determine if divalent cations especially $[Ca^{+2}]$, influence binding interactions between membrane-associated t-/v-SNAREs.

(4) Determine the thermodynamics and phase transitions during membrane fusion.

(5) Provide research opportunity and experience for undergraduates and graduates.

2011-2012 **Grant Title:** Electron crystallography and X-ray determination of t-/v-SNARE structures

Grant type and number: DOE 1194

Role in Project: PI

Description of the major goal: The overall objective of this study is to determine the chemistry of $[Ca^{+2}]$ -lipid interactions in membrane fusion, and the molecular assembly of the SNARE ring complex enabling this interaction.

2011-2016 **Grant Title:** Elucidation of Membrane Fusion Mechanisms Using a Combined Stimulation and Experimental Approach

Grant type and number: NSF CBET 1066661

Role in Project: Co-PI

Description of the major goal: The *objective* of this work is to understand membrane fusion at the atomic level.

(1) Determine the effect of Ca^{+2} on interactions between opposing lipid bilayers and membrane interfacial tension.

(2) Determine the role of Ca^{2+} concentration gradient and the subsequent formation of water pores on membrane fusion.

(3) Elucidate the role of synaptotagmin-1 in the regulation of membrane fusion.

Current

2015-2017 **Grant Title:** Use of QD's in single molecular thermometry in early disease detection and therapy

Grant type and number: Richard Barber Foundation Award

Role in Project: PI

Description of the major goal: In the last decade, zero-dimensional semiconductor nanoparticles, better known as quantum dots (QDs) have attracted considerable attention for their promising applications in major technological and biomedical areas ranging from optoelectronics to medical diagnostics. These small-sized QDs with enhanced photo-stability and better brightness quality are considered superior than standard organic dyes, green fluorescent proteins and lanthanide based chelates for the careful investigation of essential life processes at nanometer resolution. In the recent past, several studies have reported the potential use of quantum dots as nano-thermometers (NThs) for sensitive probing of local temperatures in fundamental biological systems. The emitted fluorescence (FL) intensity and the spectral wavelength shifts of the QDs are the two vital

parameters for the purpose of temperature sensing. It has been reported that the FL intensity of the QDs decreases following an increase in temperature, while a temperature rise could also manifest as a spectral red shift causing minor alterations in the emission color of these tiny particles. Studies have shown the possible use of a single CdSe quantum dot as an effective NTh (resolution of $\sim 1^\circ\text{C}$) depending on the spectroscopic studies based on wavelength shifts. In order to achieve better accuracy, recent studies have also been conducted on CdSe-CdS quantum dot/ quantum rod based NThs for recording temperatures of fundamental intracellular events with a minimum resolution of 0.2°C . Studies also report CdTe QDs as a promising candidate especially when it comes to temperature sensing of essential biological activities with a high degree of precision ($\sim 0.2^\circ\text{C}$). Cancer cells exhibit a higher metabolic rate, hence their detection using CdTe QDs. The proposed research will require very little training to master by an undergraduate and or graduate student, while providing very simple and elegant approaches in life-saving disease detection and therapy.

Unfunded Current Projects

- 2014-pr **Title:** Nanometer scale thermometry of cells and biomolecules
Role in Project: PI
Project Description: Despite recent advances in thermometry, determination of temperature at the nanometer scale in single molecules to live cells **remains** a challenge that holds great promise in disease detection among others. In a recent study (**manuscript submitted**), we use a new approach to nanometer scale thermometry with a spatial and thermal resolution of 80 nm and 1 mK respectively, capable of determining muscle efficiency, cancer, and with promise for early diagnosis and treatment of various metabolic disorders. [**Patent Protection Filed**].
- 2014-pr **Title:** Membrane biogenesis in cells
Role in Project: PI
Project Description: In addition to delimiting the cell and its intracellular compartments, biological membranes and their biogenesis govern a wide range of life processes including cell division, development, growth, and motility. From recent studies we have gained molecular understanding of membrane biogenesis in cells (**manuscript in preparation**).
- 2015-pr **Title:** Secretory vesicle-associated heterotrimeric GTP-binding G-proteins on insulin secretion
Role in Project: PI
Project Description: Heterotrimeric GTP-binding G-proteins present at the beta cell plasma membrane and membrane of the insulin secretory granule (ISG) implicated in glucose-stimulated insulin secretion have become primary candidates for drug targets in the treatment of Type-2 diabetes. Although our understanding of the role of G-proteins associated at the beta cell plasma membrane has greatly advanced, the function of ISG-associated G_i and G_s in the distal secretory pathway of glucose-stimulated insulin release is poorly

understood. The objective of the proposed study is to (1) determine the signaling pathways upstream and downstream of ISG-associated Gi/Gs that are important for the regulation of glucose-stimulated insulin secretion in beta cells; and (2) determine how ISG-associated Gi and Gs proteins participate in glucose-stimulated insulin secretion.

Report of Scholarship

Peer-Reviewed Scholarship in print (Selected):

Research Investigations (Selected):

1. [Exosomes in Epilepsy of Tuberous Sclerosis Complex: Carriers of Pro-Inflammatory MicroRNAs.](#) Cukovic D, Bagla S, Ukasik D, [Stemmer PM](#), [Jena BP](#), [Naik AR](#), Sood S, [Asano E](#), Luat A, Chugani DC, Dombkowski AA. *Non-Coding Rna*. 7. PMID [34287356](#) DOI: [10.3390/ncrna7030040](#).

2. [Regulation of Hepatic Circadian Metabolism by the E3 ubiquitin ligase HRD1-controlled CREBH/PPAR \$\alpha\$ Transcriptional Program.](#) [Kim H](#), Wei J, Song Z, Mottillo E, Samavati L, [Zhang R](#), [Li L](#), [Chen X](#), [Jena BP](#), [Lin JD](#), Fang D, Zhang K. *Molecular Metabolism*. 101192. PMID [33592335](#) DOI: [10.1016/j.molmet.2021.101192](#)

3. [Skeletal muscle remodeling in immobilized patients: Determined using a parameter estimation histomorphometric approach.](#) Gatti DL, Larsson L, Arslanturk S, [Jena BP](#). *bioRxiv*.2020.06.17.157438; doi: <https://doi.org/10.1101/2020.06.17.157438>.

4. [Cystic fibrosis transmembrane conductance regulator \(CFTR\) inhibition results in mucus accumulation in human airway epithelia Calu-3 cells: Experimental and machine learning studies.](#) Laethem BS, Lewis KT, Ramos R, Hou X, Sun F, Taatjes DJ, [Jena BP](#), Arslanturk, S. *bioRxiv*.2020.06.17.157438; doi: <https://doi.org/10.1101/2020.06.17.157438>.

5. Nanoscale imaging using differential expansion microscopy. Pernal, S.P., Liyanaarachchi, A., Gatti, D.L., Formosa, B., Pulvender, R., Kuhn, E.R., Ramos, R., Naik, A.R., George, K., Arslanturk, S., Taatjes, D.J., [Jena, B.P.](#) (2020) *Histochem Cell Biol*. doi:<https://doi.org/10.1007/s00418-020-01869-7>

6. Res-CR-Net, a residual network with a novel architecture optimized for the semantic segmentation of microscopy images. Abdallah, H., Liyanaarachchi, A., Saigh, M., Silvers, S., Arslanturk, S., Taatjes, D.J., Larsson, L., [Jena, B.P.](#), Gatti, D.L. (2020) *arXiv*; doi: <https://arxiv.org/abs/2004.08246v1>

7. [vH-ATPase-induced intracellular acidification is critical to glucose-stimulated insulin secretion in beta cells.](#) Naik AR, Formosa BJ, Pulvender RG, Liyanaarachchi AG, [Jena BP](#). (2019)

Histochemistry and Cell Biology. PMID [31901974](#) DOI: [10.1007/s00418-019-01841-0](#)

8. [Chaperone co-inducer BGP-15 mitigates early contractile dysfunction of the soleus muscle in a rat ICU model.](#)

Cacciani N, Salah H, Li M, Akkad H, Backeus A, Hedstrom Y, **Jena BP**, Bergquist J, Larsson L. (2019) *Acta Physiologica (Oxford, England)*. e13425. PMID [31799784](#) DOI: [10.1111/apha.13425](#)

9. [Self-Assembly and Biogenesis of Cellular Membrane is Dictated by Membrane Stretch and Composition.](#)

[Naik AR](#), Kuhn ER, [Lewis KT](#), Kokotovich KM, Maddipati KR, Chen X, Hörber JHK, Taatjes DJ, [Potoff J](#), **Jena BP**. (2019) *The Journal of Physical Chemistry. B*. 123(32): 6997-7005. PMID [31322890](#) DOI: [10.1021/acs.jpcc.9b04769](#)

(A comprehensive understanding of the biogenesis of additional membrane to pre-existing cellular membrane determined by the study)

10. [Exosome- enriched fractions from multiple sclerosis B cells induce oligodendrocyte death.](#)

Benjamins JA, Nedelkoska L, Touil H, Stemmer, Carruthers NJ, **Jena BP**, Naik AR, Bar-Or A, Lisak RP. (2019) *Neurology(R) Neuroimmunology & Neuroinflammation*. 6: e550. PMID [31044144](#) DOI: [10.1212/NXI.0000000000000550](#)

11. [Human skeletal muscle cells on engineered 3D platform express key growth and developmental proteins.](#)

Naik AR, Pernal S, Lewis KT, Wu Y, Wu H, Carruthers NJ, Stemmer PM, **Jena BP**. (2019) *ACS Biomaterials Science & Engineering* 2019 DOI: 10.1021/acsbomaterials.8b01338.

