Dr Shweta Saran

Professor
School of Life Sciences,
Jawaharlal Nehru University,
New Delhi, 110 067.
Telephone: (O) 011-26704157, (M) 09871382398
E-mail: ssaran@mail.jnu.ac.in; shweta_saran@hotmail.com

Date of Birth: Dec 11th, 1960

EDUCATION

University	Degree	Year	Div.	Honours
Banaras Hindu Univ.	Ph.D (Zoology)	1990		-----
Banaras Hindu Univ	M.Sc	1982	First	Second in order of merit
Banaras Hindu Univ.	B.Sc	1980	First	Honours in Zoology

CAREER PROFILE

Position	Organization	Year
Professor	SLS, JNU	September 2009
Associate Professor	SLS, JNU	June, 05 –August 2009
Reader	Dept of Zoology, University of Delhi	September, 03 –June 05
Research Assistant	Wellcome Trust University of Dundee, UK	March, 01- August, 03
Research Associate	University of Delhi	May 00 to March 01
Research Associate	Jawaharlal Nehru University	Jan 99 to April 00
Young Scientist ,DST	Jawaharlal Nehru University	May 97 to Dec 98
Pool Officer, CSIR	Jawaharlal Nehru University	June 94 to Apr 97
Visiting Scientist Basic Biology	National Institute for Okazaki, Japan	Apr 93 to Nov 93
Postdoctoral Fellow	Univ. of Konstanz, Germany Sonderforschungbereich: 156	Aug 92 to Oct 92
Postdoctoral, DBT fellow	Indian Institute of Science, Bangalore	Sept 90 to Mar 93
Research Associate , UGC	Banaras Hindu University	Apr 90 to Jul 90

AWARDS AND HONOURS

i. Post doctoral fellowship to work at Wellcome Trust University of Dundee, UK (March, 01-August, 03)
ii. Fellowship and travel to work at National Institute for Okazaki, Japan (Apr 93 to Nov 93)

iii. Sonderforschungbereich: 156 (Aug 92 to Oct 92) for working at University of Konstanz, Germany

iv. Was awarded Swami Pranavananda Science Award for Young Scientist by the Indian Society for Developmental Biologists for the year 1992.

v. JRF and SRF of CSIR- NET (1984)

vi. Stood SECOND in the order of merit in M.Sc. Zoology, Banaras Hindu University

TEACHING

1. I teach the following courses at Jawaharlal Nehru University, New Delhi.
   i. Animal Developmental Biology to Masters' students.
   ii. Advanced course in Animal Developmental Biology and share a course in cell signaling for the MPhil/PhD students.
2. I also taught animal developmental biology to the Masters' students at the following places.
   i. School of Life Sciences, IGNOU, Delhi: 2012, 2013, 2014-full course
   ii. Department of Human Genetics, Chandigarh, Panjab University, 2006
   iii. Department of Zoology, Delhi University: 2003 -2005, 2009 onwards
   iv. Department of Biochemistry, UDSC: 1994-2001, 2003-2009 (special lectures)
   v. Department of Genetics, UDSC: 1994-2001, 2003-2010 (special lectures)
   vi. IISER, Mohali, 2011, 2015 (theory + practicals on *Dictyostelium*)
   vii. Department of Zoology, Jiwaji University: 2003-2006 (special lectures)
   viii. Centre for Molecular and Human Genetics, BHU: 2000 (on *Dictyostelium*, theory + practicals)
   ix. Academic Staff College, JNU: 1994, 1998, 2003-till date
3. I have also taught a course in Cell Physiology at the Department of Zoology, Delhi University: 2003 -2005
4. I have taught special topics in Cell Biology at the following places:
   i. Ambedkar Centre of Biomedical Research, DU: 2005- 2007
   ii. IGNOU, Delhi 2013-14 (MPhil course)
5. Regularly teach at the Staff College, Summer School and Winter School of JNU.
6. Lectures and practicals on *Dictyostelium* in a National Workshop on "Model Systems and Advanced Techniques in Developmental Genetics", supported by DBT (9-22 Sept, 1997*)*.

RESEARCH SPECIALIZATION: Cell and Developmental Biology

Research interest

My laboratory is engaged in the study of cell differentiation using *Dictyostelium discoideum* as a model system. *D. discoideum* is a lower eukaryotic system having two terminally differentiated cell types, the dead vacuolated stalk cells and the viable spore cells. It is a very interesting organism because it serves as a link between prokaryotes and eukaryotes as it has both unicellular and multicellular stages incorporated in its life cycle.

My laboratory is mainly interested in the programmed cell death that is, autophagic cell death. *Dictyostelium* genome has been completely sequenced but yet to be completely annotated. There are no caspases present but programmed cell death exists. At any given time during its development 15-20% of

the cells are destined to die that is they show stalk cell like characteristics. Evidences have started coming in suggesting that this PCD is mainly in the form of autophagy. Therefore, we are trying to understand the caspase independent cell death program using this organism as a model system. Presently our work could be divided into the following areas:

1. Delineating the nutritional stress (mTOR) pathway leading to autophagy.
2. Studying longevity/aging in this model system with special reference to sirtuins.
3. Understanding the biology of Huntingtin protein.
4. Identification, classification and characterization of the homeobox containing genes.
5. Role of polyamines during development and differentiation.
6. Role of transglutaminase and finding of a novel peptide N-glycanase.
7. Epigenetic control of cell differentiation.

Publications

1. Rakhee Lohia, Punita Jain, Mukul Jain, Bhumika Madan, Pradeep Kumar Burma and **Shweta Saran** (2016) Functional analyses of *Dictyostelium discoideum* Sir2D, an ortholog of human SIRT1 (submitted).
2. Rakesh Kumar and **Shweta Saran** (2016) A comparative study of eukaryotic TCTPs: structural modelling, molecular and essential dynamics. (submitted).
3. Rakesh Kumar, Ranjana Maurya and **Shweta Saran** (2015) Virtual screening and molecular dynamics simulation study for the identification of novel inhibitors of the translationally controlled tumor protein (TCTP) (under revision)
3. Klionsky et al. (2016) Guidelines for the use and interpretation of assays for monitoring autophagy (3rd edition) Autophagy 12(1):1-222. (Invited author)
4. Pynskhem Bok Swer, Himanshu Mishra, Rakhee Lohia and **Shweta Saran** (2015) Overexpression of TOR (target of rapamycin) inhibits cell proliferation in *Dictyostelium discoideum* Journal of Basic Microbiology doi: 10.1002/jobm.201500313)
5. Mishra H, **Saran** S. (2015) Classification and expression analyses of homeobox genes from *Dictyostelium discoideum*. J Biosci. 40(2):241-55.
6. Rishikesh Kumar, S Rafia, **Shweta Saran** Cloning, expression and characterization of Ornithine decarboxylase gene from *Dictyostelium discoideum* International Journal of Developmental Biology 58: 669-676
7. Swer PB, Lohia R, **Saran S**. (2014) Analysis of rapamycin induced autophagy in *Dictyostelium discoideum*. Indian J Exp Biol. 52(4):295-304.
8. Gosain A, Srivastava A, **Saran S**. (2014) Peptide: N- glycanase is expressed in prestalk cells and plays a role in the differentiation of prespore cells during development of *Dictyostelium discoideum*. Indian J Exp Biol. 52(3):197-206.
9. Swer PB, Bhadoriya P, **Saran S**. (2014) Analysis of Rheb in the cellular slime mold *Dictyostelium discoideum:* cellular localization, spatial expression and overexpression. J Biosci. 39(1):75-84
10. Article on **Shweta Saran**, a researcher in