12. [Differential expansion microscopy.](#)

Pernal, S.P., Liyanaarachchi, A., Gatti, D.L., Formosa, B., Pulvender, R., Kuhn, E.R., Ramos, R., Naik, A.R., George, K., Arslanturk, S., Taatjes, D.J., **Jena BP**. (2019) *bioRxiv* 699579; doi: <https://doi.org/10.1101/699579>

(Demonstrated that in expansion microscopy (ExM), anisotropic expansion is observed between tissues, between cells, between cellular organelles, and even within organelles themselves, hence called differential expansion microscopy (DiExM))

13. [Deep learning strategies for differential expansion microscopy.](#)

Gatti, D.L., Arslanturk, S., Lal, S., **Jena BP**. (2019) DOI: *bioRxiv* 743682; doi: <https://doi.org/10.1101/74368>

14. [Nanothermometry Reveals Calcium-Induced Remodeling of Myosin.](#)

Kuhn ER, Naik AR, Lewis BE, Kokotovich KM, Li M, Stemmler TM, Larsson L, **Jena BP**. *ACS Nano Letters* October 22, 2018, DOI: 10.1021/acs.nanolett.8b02989

(Enthalpy changes in the motor protein myosin, and the consequent loss in the alpha helical content of the protein demonstrated following calcium binding)

15. [Human Skeletal Muscle Cell Atlas: Unraveling Cellular Secrets Utilizing 'Muscle-on-a-Chip', Differential Expansion Microscopy, Mass Spectrometry, Nanothermometry and Machine Learning.](#)

Jena BP, Gatti DL, Arslanturk S, Pernal S, Taatjes DJ.
Micron <https://doi.org/10.1016/j.micron.2018.11.002>

16. [Valproate inhibits glucose-stimulated insulin secretion in beta cells.](#)

Yedulla NR, Naik AR, Kokotovich KM, Yu W, Greenberg ML, Jena BP.
Histochem Cell Biol. 2018 Aug 25. doi: 10.1007/s00418-018-1713-6. PMID: 30145684

(First demonstration of the reduction of glucose-stimulated insulin secretion in beta cells following exposure to Valproate, an FDA approved drug that has been used clinically for decades, in treating migraines, bipolar disorder, and epileptic seizures.)

17. [Secretion induces cell pH dynamics impacting assembly-disassembly of the fusion protein complex: A combined fluorescence and atomic force microscopy study.](#)

Lewis KT, Naik AR, Laha SS, Wang S, Mao G, Kuhn E, Jena BP. *Semin Cell Dev Biol.* 2018 Jan;73:57-63. doi: 10.1016/j.semcd.2017.08.003. Epub 2017 Aug 3. PMID: 28779980

(Secretion induces pH dynamics of cells impacting assembly-disassembly of the membrane-associated t-SNAREs and v-SNARE complex complex)

18. [Molecular architecture of mouse and human pancreatic zymogen granules: protein components and their copy numbers.](#)

Lee JS, Caruso JA, Hubbs G, Schnepf P, Woods J, Fang J, Li C, Zhang K, Stemmer PM, Jena BP, Chen X.
Biophys Rep. 2018;4(2):94-103. doi: 10.1007/s41048-018-0055-1. Epub 2018 Apr 26. PMID: 29756009

19. [Porosome: Supramolecular Structures at the Synaptosome Membrane Involved in Vesicle Docking, Fusion, and Neurotransmitter Release.](#)

Jena BP.

Synaptosome Methods and Applications Springer Nature. Editor: Murphy K.; Series Editor: Walz W. 2018 Humana Press ISSN: 0893-2336.

20. [Nano thermometry measure of muscle efficiency.](#)

Laha SS, Naik AR, Kuhn ER, Alvarez M, Sujkowsky A, Wessells RJ, Jena BP.
ACS Nano Letters 2017 Jan 23. DOI: 10.1021/acs.nanolett.6b05092
Patent: US 62/498,015.

(Establishes a novel approach to determine muscle efficiency, with promise for early diagnosis and treatment of various metabolic disorders including cancer)

21. [Unique lipid chemistry of synaptic vesicle and synaptosome membrane revealed using mass spectrometry.](#)

Lewis KT, Maddipati KR, Naik AR, **Jena BP**.

ACS Chemical Neuroscience. 2017 DOI: 10.1021/acschemneuro.7b00030. PMID: 28244738.

(Tight regulation of nerve cells in compartmentalization of membrane lipids at the nerve terminal is demonstrated)

22. [Human Platelet Vesicles Exhibit Distinct Size and Proteome.](#)

Jena BP, Stemmer PM, Wang S, Mao G, Lewis KT, Walz DA.

ACS J Proteome Res. 2017 Jun 9. doi: 10.1021/acs.jproteome.7b00309. [Epub ahead of print]

PMID:28587468

23. [Secretion induces cell pH dynamics impacting assembly-disassembly of the fusion protein complex: a combined fluorescence and atomic force microscopy study.](#)

Lewis KT, Naik AR, Laha SS, Wang S, Mao G, Kuhn E, **Jena BP**.

Seminars in Cell and Development Biology 2017

9.<http://www.sciencedirect.com/science/article/pii/S1084952117300149>

24. [Functionalized nanoparticles enable tracking the rapid entry and release of doxorubicin in human pancreatic cancer cells.](#)

Arachchige MP, Laha SS, Naik AR, Lewis KT, Naik R, **Jena BP**.

Micron. 2017 Jan;92:25-31. doi: 10.1016/j.micron.2016.10.005.

PMID: 27846432

25. [Functional Reconstitution of the Insulin-Secreting Porosome Complex in Live Cells.](#)

Naik AR, Kulkarni SP, Lewis KT, Taatjes DJ, **Jena BP**.

Endocrinology. 2016 Jan;157(1):54-60. doi: 10.1210/en.2015-1653.

PMID: 26523491

(Porosome functionally reconstituted into live cells for the first time)

26. [The neuronal porosome complex in health and disease.](#)

Naik AR, Lewis KT, **Jena BP**.

Exp Biol Med (Maywood). 2016 Jan;241(2):115-30. doi: 10.1177/1535370215598400.

PMID: 26264442 **Free PMC Article**

27. [Matriptase activation and shedding through PDGF-D-mediated extracellular acidosis.](#)

Najy AJ, Dyson G, **Jena BP**, Lin CY, Kim HR.

Am J Physiol Cell Physiol. 2016 Feb 15;310(4):C293-304. doi:

10.1152/ajpccell.00043.2015.
PMID: 26157007

28. [Nanometric features of myosin filaments extracted from a single muscle fiber to uncover the mechanisms underlying organized motility.](#)

Li M, Deguchi T, Näreoja T, **Jena BP**, Hänninen P, Larsson L.
Arch Biochem Biophys. 2015 Oct 1;583:1-8. doi: 10.1016/j.abb.2015.06.010.
PMID: 26116379

29. [COPII-Dependent ER Export: A Critical Component of Insulin Biogenesis and \$\beta\$ -Cell ER Homeostasis.](#)

Fang J, Liu M, Zhang X, Sakamoto T, Taatjes DJ, **Jena BP**, Sun F, Woods J, Bryson T, Kowluru A, Zhang K, Chen X.
Mol Endocrinol. 2015 Aug;29(8):1156-69. doi: 10.1210/me.2015-1012.
PMID: 26083833 **Free PMC Article**

30. ['Porosome' discovered nearly 20 years ago provides molecular insights into the kiss-and-run mechanism of cell secretion.](#)

Jena BP.
J Cell Mol Med. 2015 Jul;19(7):1427-40. doi: 10.1111/jcmm.12598.
PMID: 26033351 **Free PMC Article**

31. [Proteome of the insulin-secreting Min6 cell porosome complex: involvement of Hsp90 in its assembly and function.](#)

Rajagopal A, Kulkarni S, Lewis KT, Chen X, Maarouf A, Kelly CV, Taatjes DJ, **Jena BP.**
J Proteomics. 2015 Jan 30;114:83-92. doi: 10.1016/j.jprot.2014.11.010.
PMID: 25464371

32. [Neuronal Porosome-The Secretory Portal at the Nerve Terminal: It's Structure-Function, Composition, and Reconstitution.](#)

Jena BP. (2014) J Mol Struct. 2014 Sep 5;1073:187-195.
PMID: 26412873 **Free PMC Article**

33. [Neuronal porosome lipidome.](#)

Lewis KT, Maddipati KR, Taatjes DJ, **Jena BP.**
J Cell Mol Med. 2014 Oct;18(10):1927-37. doi: 10.1111/jcmm.12383.
PMID: 25224862 **Free PMC Article**

(Some core lipids constituting the neuronal porosome complex in the rat brain was determined in the study)

34. [Porosome in Cystic Fibrosis.](#)

Jena BP. (2014) Discoveries (Craiova). 2014 Jul-Sep;2(3). pii: e24.
PMID: 26413568 **Free PMC Article**

35. [Proteome of the porosome complex in human airway epithelia: interaction with the](#)

[cystic fibrosis transmembrane conductance regulator \(CFTR\).](#)

Hou X, Lewis KT, Wu Q, Wang S, Chen X, Flack A, Mao G, Taatjes DJ, Sun F, **Jena BP**. (2014) J Proteomics. 2014 Jan 16;96:82-91. doi: 10.1016/j.jprot.2013.10.041. PMID: 24220302 **Free PMC Article**

36. [X-ray solution structure of the native neuronal porosome-synaptic vesicle complex: Implication in neurotransmitter release.](#)

Kovari LC, Brunzelle JS, Lewis KT, Cho WJ, Lee JS, Taatjes DJ, **Jena BP**. Micron. 2014 Jan;56:37-43. doi: 10.1016/j.micron.2013.10.002. PMID: 24176623

(Native neuronal porosome structure determined using solution X-ray. The X-ray solution structure of synaptic vesicles docked at porosomes present at the presynaptic membrane of isolated rat brain synaptosomes, was determined for the first time in the study)

37. [CXCR2 macromolecular complex in pancreatic cancer: a potential therapeutic target in tumor growth.](#)

Wang S, Wu Y, Hou Y, Guan X, Castelvetero MP, Oblak JJ, Banerjee S, Filtz TM, Sarkar FH, Chen X, **Jena BP**, Li C. Transl Oncol. 2013 Apr;6(2):216-25. Erratum in: Transl Oncol. 2013 Dec;6(6):erratum. PMID: 23544174 **Free PMC Article**

38. [Atomic force microscopy: High resolution dynamic imaging of cellular and molecular structure in health and disease.](#)

Taatjes DJ, Quinn AS, Rand JH, **Jena BP**. J Cell Physiol. 2013 Oct;228(10):1949-55. doi: 10.1002/jcp.24363. PMID: 23526453

39. [Aguaporin-assisted and ER-mediated mitochondrial fission: a hypothesis.](#)

Lee JS, Hou X, Bishop N, Wang S, Flack A, Cho WJ, Chen X, Mao G, Taatjes DJ, Sun F, Zhang K, **Jena BP**. Micron. 2013 Apr;47:50-8. doi: 10.1016/j.micron.2013.01.005. PMID: 23416165 **Free PMC Article**

40. [Porosome: the secretory NanoMachine in cells.](#)

Jena BP. Methods Mol Biol. 2013;931:345-65. doi: 10.1007/978-1-62703-056-4_17. PMID: 23027011

41. [Porosome: the secretory portal.](#)

Jena BP. Exp Biol Med (Maywood). 2012 Jul;237(7):748-57. doi: 10.1258/ebm.2012.012110. PMID: 22859740

42. [Neuronal porosome proteome: Molecular dynamics and architecture.](#)

Lee JS, Jeremic A, Shin L, Cho WJ, Chen X, **Jena BP**.
J Proteomics. 2012 Jul 16;75(13):3952-62. doi: 10.1016/j.jprot.2012.05.017.
PMID: 22659300 **Free PMC Article**

(Core proteins constituting the neuronal porosome complex in the rat brain was determined in the study)

43. [3D organization and function of the cell: Golgi budding and vesicle biogenesis to docking at the porosome complex.](#)

Wang S, Lee JS, Bishop N, Jeremic A, Cho WJ, Chen X, Mao G, Taatjes DJ, **Jena BP**.
Histochem Cell Biol. 2012 Jun;137(6):703-18. doi: 10.1007/s00418-012-0948-x.
PMID: 22527693

44. [Lysophosphatidylcholine inhibits membrane-associated SNARE complex disassembly.](#)

Shin L, Wang S, Lee JS, Flack A, Mao G, **Jena BP**.
J Cell Mol Med. 2012 Aug;16(8):1701-8. doi: 10.1111/j.1582-4934.2011.01433.x.
PMID: 21883893 **Free PMC Article**

45. [Water channels in platelet volume regulation.](#)

Lee JS, Agrawal S, von Turkovich M, Taatjes DJ, Walz DA, **Jena BP**.
J Cell Mol Med. 2012 Apr;16(4):945-9. doi: 10.1111/j.1582-4934.2011.01362.x.
PMID: 21692982 **Free PMC Article**

46. [Role of SNAREs in membrane fusion.](#)

Jena BP.
Adv Exp Med Biol. 2011;713:13-32. doi: 10.1007/978-94-007-0763-4_3.
PMID: 21432012

47. [Conformation states of the neuronal porosome complex.](#)

Cho WJ, Lee JS, **Jena BP**.
Cell Biol Int. 2010 Nov;34(11):1129-32. doi: 10.1042/CBI20100510.
PMID: 20939833

48. [Ca\(2+\) bridging of apposed phospholipid bilayers.](#)

Issa ZK, Manke CW, **Jena BP**, Potoff JJ.
J Phys Chem B. 2010 Oct 21;114(41):13249-54. doi: 10.1021/jp105781z.
PMID: 20836527

49. [Membrane-directed molecular assembly of the neuronal SNARE complex.](#)

Cho WJ, Lee JS, Zhang L, Ren G, Shin L, Manke CW, Potoff J, Kotaria N, Zhvania MG, **Jena BP**.
J Cell Mol Med. 2011 Jan;15(1):31-7. doi: 10.1111/j.1582-4934.2010.01152.x.
PMID: 20716122 **Free PMC Article**

50. [Involvement of cholesterol in synaptic vesicle swelling.](#)

Lee JS, Cho WJ, Shin L, **Jena BP**.
Exp Biol Med (Maywood). 2010 Apr;235(4):470-7. doi: 10.1258/ebm.2010.009259.
PMID: 20407079

51. [Membrane lipids influence protein complex assembly-disassembly.](#)

Shin L, Cho WJ, Cook JD, Stemmler TL, **Jena BP**.
J Am Chem Soc. 2010 Apr 28;132(16):5596-7. doi: 10.1021/ja101574d.
PMID: 20373736 **Free PMC Article**

52. [Involvement of \$\beta\$ -adrenergic receptor in synaptic vesicle swelling and implication in neurotransmitter release.](#)

Chen ZH, Lee JS, Shin L, Cho WJ, **Jena BP**.
J Cell Mol Med. 2011 Mar;15(3):572-6. doi: 10.1111/j.1582-4934.2010.01026.x.
PMID: 20132410 **Free PMC Article**

53. [Secretory vesicles transiently dock and fuse at the porosome to discharge contents during cell secretion.](#)

Jena BP.
Cell Biol Int. 2009 Dec 16;34(1):3-12. doi: 10.1042/CBI2009016.
PMID: 20017733

54. [Functional organization of the porosome complex and associated structures facilitating cellular secretion.](#)

Jena BP.
Physiology (Bethesda). 2009 Dec;24:367-76. doi: 10.1152/physiol.00021.2009.
PMID: 19996367 **Free Article**

55. [Structure of membrane-associated neuronal SNARE complex: implication in neurotransmitter release.](#)

Cho WJ, Shin L, Ren G, **Jena BP**.
J Cell Mol Med. 2009 Oct;13(10):4161-5. doi: 10.1111/j.1582-4934.2009.00895.x.
PMID: 19737333 **Free PMC Article**

56. [Involvement of vH\(+\)-ATPase in synaptic vesicle swelling.](#)

Shin L, Basi N, Jeremic A, Lee JS, Cho WJ, Chen Z, Abu-Hamdah R, Oupicky D, **Jena BP**.
J Neurosci Res. 2010 Jan;88(1):95-101. doi: 10.1002/jnr.22180.
PMID: 19610106 **Free PMC Article**

57. [Membrane fusion: role of SNAREs and calcium.](#)

Jena BP.
Protein Pept Lett. 2009;16(7):712-7. Review.
PMID: 19601899

58. [Atomic force microscopy: Unraveling the fundamental principles governing secretion and membrane fusion in cells.](#)

Jena BP.

Ultramicroscopy. 2009 Jul;109(8):1094-104. doi: 10.1016/j.ultramic.2009.03.043.
PMID: 19443122 **Free PMC Article**

59. [Circular dichroism \(CD\) spectroscopy of the assembly and disassembly of SNAREs: The proteins involved in membrane fusion in cells.](#)

Cook JD, Cho WJ, Stemmler TL, **Jena BP.**
Chem Phys Lett. 2008 Sep 1;462(1-3):6-9.
PMID: 19412345 **Free PMC Article**

60. [Porosome: the secretory portal in cells.](#)

Jena BP.

Biochemistry. 2009 May 19;48(19):4009-18. doi: 10.1021/bi9002698. Review. Erratum
in: Biochemistry. 2009 Jun 9;48(22):5050.
PMID: 19364126 **Free PMC Article**

61. [Nano-scale imaging and dynamics of amylin-membrane interactions and its implication in type II diabetes mellitus.](#)

Cho WJ, **Jena BP**, Jeremic AM.
Methods Cell Biol. 2008;90:267-86. doi: 10.1016/S0091-679X(08)00813-3.
PMID: 19195555

62. [Understanding membrane fusion combining experimental and simulation studies.](#)

Jena BP.

Methods Cell Biol. 2008;90:183-98. doi: 10.1016/S0091-679X(08)00809-1.
PMID: 19195551

63. [Assembly and disassembly of SNAREs in membrane fusion.](#)

Jena BP.

Methods Cell Biol. 2008;90:157-82. doi: 10.1016/S0091-679X(08)00808-X.
PMID: 19195550

64. [Intracellular organelle dynamics at nm resolution.](#)

Jena BP.

Methods Cell Biol. 2008;90:19-37. doi: 10.1016/S0091-679X(08)00802-9.
PMID: 19195544

65. [Extracellular dynamics at nm resolution in live cells.](#)

Jena BP.

Methods Cell Biol. 2008;90:1-18. doi: 10.1016/S0091-679X(08)00801-7.
PMID: 19195543

66. [Methods in nano cell biology. Preface.](#)

Jena BP.

Methods Cell Biol. 2008;90:xvii-xix. doi: 10.1016/S0091-679X(08)00823-6. No abstract
available.

PMID: 19195542

67. [Nanoscale 3D contour map of protein assembly within the astrocyte porosome complex.](#)

Cho WJ, Ren G, Lee JS, Jeftinija K, Jeftinija S, **Jena BP**.
Cell Biol Int. 2009 Feb;33(2):224-9. doi: 10.1016/j.cellbi.2008.11.008.
PMID: 19084606

68. [EM 3D contour maps provide protein assembly at the nanoscale within the neuronal porosome complex.](#)

Cho WJ, Ren G, **Jena BP**.
J Microsc. 2008 Oct;232(1):106-11. doi: 10.1111/j.1365-2818.2008.02088.x.
PMID: 19017207 **Free Article**

(EM 3D contour map of the neuronal porosome complex confirming its 15-17 nm size, having a central plug connected to 8 protein densities at the periphery of the structure)

69. [Porosome: the universal molecular machinery for cell secretion.](#)
Jena BP.

Mol Cells. 2008 Dec 31;26(6):517-29. Review.
PMID: 19011361 **Free Article**

70. [Ca²⁺-dimethylphosphate complex formation: providing insight into Ca²⁺-mediated local dehydration and membrane fusion in cells.](#)

Potoff JJ, Issa Z, Manke CW Jr, **Jena BP**.
Cell Biol Int. 2008 Apr;32(4):361-6. doi: 10.1016/j.cellbi.2008.03.002.
PMID: 18452809 **Free PMC Article**

(The study using simulation demonstrated that hydrated Ca²⁺ is capable of bridging phospholipid head groups, resulting in the expulsion of water from both phospholipid head groups and the calcium ion. The distance between the anionic oxygens in DMP bridged by calcium is 2.92Å, which is in close agreement with the 2.8Å reported in experiments using X-ray diffraction)

71. [Porosome in astrocytes.](#)

Lee JS, Cho WJ, Jeftinija K, Jeftinija S, **Jena BP**.
J Cell Mol Med. 2009 Feb;13(2):365-72. doi: 10.1111/j.1582-4934.2008.00334.x.
PMID: 18400049 **Free PMC Article**

72. [Secretion machinery at the cell plasma membrane.](#)
Jena BP.

Curr Opin Struct Biol. 2007 Aug;17(4):437-43.
PMID: 17764925 **Free PMC Article**

73. [Neuronal fusion pore assembly requires membrane cholesterol.](#)

Cho WJ, Jeremic A, Jin H, Ren G, **Jena BP**.
Cell Biol Int. 2007 Nov;31(11):1301-8.
PMID: 17703958 **Free PMC Article**

74. [Secretory vesicle swelling by atomic force microscopy.](#)

Cho SJ, **Jena BP**.
Methods Mol Biol. 2006;319:317-30.
PMID: 16719363

75. [Porosome: the fusion pore revealed by multiple imaging modalities.](#)

Jena BP.
Methods Mol Biol. 2006;319:295-316.
PMID: 16719362

76. [Cell secretion machinery: studies using the AFM.](#)

Jena BP.
Ultramicroscopy. 2006 Jun-Jul;106(8-9):663-9.
PMID: 16713093

77. [Secretory vesicles in live cells are not free-floating but tethered to filamentous structures: a study using photonic force microscopy.](#)

Abu-Hamdah R, Cho WJ, Hörber JK, **Jena BP**.
Ultramicroscopy. 2006 Jun-Jul;106(8-9):670-3.
PMID: 16713090

78. [Cholesterol is critical to the integrity of neuronal porosome/fusion pore.](#)

Jeremic A, Jin Cho W, **Jena BP**.
Ultramicroscopy. 2006 Jun-Jul;106(8-9):674-7.
PMID: 16709444

79. [Energy-dependent disassembly of self-assembled SNARE complex: observation at nanometer resolution using atomic force microscopy.](#)

Jeremic A, Quinn AS, Cho WJ, Taatjes DJ, **Jena BP**.
J Am Chem Soc. 2006 Jan 11;128(1):26-7.
PMID: 16390104

80. [Involvement of water channels in synaptic vesicle swelling.](#)

Jeremic A, Cho WJ, **Jena BP**.
Exp Biol Med (Maywood). 2005 Oct;230(9):674-80.
PMID: 16179736

81. [Size of supramolecular SNARE complex: membrane-directed self-assembly.](#)

Cho WJ, Jeremic A, **Jena BP**.
J Am Chem Soc. 2005 Jul 27;127(29):10156-7.
PMID: 16028912 **Free PMC Article**

(t-SNAREs and v-SNAREs present in opposing bilayers interact to form a rosette or ring complex. The size of the rosette is directly proportional to the curvature of the SNARE-associated membrane, hence smaller the vesicle higher its curvature, and smaller the size of the t-/v-SNARE rosette)

82. [Patch clamped single pancreatic zymogen granules: direct measurements of ion channel activities at the granule membrane.](#)

Kelly ML, Abu-Hamdah R, Jeremic A, Cho SJ, Ilie AE, **Jena BP**.
Pancreatology. 2005;5(4-5):443-9.
PMID: 15985770

83. [Direct interaction between SNAP-23 and L-type Ca²⁺ channel.](#)

Cho WJ, Jeremic A, **Jena BP**.
J Cell Mol Med. 2005 Apr-Jun;9(2):380-6.
PMID: 15963257 **Free Article**

84. [Cell secretion and membrane fusion.](#)

Jena BP.
Domest Anim Endocrinol. 2005 Jul;29(1):145-65.
PMID: 15876511

85. [Molecular machinery and mechanism of cell secretion.](#)

Jena BP.
Exp Biol Med (Maywood). 2005 May;230(5):307-19.
PMID: 15855297

86. [Insulin receptor \(IR\) and glucose transporter 2 \(GLUT2\) proteins form a complex on the rat hepatocyte membrane.](#)

Eisenberg ML, Maker AV, Slezak LA, Nathan JD, Sritharan KC, **Jena BP**, Geibel JP, Andersen DK.
Cell Physiol Biochem. 2005;15(1-4):51-8.
PMID: 15665515 **Free Article**

87. [Vesicle swelling regulates content expulsion during secretion.](#)

Kelly ML, Cho WJ, Jeremic A, Abu-Hamdah R, **Jena BP**.
Cell Biol Int. 2004;28(10):709-16.
PMID: 15516329

(First demonstration that secretory vesicle swelling is a requirement for content release during cell secretion)

88. [Structure, isolation, composition and reconstitution of the neuronal fusion pore.](#)

Cho WJ, Jeremic A, Rognlien KT, Zhvania MG, Lazrishvili I, Tamar B, **Jena BP**.
Cell Biol Int. 2004;28(10):699-708.
PMID: 15516328

(Neuronal porosome complex isolated and functionally reconstituted for the first time)

89. [Addendum to "Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex" \[Cell Biol. Int. 2004\(1\):7-17\].](#)

Abu-Hamdah R, Cho WJ, Cho SJ, Jeremic A, Kelly M, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(5):421. No abstract available.
PMID: 15270024

90. [Discovery of the Porosome: revealing the molecular mechanism of secretion and membrane fusion in cells.](#)

Jena BP.

J Cell Mol Med. 2004 Jan-Mar;8(1):1-21.
PMID: 15090256 **Free Article**

91. [Calcium drives fusion of SNARE-apposed bilayers.](#)

Jeremic A, Kelly M, Cho JA, Cho SJ, Horber JK, Jena BP.
Cell Biol Int. 2004;28(1):19-31.
PMID: 14759765

(This study demonstrates that SNAREs and calcium are the minimal fusion machinery. Furthermore, results from the study suggests that neutralization of the negatively charged phospholipid head groups by Ca²⁺, results in enhanced membrane–membrane interactions, formation of Ca²⁺-phosphate bridges between opposing bilayers, freeing bilayers of inter-lamellar water, consequently resulting in lipid mixing and membrane fusion)

92. [Membrane fusion: what may transpire at the atomic level.](#)

Jeremic, A., Cho, W-J, Jena, B.P. (2004). *J. Biol. Phys. & Chem.* 4:139-142.

(SNAREs overcome repulsive charges and bring opposing bilayers closer to be bridged by calcium. Hydrated calcium ions are too large (6-7 Å) to fit between the space in SNARE-apposed bilayers, and therefore unable to induce membrane fusion. However in the presence of calcium, t-SNARE vesicles interact with v-SNARE vesicles, allowing the formation of calcium-phosphate bridges between the opposing bilayers, resulting in the expulsion of water due to disruption of the water shell around the calcium ion, enabling lipid mixing and membrane fusion)

93. [Regulation of the water channel aquaporin-1: isolation and reconstitution of the regulatory complex.](#)

Abu-Hamdah R, Cho WJ, Cho SJ, Jeremic A, Kelly M, Ilie AE, Jena BP.
Cell Biol Int. 2004;28(1):7-17.
PMID: 14759764

94. [Reconstituted fusion pore.](#)

Jeremic A, Kelly M, Cho SJ, Stromer MH, Jena BP.

Biophys J. 2003 Sep;85(3):2035-43.
PMID: 12944316 **Free PMC Article**

(Using electron microscopy, first demonstration of secretory vesicle fused to the porosome base, and the structural and functional reconstitution of isolated porosomes into lipid membrane)

95. [Fusion pore or porosome: structure and dynamics.](#)

Jena BP.

J Endocrinol. 2003 Feb;176(2):169-74.

PMID: 12553865 **Free Article**

96. [Structure and composition of the fusion pore.](#)

Jena BP, Cho SJ, Jeremic A, Stromer MH, Abu-Hamdah R.

Biophys J. 2003 Feb;84(2 Pt 1):1337-43.

PMID: 12547814 **Free PMC Article**

(Demonstration that t-SNARE is present at the base of the cup-shaped porosome complex facing the cytosol)

97. [New structure involved in transient membrane fusion and exocytosis.](#)

Cho SJ, Wakade A, Pappas GD, Jena BP.

Ann N Y Acad Sci. 2002 Oct;971:254-6.

PMID: 12438127

98. [Fusion pore in live cells.](#)

Jena BP.

News Physiol Sci. 2002 Dec;17:219-22.

PMID: 12433973 **Free Article**

99. [SNAREs in opposing bilayers interact in a circular array to form conducting pores.](#)

Cho SJ, Kelly M, Rognlien KT, Cho JA, Hörber JK, Jena BP.

Biophys J. 2002 Nov;83(5):2522-7.

PMID: 12414686 **Free PMC Article**

(t-SNAREs and v-SNARE present in opposing bilayers interact to form a rosette or ring complex establishing a conducting channel in presence of calcium)

100. [The atomic force microscope in the study of membrane fusion and exocytosis.](#)

Jena BP, Cho SJ.

Methods Cell Biol. 2002;68:33-50. No abstract available.

PMID: 12053737

101. [G\(alpha\)\(i3\) in pancreatic zymogen granules participates in vesicular fusion.](#)

Sattar AA, Boinpally R, Stromer MH, Jena BP.

J Biochem. 2002 Jun;131(6):815-20.

PMID: 12038977 **Free Article**

102. [Aquaporin 1 regulates GTP-induced rapid gating of water in secretory vesicles.](#)
Cho SJ, Sattar AK, Jeong EH, Satchi M, Cho JA, Dash S, Mayes MS, Stromer MH,
Jena BP.

Proc Natl Acad Sci U S A. 2002 Apr 2;99(7):4720-4. Erratum in: Proc Natl Acad Sci U S A 2002 Oct 1;99(20):13357.

PMID: 11917120 **Free PMC Article**

(First demonstration that secretory vesicle volume increase is via the water channel or aquaporin, which is a GTP-mediated event)

103. [Structure and dynamics of the fusion pores in live GH-secreting cells revealed using atomic force microscopy.](#)

Cho SJ, Jeftinija K, Glavaski A, Jeftinija S, **Jena BP**, Anderson LL.

Endocrinology. 2002 Mar;143(3):1144-8.

PMID: 11861542

104. [Structure and dynamics of the fusion pore in live cells.](#)

Cho SJ, Quinn AS, Stromer MH, Dash S, Cho J, Taatjes DJ, **Jena BP.**

Cell Biol Int. 2002;26(1):35-42.

PMID: 11779219

(Immuno-AFM studies localizing secretory antibody-conjugated gold against secreted protein, demonstrate that the pores present at the cell surface of pancreatic acinar cells are secretory portals)

105. [The number of secretory vesicles remains unchanged following exocytosis.](#)

Cho SJ, Cho J, **Jena BP.**

Cell Biol Int. 2002;26(1):29-33.

PMID: 11779218

106. [Impaired hepatocyte glucose transport protein \(GLUT2\) internalization in chronic pancreatitis.](#)

Nathan JD, Zdankiewicz PD, Wang J, Spector SA, Aspelund G, **Jena BP**, Seymour NE, Geibel JP, Andersen DK.

Pancreas. 2001 Mar;22(2):172-8.

PMID: 11249072

107. [Insights on membrane fusion.](#)

Jena BP.

Cell Biol Int. 2000;24(11):769-71.

PMID: 11067761

108. [Continuous detection of extracellular ATP on living cells by using atomic force microscopy.](#)

Schneider SW, Egan ME, **Jena BP**, Guggino WB, Oberleithner H, Geibel JP.
Proc Natl Acad Sci U S A. 1999 Oct 12;96(21):12180-5.
PMID: 10518596 **Free PMC Article**

109. [The native membrane fusion machinery in cells.](#)

Jeong EH, Webster P, Khuong CQ, Abdus Sattar AK, Satchi M, **Jena BP**.
Cell Biol Int. 1998;22(9-10):657-70.
PMID: 10452836

110. [Binding contribution between synaptic vesicle membrane and plasma membrane proteins in neurons: an AFM study.](#)

Sritharan KC, Quinn AS, Taatjes DJ, **Jena BP**.
Cell Biol Int. 1998;22(9-10):649-55.
PMID: 10452835

111. [ATOMIC FORCE MICROSCOPE: PROVIDING NEW INSIGHTS ON THE STRUCTURE AND FUNCTION OF LIVING CELLS.](#)

Jena BP.

Cell Biol Int. 1997 Nov;21(11):683-684. No abstract available.
PMID: 9817808

112. [Rapid aldosterone-induced cell volume increase of endothelial cells measured by the atomic force microscope.](#)

Schneider SW, Yano Y, Sumpio BE, **Jena BP**, Geibel JP, Gekle M, Oberleithner H.
Cell Biol Int. 1997 Nov;21(11):759-68.
PMID: 9768474

113. [Gi regulation of secretory vesicle swelling examined by atomic force microscopy.](#)

Jena BP, Schneider SW, Geibel JP, Webster P, Oberleithner H, Sritharan KC.
Proc Natl Acad Sci U S A. 1997 Nov 25;94(24):13317-22.
PMID: 9371843 **Free PMC Article**

(GTP-induced live secretory vesicle swelling observed at nanometer resolution in 3D using AFM)

114. [Localization of SH-PTP1 to synaptic vesicles: a possible role in neurotransmission.](#)

Jena BP, Webster P, Geibel JP, Van den Pol AN, Sritharan KC.
Cell Biol Int. 1997 Aug;21(8):469-76.
PMID: 9451803

115. [Exocytotic fusion: total or transient?](#)

Jena BP.

Cell Biol Int. 1997 May;21(5):257-9. No abstract available.
PMID: 9243800

116. [Surface dynamics in living acinar cells imaged by atomic force microscopy:](#)

[identification of plasma membrane structures involved in exocytosis.](#)

Schneider SW, Sritharan KC, Geibel JP, Oberleithner H, **Jena BP**.

Proc Natl Acad Sci U S A. 1997 Jan 7;94(1):316-21.

PMID: 8990206 **Free PMC Article**

(Using AFM, 100-180 nm pores at the apical plasma membrane of live pancreatic acinar cells were observed for the first time. The pores dilated during secretion, and returned to resting size following completion of secretion. Exposure of the cell to the actin depolymerizing fungal toxin cytochalasin, results in collapse of the pore opening and a consequent loss of secretion)

117. [Effect of tyrosine kinase inhibition on basal and epidermal growth factor-stimulated human Caco-2 enterocyte sheet migration and proliferation.](#)

Basson MD, Beidler DR, Turowski G, Zarif A, Modlin IM, **Jena BP**, Madri JA.

J Cell Physiol. 1994 Sep;160(3):491-501.

PMID: 8077287

118. [Redistribution of a rab3-like GTP-binding protein from secretory granules to the Golgi complex in pancreatic acinar cells during regulated exocytosis.](#)

Jena BP, Gumkowski FD, Konieczko EM, von Mollard GF, Jahn R, Jamieson JD.

J Cell Biol. 1994 Jan;124(1-2):43-53.

PMID: 8294505 **Free PMC Article**

119. [Acidic residues are involved in substrate recognition by two soluble protein tyrosine phosphatases, PTP-5 and rrbPTP-1.](#)

Hippen KL, Jakes S, Richards J, **Jena BP**, Beck BL, Tabatabai LB, Ingebritsen TS.

Biochemistry. 1993 Nov 23;32(46):12405-12.

PMID: 8241130

120. [Distinct and specific GAP activities in rat pancreas act on the yeast GTP-binding proteins Ypt1 and Sec4.](#)

Jena BP, Brennwald P, Garrett MD, Novick P, Jamieson JD.

FEBS Lett. 1992 Aug 31;309(1):5-9.

PMID: 1511744 **Free Article**

121. [Independent modulation of enterocyte migration and proliferation by growth factors, matrix proteins, and pharmacologic agents in an in vitro model of mucosal healing.](#)

Basson MD, Modlin IM, Flynn SD, **Jena BP**, Madri JA.

Surgery. 1992 Aug;112(2):299-307; discussion 307-8.

PMID: 1353641

122. [Protein tyrosine phosphatase stimulates Ca\(2+\)-dependent amylase secretion from pancreatic acini.](#)

Jena BP, Padfield PJ, Ingebritsen TS, Jamieson JD.

J Biol Chem. 1991 Sep 25;266(27):17744-6.

PMID: 1717440 **Free Article**

123. [Evidence for a rabbit luteal ADP-ribosyltransferase activity which appears to be capable of activating adenylyl cyclase.](#)

Abramowitz J, **Jena BP.**

Int J Biochem. 1991;23(5-6):549-59.

PMID: 1648518

124. [Pertussis toxin-mediated ADP-ribosylation of rabbit luteal Gi uncouples enkephalin inhibition of adenylyl cyclase.](#)

Abramowitz J, Campbell AR, **Jena BP.**

Int J Biochem. 1990;22(1):31-7.

PMID: 2109707

[Similar articles](#)

125. [Catecholamine-induced heterologous desensitization of rabbit luteal adenylyl cyclase: loss of luteinizing hormone responsiveness is associated with impaired G-protein function.](#)

Jena BP, Abramowitz J.

Endocrinology. 1989 Apr;124(4):1942-8.

PMID: 2538315

126. [Human chorionic gonadotropin-induced heterologous desensitization of rabbit luteal adenylyl cyclase is associated with altered receptor and G-protein function.](#)

Jena BP, Abramowitz J.

Endocrinology. 1989 Apr;124(4):1932-41.

PMID: 2538314

Reviews, chapters, monographs and editorials (Selected):

127. [Aquaporin regulation: Lessons from secretory vesicles.](#)

Jena BP. (2020)

Aquaporin Regulation Vol. 13 of Vitamins & Hormones Academic Press/Elsevier. Editor: Gerald Litwack 112: 147-162. <https://doi.org/10.1016/bs.vh.2019.08.007>

128. Jena, B.P. (2020). [Preface: Cellular Nanomachines](#) *Natures Engineered Marvels.* Springer Nature ix-xi, ISBN: 9783030444952

129. Jena, B.P. (2020). [Introduction: Cellular Nanomachines](#) *Natures Engineered Marvels.* Springer Nature xii-xv, ISBN: 9783030444952

130. Jena, B.P. (2020). [Porosome: Cells Secretory Nanomachine](#) *Natures Engineered Marvels.* Springer Nature p1-40, ISBN: 9783030444952

131. Jena, B.P. (2020). [Ubiquitine-Proteasome Machinery: Cells Garbage Disposal](#)

Natures Engineered Marvels. Springer Nature p41-48, ISBN: 9783030444952

132. Jena, B.P. (2020). [Chaperonin: Protein Folding Machinery in Cells](#) *Natures Engineered Marvels. Springer Nature* p49-56, ISBN: 9783030444952

133. Jena, B.P. (2020). [ATP Synthase: Energy Generating Machinery in Cells](#) *Natures Engineered Marvels. Springer Nature* p57-62, ISBN: 9783030444952

134. Jena, B.P. (2020). [Ribosome: Cells Protein Synthetic Machinery](#) *Natures Engineered Marvels. Springer Nature* p63-70, ISBN: 9783030444952

135. Jena, B.P. (2020). [Nuclear Pore: A Bidirectional Transport Machinery](#) *Natures Engineered Marvels. Springer Nature* p71-78, ISBN: 9783030444952

136. Jena, B.P. (2020). [Myosin: Cellular Molecular Motor](#) *Natures Engineered Marvels. Springer Nature* p79-90, ISBN: 9783030444952

137. Jena, B.P. (2020). [Assembly of Cellular Nanomachines](#) *Natures Engineered Marvels. Springer Nature* p91-104, ISBN: 9783030444952

138. [Porosome: Supramolecular Structures at the Synaptosome Membrane Involved in Vesicle Docking, Fusion, and Neurotransmitter Release.](#)

Jena BP. (2018)

Synaptosome Methods and Applications Springer Nature. Editor: Murphy K.; Series Editor: Walz W. Humana Press ISSN: 0893-2336.

139. [Gd-Doped Superparamagnetic Magnetite Nanoparticles for Potential Cancer Theranostics.](#)

Maheshika Palihawadana-Arachchige, Vaman M. Naik, Prem P. Vaishnava, **Bhanu P. Jena**, Ratna Naik. (2017) *Nanostructured Materials-Fabrication to Application, Chapter 5. INTECH.* <http://dx.doi.org/10.5772/intechopen.68219>.

140. [Porosome Enables the Establishment of Fusion Pore at its base and the Consequent Kiss-and-Run Mechanism of Secretion from Cells.](#)

Jena BP. (2017)

Domestic Animal Biology, 2017 August CRC Press. Edited by Scanes, C.G & Hall, R.A. ISBN 9781498747851 - CAT# K27066 425pg (**Porosome Cover Illustration**)

141. [The neuronal porosome complex in health and disease.](#)

Naik AR, Lewis KT, **Jena BP.** (2016)

Exp Biol Med (Maywood). 2016 Jan;241(2):115-30. doi: 10.1177/1535370215598400. Review.

PMID: 26264442 **Free PMC Article**

142. ['Porosome' discovered nearly 20 years ago provides molecular insights into the kiss-and-run mechanism of cell secretion.](#)

Jena BP. (2015)

J Cell Mol Med. 2015 Jul;19(7):1427-40. doi: 10.1111/jcmm.12598. Review.

PMID: 26033351 **Free PMC Article**

143. [Neuronal Porosome-The Secretory Portal at the Nerve Terminal: It's Structure-Function, Composition, and Reconstitution.](#)

Jena BP. (2014)

J Mol Struct. 2014 Sep 5;1073:187-195.

PMID: 26412873 **Free PMC Article**

144. [Porosome in Cystic Fibrosis.](#)

Jena BP. (2014)

Discoveries (Craiova). 2014 Jul-Sep;2(3). pii: e24.

PMID: 26413568 **Free PMC Article**

145. [Atomic force microscopy: High resolution dynamic imaging of cellular and molecular structure in health and disease.](#)

Taatjes DJ, Quinn AS, Rand JH, **Jena BP.** (2013)

J Cell Physiol. 2013 Oct;228(10):1949-55. doi: 10.1002/jcp.24363.

PMID: 23526453

146. [Porosome: the secretory NanoMachine in cells.](#)

Jena BP. (2013)

Methods Mol Biol. 2013;931:345-65. doi: 10.1007/978-1-62703-056-4_17.

PMID: 23027011

147. [Porosome: the secretory portal.](#)

Jena BP. (2012)

Exp Biol Med (Maywood). 2012 Jul;237(7):748-57. doi: 10.1258/ebm.2012.012110. Review.

PMID: 22859740

148. [Role of SNAREs in membrane fusion.](#)

Jena BP. (2011)

Adv Exp Med Biol. 2011;713:13-32. doi: 10.1007/978-94-007-0763-4_3. Review.

PMID: 21432012

149. [Functional organization of the porosome complex and associated structures facilitating cellular secretion.](#)

Jena BP. (2009)

Physiology (Bethesda). 2009 Dec;24:367-76. doi: 10.1152/physiol.00021.2009. Review.

PMID: 19996367 **Free Article**

150. [Membrane fusion: role of SNAREs and calcium.](#)

Jena BP. (2009)

Protein Pept Lett. 2009;16(7):712-7. Review.

PMID: 19601899

151. [Atomic force microscopy: Unraveling the fundamental principles governing secretion and membrane fusion in cells.](#)

Jena BP.

Ultramicroscopy. 2009 Jul;109(8):1094-104. doi: 10.1016/j.ultramic.2009.03.043. Review.

PMID: 19443122 **Free PMC Article**

152. [Understanding membrane fusion combining experimental and simulation studies.](#)

Jena BP.

Methods Cell Biol. 2008;90:183-98. doi: 10.1016/S0091-679X(08)00809-1.

PMID: 19195551

153. [Assembly and disassembly of SNAREs in membrane fusion.](#)

Jena BP.

Methods Cell Biol. 2008;90:157-82. doi: 10.1016/S0091-679X(08)00808-X.

PMID: 19195550

154. [Intracellular organelle dynamics at nm resolution.](#)

Jena BP.

Methods Cell Biol. 2008;90:19-37. doi: 10.1016/S0091-679X(08)00802-9.

PMID: 19195544

155. [Extracellular dynamics at nm resolution in live cells.](#)

Jena BP.

Methods Cell Biol. 2008;90:1-18. doi: 10.1016/S0091-679X(08)00801-7.

PMID: 19195543

156. [Methods in nano cell biology. Preface.](#)

Jena BP.

Methods Cell Biol. 2008;90:xvii-xix. doi: 10.1016/S0091-679X(08)00823-6. No abstract available.

PMID: 19195542

157. [Porosome: the universal molecular machinery for cell secretion.](#)

Jena BP.

Mol Cells. 2008 Dec 31;26(6):517-29. Review.

PMID: 19011361 **Free Article**

158. [Secretion machinery at the cell plasma membrane.](#)

Jena BP.

Curr Opin Struct Biol. 2007 Aug;17(4):437-43. Review.

PMID: 17764925 **Free PMC Article**

159. [Porosome: the fusion pore revealed by multiple imaging modalities.](#)

Jena BP.

Methods Mol Biol. 2006;319:295-316.

PMID: 16719362

160. [Cell secretion machinery: studies using the AFM.](#)

Jena BP.

Ultramicroscopy. 2006 Jun-Jul;106(8-9):663-9. Review.

PMID: 16713093

161. [Cell secretion and membrane fusion.](#)

Jena BP.

Domest Anim Endocrinol. 2005 Jul;29(1):145-65. Review.

PMID: 15876511

162. [Molecular machinery and mechanism of cell secretion.](#)

Jena BP.

Exp Biol Med (Maywood). 2005 May;230(5):307-19. Review.

PMID: 15855297

163. [Discovery of the Porosome: revealing the molecular mechanism of secretion and membrane fusion in cells.](#)

Jena BP.

J Cell Mol Med. 2004 Jan-Mar;8(1):1-21. Review.

PMID: 15090256 **Free Article**

164. [Fusion pore or porosome: structure and dynamics.](#)

Jena BP.

J Endocrinol. 2003 Feb;176(2):169-74. Review.

PMID: 12553865 **Free Article**

165. [New structure involved in transient membrane fusion and exocytosis.](#)

Cho SJ, Wakade A, Pappas GD, **Jena BP.**

Ann N Y Acad Sci. 2002 Oct;971:254-6. Review.

PMID: 12438127

166. [Fusion pore in live cells.](#)

Jena BP.

News Physiol Sci. 2002 Dec;17:219-22. Review.

PMID: 12433973 **Free Article**

167. [The atomic force microscope in the study of membrane fusion and exocytosis.](#)

Jena BP, Cho SJ.

Methods Cell Biol. 2002;68:33-50. No abstract available.

PMID: 12053737

168. [Insights on membrane fusion.](#)

Jena BP.

Cell Biol Int. 2000;24(11):769-71.

PMID: 11067761

169. [ATOMIC FORCE MICROSCOPE: PROVIDING NEW INSIGHTS ON THE STRUCTURE AND FUNCTION OF LIVING CELLS.](#)

Jena BP.

Cell Biol Int. 1997 Nov;21(11):683-684. No abstract available.

PMID: 9817808

170. [Exocytotic fusion: total or transient?](#)

Jena BP.

Cell Biol Int. 1997 May;21(5):257-9. Review. No abstract available.

PMID: 9243800

Books/textbooks for the medical or scientific community [6 Books Published]:

171. •Jena, B.P. (2020). [Cellular Nanomachines](#) Natures Engineered Marvels. Springer Nature p1-109, ISBN: 9783030444952 [Cover: Schematic representation of the Porosome Complex].

172. •Jena, B. P., Taatjes, D.J. (2014). [NanoCellBiology: Multimodal Imaging in Biology & Medicine](#) Pan Sanford Publishing Pte. Ltd. p1-400, ISBN: 9789814411790 [Cover: Neuronal Porosome Complex].

173. •Jena, B.P. (2012). [NanoCellBiology of Secretion: Imaging its Cellular and Molecular Underpinnings](#). Springer Briefs in Biological Imaging 1:1-70.

174. •Jena, B. P. (2008). [Methods in nano cell biology](#). Methods in Cell Biology, Academic Press 90:1-505. [Cover: Porosome Complex].

175. •Jena, B. P., Hoerber, J.K.H. (2006). [Force microscopy: application in biology and medicine](#). Wiley & Sons, Inc. 1-300. [Cover: Porosome Complex].

176. •Jena, B. P., Horber, J.K.H. (2002). [Atomic force microscopy in cell biology](#). Methods in Cell Biology, Academic Press 68:1-409. [Cover: Porosome Complex].

Abstracts, Poster Presentations at Professional Meetings (Recent):

177. 2019 EBM (ASBMB): Human Skeletal Muscle-on-a-Chip; Naik, A. R., Pernal, S., Lewis, K.T., Wu, Y., Wu, H., Stemmer, P.M., Jena, B.P.

178. 2019 EBM (ASBMB): Differential Expansion Microscopy; Pernal, S., Kuhn, E.R.,

Pulvender, R., Formosa, B., Ramos, R., Naik, A.R., Liyanaarachchi, A., George, K., Rajagopalan, R., Jena, B. P.

179. 2019 International Neuroscience Conference, Tbilisi, GEORGIA: Differential Expansion Microscopy Techniques; *Pernal, S., Kuhn, E.R., Pulvender, R., Formosa, B., Ramos, R., Naik, A.R., Liyanaarachchi, A., George, K., Rajagopalan, R., Jena, B. P.* **(Selected for Oral Presentation)**

180. 2018 EBM (ASBMB): Valporate inhibits glucose-stimulated insulin secretion in beta cells; *Yedulla, N. R.; Naik, A. R.; Kokotovich, K. M.; Yu, W.; Greenberg, M. L.; Jena, B. P.*

181. 2018 EBM (ASBMB): Membrane Biogenesis in Cells. *Akshata R. Naik, Eric R. Kuhn, Kenneth T. Lewis, Kieth M. Kokotovich, Krishna R. Maddipati, Xuequn Chen, J.H.K. Hörber, Douglas J. Taatjes, Jeffrey J. Potoff, Bhanu P. Jena* (Selected for oral presentation) **(Selected for Oral Presentation)**

182. 2018 NCUR: Valporate inhibits glucose-stimulated insulin secretion in beta cells; *Yedulla, N. R.; Naik, A. R.; Kokotovich, K. M.; Yu, W.; Greenberg, M. L.; Jena, B. P.* (Received Travel Fellowship to NCUR, Oklahoma, to Nikhil Yedulla)

183. 2017 EBM: Machinery Mediating Kiss-and-Run Mechanism of Cell Secretion; *Bhanu P. Jena*

184. 2017 EBM: Different Lipids in Synaptic Vesicle and Synaptosome Membrane. *Kenneth T. Lewis†, Krishna R. Maddipati, Akshata R. Naik, Bhanu P. Jena* (Selected for oral presentation)

185. 2017 EBM: Functional Reconstitution of the Beta Cell Porosome. *Akshata R. Naik, Kenneth T. Lewis, and Bhanu P. Jena*

186. 2016 NCUR: Insulin Secretion in Min6 Cells Reconstituted with the Porosome Complex. *Sanjana Kulkarni, Bhanu Jena*, (Received Travel Fellowship to NCUR, North Carolina & Best Poster in Undergraduate Research Day to S. Kulkarni)

187. 2015 NCUR: Molecular mechanism of regulated insulin release from β -cells. *Sanjana Kulkarni, Bhanu Jena*, (Received Travel Fellowship to NCUR, Kentucky)

188. 2015 EBM: Porosome: Involvement of Hsp90 in its Assembly and Function. *Bhanu Jena, Amulya Rajagopal, Sanjana Kulkarni, Kenneth Lewis, Xuequn Chen and Douglas Taatjes* FASEB J April 2015 29:975.6

189. 2014 NCUR: Proteome of the insulin-secreting Min6 cell porosome complex: Involvement of Hsp90 in its assembly and function. *Amulya Rajgopal, Bhanu Jena*, (Received Travel Fellowship to NCUR, Washington, D.C.).

Invited Presentations (Recent/Selected from over 400):

National

- 2002 Prof. Ahmed H. Zewail Guest Lecture on “Porosome Discovery”, Laboratory for Molecular Sciences, California Institute of Technology. Pasadena, CA. (Sponsored).
- 2002 Wise & Hellen Burroughs Foundation Lecture, Iowa State University, IA. (Sponsored).
- 2003 Invited Speaker, “Discovery of the Porosome” Department of Physiology & Cellular Biophysics, Columbia University College of Physicians & Surgeons, NY. (Sponsored).
- 2005 Sir Aaron Klug Distinguished Lecture & Award, Mississippi State University, MS. (Sponsored).
- 2005 George E. Palade Distinguished Lecture & Award, Wayne State University School of Medicine, Detroit, MI. (Sponsored).
- 2006 Keynote Lecture, Genome Science & Technology, Student Research Day, University of Tennessee & Oak Ridge National Laboratory, Knoxville, TN (Sponsored)
- 2007 Keynote Speaker, International Conference on Biological Sensorics: Critical Technologies for Future Biosystems, Minneapolis, MN (Sponsored).
- 2008 Plenary Lecture, International Scanning Probe Microscopy Meeting, Seattle, WA (Sponsored)
- 2008 Distinguished Lecture, Molecular Basis for Disease, Georgia State University, Atlanta, GA (Sponsored).
- 2008 Invited Lecture, “Porosome: The universal secretory machinery in cells” at the 48th ASCB Meetings, Seattle, WA. (Sponsored).
- 2009 Invited Lecture on “Porosome Discovery”, Department of Physiology &

Biophysics, Case Western Reserve University School of Medicine, Cleveland, OH. (Sponsored).

- 2009 Invited Lecture on “Porosome Discovery”, Department of Physiology, University of Michigan School of Medicine, Ann Arbor, MI. (Sponsored).
- 2011 Invited Colloquia Lecture, “Discovery of the Porosome: The Universal Secretory Machinery in Cells”, Department of Physics, University of Wisconsin-Milwaukee, WI. (Sponsored).
- 2011 Invited Lecture on “Porosome Discovery”, Larry L. Hillblom Islet Research Center, UCLA, School of Medicine, Los Angeles, CA
- 2012 Keynote Speaker, American Physical Society, Detroit, MI. (Sponsored).
- 2014 Distinguished Lecture, Harvard College Undergraduate Research Association (HCURA), Cambridge, MA
- 2014 Invited Speaker, Gordon Research Conference, Cilia, Mucus, & Mucociliary Interactions, Galveston, TX. (Sponsored).
- 2014 Distinguished Lecture, Department of Pathology, Harvard Medical School, Boston, MA
- 2016 Distinguished Lecture, Harvard Medical School, Boston, MA
- 2017 Invited Lecture, Stanford Medical School, Stanford, CA (Sponsored).
- 2018 RALI Distinguished Lecture, Harvard Medical School, Boston, MA (Sponsored).
- 2019 Keynote Lecture, Nano Boston Conference, Boston, MA (Sponsored).
- 2020 Keynote Lecture, Nano Boston Conference, Boston, MA (Sponsored)

International

- 2001 Distinguished Lecture, Samsung Corporation, Seoul, Korea (Sponsored)
- 2001 State Guest & Distinguished Lecture on the “Power & Scope of Nano Science & Technology”, Korean National Assembly & Science Advisory Committee, Seoul, Korea (Sponsored)
- 2001 Distinguished Lecture, Korean National Academy of Science, Seoul, Korea (Sponsored)
- 2001 Keynote Lecture, International Meeting on Vascular Aging & Angiogenesis, Korea (Sponsored)
- 2002 Keynote Lecture, 6th International Conference on Fundamental & Applied Aspects of Physical Chemistry, Belgrade, Yugoslavia. (Sponsored).
- 2002 Distinguished Hallim Award Lecture jointly with Prof. Ahmed H. Zewail, Korean Academy of Science, Seoul, Korea. (Sponsored).
- 2002 Opening Plenary Lecture, Romanian Annual Cell Biology Society Meetings, Satu-Mari, Romania. (Sponsored).
- 2002 Distinguished Lecture, Serbian National Academy of Science, Belgrade, Yugoslavia.
- 2002 Distinguished Lecture, Vasile Goldis University, Romania (Sponsored).
- 2002 Distinguished Lecture, Vinca Research Institute, Yugoslavia. (Sponsored).
- 2003 Distinguished Lecture jointly with Prof. Günter Blobel, 'Babes-Bolyai' University, Romania (Sponsored).
- 2003 Distinguished Lecture, Georgian National Academy of Science, Tbilisi, Georgia (Sponsored).
- 2005 Distinguished Lecture, 'Carol Davila' University, Romania (Sponsored).
- 2005 Distinguished Lecture, University of Budapest, Hungary (Sponsored).
- 2006 Keynote Lecture, International NanoBioScience Conference, Pune, India. (Sponsored).
- 2006 Distinguished Lecture, Agarkar Research Institute, India (Sponsored).
- 2006 Plenary Lecture, International Meeting on Advanced Spectroscopies on

- Biomedical & Nanostructured Systems, Cluj-Napoca, Romania.
- 2008 Distinguished Lecture, 9th International Congress for Cell Biology, Seoul, South Korea. (Sponsored).
- 2008 Distinguished Lecture, Korea Vaccine Institute & Seoul National University, Korea. (Sponsored).
- 2008 Weizmann Institute Lecture, Rehovot, Israel (Sponsored & Invited by Prof. Ada Yonath).
- 2008 Department of Physiology Lecture, University of Toronto, Canada. (Sponsored).
- 2010 Keynote Speaker & Session Chair, International Neuroscience Meetings, Singapore.
- 2010 Keynote Lecture, International Garga Lectures, Tbilisi, Georgia. (Sponsored).
- 2010 Keynote Lecture, Neuroplasticity Conference, Tbilisi, Georgia. (Sponsored).
- 2010 Special Lecture, Karolinska Institute, Sweden. (Part-Sponsored).
- 2010 Special Lecture, Uppsala University, Sweden. (Part-Sponsored).
- 2011 Special Lecture, Lund University, Sweden. (Part-Sponsored).
- 2011 Keynote Lecture, Advanced Spectroscopies on Biomedical and Nanostructured Systems. Cluj-Napoca, Romania. (Sponsored).
- 2012 Indian Chemical Society Lecture, IIT, New Delhi, India. (Sponsored).
- 2012 Invited Speaker, 46th Annual Israeli Microscopy Society Meetings, Ben Gurion University, Israel. (Sponsored).
- 2012 Invited Speaker, University of Tel Aviv, Israel. (Sponsored).
- 2013 Keynote Speaker, ISTC International Scientific Seminar, Tbilisi, Georgia. (Sponsored).
- 2014 Keynote Lecture, International Garga Lectures, Tbilisi, Georgia. (Sponsored).
- 2014 “Distinguished Academy Lecture”: Georgian National Academy of Sciences, Tbilisi, Georgia. (Sponsored).

- 2014 Keynote Lecture, Annual Meeting of the Romanian Cell Biology Society, Targu Mures, Romania. (Sponsored).
- 2014 Opening Plenary Lecture, International Neuroplasticity Meetings, Tbilisi, Georgia. (Sponsored).
- 2014 Distinguished Lecture, Indian Institute of Technology, Bhubaneswar, India. (Sponsored).
- 2014 Special Lecture, Department of Biochemistry, Delhi University, India (Part-Sponsored).
- 2015 Special Lecture, Indian Institute of Technology, New Delhi, India. (Part-Sponsored).
- 2016 Keynote Lecture, World Congress of Molecular & Cell Biology, Nanjing, China. (Sponsored).
- 2016 Distinguished GIAN Lecture Series (14 Lectures), Jawaharlal Nehru University, New Delhi, India. (Sponsored).
- 2017 Distinguished Lecture, Delhi University & Ambedkar Research Institute, Delhi, India. (Sponsored).
- 2017 Distinguished Lecture, University of Windsor, ON, Canada. (Invited/Accepted/ Sponsored).
- 2017 Rystaveli National Science Foundation Lectures (14 Lectures), Tbilisi, Georgia. (Invited/Accepted/ Sponsored).
- 2017 Opening Keynote Lecture, International Physiology Congress, Beijing, China. (Invited/Accepted/ Sponsored).
- 2017 Opening Keynote Lecture, Molecular Medicine World Congress, Xi'an, China. (Invited/Accepted/ Sponsored).
- 2017 Distinguished Lecture, School of Life Sciences, JNU, Delhi, India (Part Sponsored)
- 2017 Opening Keynote Lecture, 130th Year Anniversary, Victor Babes National Research Institute, Bucharest, Romania (Sponsored)
- 2017 Presidents Lecture, Georgian Section of the European Biochemical Society, Tbilisi, Georgia (Sponsored)

- 2018 Presidents Lecture, Georgian Section of the European Neuroscience Society, Tbilisi, Georgia (Sponsored)
- 2018 Vedanta University, Institute of Eminence Presentation, New Delhi, India (Sponsored)
- 2019 6th World Congress on Nanomedical Sciences, New Delhi, India
- 2019 “Distinguished Keynote Lecture”: International Neuroscience Meeting, Tbilisi, Georgia. (Sponsored).
- 2019 Keynote Lecture, Keynote Lecture, BIT 9th World Congress of Molecular & Cell Biology, Singapore. (Sponsored).

CONTRIBUTIONS TO SCIENCE (1) Discovery of the Porosome -the secretory portal in cells: One of the primary contributions made by our laboratory in the past 20 years is the discovery of a new cellular structure at the cell plasma membrane called the porosome, and the improved understanding of how this structure is involved in the regulated fractional release of intra-vesicular contents from cells during secretion. Porosomes are cup-shaped supramolecular lipoprotein structures at the cell plasma membrane ranging in size from 15 nm in neurons and astrocytes, to 100-180 nm in endocrine and exocrine cells. Porosomes are composed of nearly 40 proteins, including a number of integral membrane proteins. In comparison, the 120 nm nuclear pore complex is composed of nearly 1,000 protein molecules. Elucidation of the porosome structure, its chemical composition, and functional reconstitution into artificial lipid membrane and live cells [1-4]. **(2) Membrane-associated SNARE Assembly:** Molecular assembly of membrane-associated t-SNARE and v-SNARE proteins in a ring or rosette complex [5-8] resulting in the establishment of membrane continuity to form a

fusion pore at the porosome base, has been demonstrated by our group. **(3) Molecular mechanism of secretory vesicle swelling:** and its requirement for intra-vesicular content release during cell secretion has been determined [9-12]. Collectively, these studies provide a molecular understanding of fractional release of intra-vesicular contents from cells during secretion, resulting in a paradigm-shift in our understanding of the secretory process. These findings have resulted in the porosome to be discussed in textbooks, including in the Boron and Boulpaep Medical Physiology textbook. In agreement, it has also been demonstrated in exocrine, endocrine, and neuronal cells that “secretory granules are recaptured largely intact following stimulated exocytosis in cultured endocrine cells” [*Proc. Natl. Acad. Sci.* 2003, 100:2070-2075]; “single synaptic vesicles fuse transiently and successively without loss of identity” [*Nature* 2003, 423:643-647]; and “zymogen granule exocytosis is characterized by long fusion pore openings and preservation of vesicle lipid identity” [*Proc. Natl. Acad. Sci.* 2004, 101:6774-6779].

(4) Development of ‘Muscle-on-a-Chip’: We have developed a stretchable micropatterned 3D human skeletal muscle (HSkM) on a chip platform for use in our study, that recapitulates organized and parallel growth of muscle fibers and cells expressing key myogenic and mitochondrial proteins [13,14]. **(5) Differential Expansion Microscopy (DiExM):** In 2015, a new substrate enhancement was pioneered termed expansion microscopy (ExM) (*Science* 2015, 347: 543-548), wherein the sample is expanded volumetrically 64-fold using hydration-competent polymers, resulting in nanoscale imaging using an ordinary diffraction limited optical microscope. However, optimal conditions for antigen retention during expansion and the relative differences in expansion between organelles within cells had not been carefully explored. Building on these earlier studies, we have developed a new approach for achieving >500-fold volumetric expansion [15,16] while retaining immunofluorescent label within the tissue. Our results further demonstrate expansion to be anisotropic between tissues, intracellular organelles and even within organelles themselves. We have designed a computational pipeline using machine learning to account for the anisotropy observed in DiExM images, to recover the high-resolution proportional image information. Furthermore, skeletal muscle being highly fibrous had not been expanded, which we have successfully expanded using our modified DiExM approach. Recently invited to establish using an initial gift of \$450 million, a Molecular Medicine Institute in Cambridge, MA.

Publications: (cited in ‘contributions’ above)

1. Schneider, S.W., Sritharan, K.C., Geibel, J.P., Oberleithner, H., **Jena, B.P.** (1997) Surface Dynamics in Living Acinar Cells Imaged by Atomic Force Microscopy: Identification of Plasma Membrane Structures Involved in Exocytosis. *Proc. Natl. Acad. Sci, USA.* 94:316-321.
2. **Jena, B.P.**, Cho, S-J., Jeremic, A., Stromer, M.H., Abu-Hamdah, R. (2003) Structure and Composition of the Fusion Pore. *Biophys. J.* 84(2):1-7.
3. Jeremic, A., Kelly, M., Cho, S-J., Stromer, M.H., **Jena, B.P.** (2003) Reconstituted Fusion Pore. *Biophys. J.* 85:2035-2043.
4. Lee, J-S., Jeremic, A., Shin, L., Cho, WJ., Chen, X., **Jena, B.P.** (2012) Neuronal Porosome proteome: Molecular dynamics and architecture. *Journal of Proteomics*

75:3952-3962.

5. Cho, S.-J., M. Kelly, M., Rognlien, K.T., Cho, J.A., Horber, J.K.H., Jena, B.P. (2002). SNAREs in opposing bilayers interact in a circular array to form conducting pores. *Biophys. J.* 83(5):2522-2527.
6. Cho, W-J., Jeremic, A., **Jena, B.P.** (2005) Size of Supramolecular SNARE Complex: Membrane-Directed Self-Assembly. *J. Am. Chem. Soc.* 127:10156-10157.
7. Jeremic, A., Quinn, A.S., Cho, W-J., Taatjes, D.J., **Jena, B. P.** (2006) Energy-dependent disassembly of self-assembled SNARE complex: observation at nanometer resolution using atomic force microscopy. *J. Am. Chem. Soc.* 128:26-27.
8. Shin, L., Cho, W-J., Cook, J., Stemmler, T., **Jena, B. P.** (2010). Membrane Lipids Influence Protein Complex Assembly-Disassembly. *J. Am. Chem. Soc.* 132:5596-5597.
9. **Jena, B.P.** Schneider, S. W., Geibel, J. P., Webster, P., Oberleithner, H., Sritharan, K. C. (1997) Gi Regulation of Secretory Vesicle Swelling Examined by Atomic Force Microscopy. *Proc. Natl. Acad. Sci, USA.* 94:13317-13322.
10. Cho, S.-J., Abdus Sattar, A.K.M., Jeong, E-H, Satchi, M., Cho, J., Dash, S., Mayes, M.S., Stromer, M.H., and **Jena, B.P.** (2002) Aquaporin 1 regulates GTP-induced rapid gating of water in secretory vesicles. *Proc. Natl. Acad. Sci. USA.* 99(7):4720-4724.
11. Kelly, M., Abu-Hamdah, R., Cho, S-J., Ilie, A.L., **Jena, B.P.** (2005) Patch clamped single pancreatic zymogen granules: direct measurement of ion channel activities at the granule membrane. *Pancreatology.* 5:443-449.
12. Shin, L., Basi, N., Lee, J-S., Cho, W-J., Chen, Z., Abu-Hamdah, R., Oupicky, D., **Jena, B. P.** (2010). Involvement of vH⁺-ATPase in synaptic vesicle swelling. *J. Neurosci. Res.* 88(1):95-101.
13. Naik, A. R., Pernal, S., Lewis, K. T., Wu, Y., Wu, H., Carruthers, N. J., Stemmer, P. M., **Jena, B. P.** (2019) Human skeletal muscle cells on engineered 3D platform express key growth and developmental proteins. *ACS Biomaterials Science & Engineering* 5(2): 970-976.
14. **Jena, B. P.**, Gatti, D. L., Arslanturk, S., Pernal, S., Taatjes, D. J. (2019). Human Skeletal Muscle Cell Atlas: Unraveling Cellular Secrets Utilizing 'Muscle-on-a-Chip', Differential Expansion Microscopy, Mass Spectrometry, Nanothermometry and Machine Learning. *Micron* 177: 55-59.
15. Pernal, S.P., Liyanaarachchi, A., Gatti, D.L., Formosa, B., Pulvender, R., Kuhn, E.R., Ramos, R., Naik, A.R., George, K., Arslanturk, S., Taatjes, D.J., **Jena, B.P.** (2020) Nanoscale imaging using differential expansion microscopy. *Histochem Cell Biol.* 153(6):469-480.
16. Formosa, B., Liyanaarachchi, A., Silvers, S., Gatti, D.L., Larsson, L., Arslanturk, S., **Jena, B.P.** (2020). Skeletal muscle remodeling in immobilized patients: Determined using a parameter estimation histomorphometric approach. *bioRxiv.2020.06.17.157438.*

CURRENT RESEARCH

- A. Determine the distribution of proteins within the neuronal porosome complex utilizing chemical cross linking followed by mass spectrometry and molecular modeling.
- B. Determine the structure and composition of the neuronal porosome complex during development.
- C. Use of single molecule nanoscale thermometry to understand the enthalpy of protein-protein and protein-ion interactions, impact of cation binding on the structure-function of the motor protein myosin, in evaluating muscle efficiency, detection of metabolic diseases including cancer, single molecule calorimetry, and the detection of bacterial antibiotic resistance and pathogenesis.
- D. Establish the ‘[Human Skeletal Muscle Cell Atlas](#)’ utilizing ‘[Machine Learning](#)’.
- E. Molecular mechanism of membrane biogenesis in cells.
- F. Mitochondrial electron transport chain.
- G. Exosome biology.
- H. Differential Expansion Microscopy.
- I. Determination of intracellular pH at the nanometer and milli-pH scale.
- J. “Muscle-on-a-Chip” stretchable 3D microphysiological platform.

Institution-Building Activity:

TO BENEFIT HUMANITY: Educate, Innovate, Invent, Inspire

1. Establishment of a Molecular Medicine Institute, Cambridge, MA, USA. (Source of Resource: Philanthropy; **\$10.45 billion**)
[\[https://cms9.revize.com/revize/moleculartx/\]](https://cms9.revize.com/revize/moleculartx/).
2. Develop an ‘Astromedicine Program’.
3. Help in the establishment of Vedanta University in India. (Source of Resource: Philanthropy; **\$3 billion**)
4. Help in the establishment of Nano Institute & Neuroscience Doctoral Program, Tbilisi, Georgia (Source of Resource: Georgia National Foundation)
5. Establish Nano Medicine Institute, Delhi University, Delhi, India (Source of Resource: Govt. of India)
6. Co-Founder & President: QPathology [\[https://www.qpathology.com\]](https://www.qpathology.com)
7. Co-Founder & President: Viron Therapeutics [\[https://www.virontherapeutics.com\]](https://www.virontherapeutics.com)

BRIEF BIOGRAPHY



I was born in Jajpur, a small town in Odisha, India, on November 1, 1955, to Manju and Prafulla Jena. My early childhood was spent in remote villages in Odisha, where my grandfather Braja Kishore practiced medicine. The dedication of my father and grandfather to science and medicine and their service to humanity greatly influenced me to choose a career in science. I majored in Chemistry, Zoology, and Botany, for my Undergraduate studies at BJB College in Bhubaneswar, Odisha (B.Sc., 1975) and completed Masters in Zoology (Endocrinology) from Utkal University, (M.Sc., 1978). I graduated top of my graduating class in the Masters of Science program and received the Prasant Ku. Memorial Prize and the Utkal University Gold Medal. In December of 1988, I received Doctorate Degree (Ph.D.) in Zoology (Molecular Endocrinology), and the Research Excellence Award from Iowa State University. Following postdoctoral training as a Fellow at Yale University, I accepted a faculty appointment at Yale University as an Assistant Professor, and in 2000, moved to the Department of Physiology, at Wayne State University School of Medicine, as a tenured full Professor, and Founder-Director of the Institute of NanoBioScience. In 2004, I was conferred the title of Distinguished Professor, and the George E. Palade University Professor by the Board of Governors of Wayne State University. I am the only living University Professor, and the second at Wayne State University's 160-year history.

Since high school, my passion has been to understand the workings of the unit of life, 'the cell'. At a very early age, I was fascinated by the complexity of 'the cell' in electron micrographs, similar to the complexity of a city, yet every aspect of its function is so precisely regulated. My scientific enquiry on how cells secrete, led to the discovery of the "porosome" -a new cellular structure and a molecular nanomachine, demonstrated to be the universal secretory portal in cells involved in the fractional discharge of intra-vesicular contents during secretion. Currently, the major focus of my laboratory is to determine the distribution of proteins within the porosome complex using single particle cryoelectron microscopy, and small angle x-ray solution and neutron scattering. Additionally, in the past 15 years, I have been involved in institution building to bring the benefits of science and education to society.

Among the honors and awards I have received over the years are: 2015 Distinguished Scientist Award from the Society for Experimental Biology and Medicine; Elected Foreign Member of the Georgian National Academy of Science; Fellow AAAS; Elected to the European Union Academy of Science; the Swedelius Cancer Research Award; the Hallim Distinguished Award Lecture jointly with the Prof. Ahmed H. Zewail; Sir. Aaron Klug Award; ASAS Basic Biological Science Award; Ranbaxy Basic Research in Medical Sciences Award; Elected Foreign Member of the Korea Academy of Science & Technology; Elected Foreign Member of the National Academy of Medicine, Romania; George E. Palade Gold Medal; elected to the Academy of Scholars at Wayne State University; six Honorary Doctorates including one from Babes-Bolyai University, Romania, jointly with Prof's George E. Palade and Günter Blobel; and Distinguished Visiting Professorships in a number of academic institutions.

Throughout my career, I have been very fortunate to avail the opportunity to learn from wonderful teachers and scholars, and to work with students and colleagues with a passion for science. My parents and my family have been a great source of peace, inspiration, and joy in my life.

"The three stages of truth: At first it is ridiculed. Then, violently opposed and finally become accepted as self-evident." Arthur Schopenhauer (1788-1860).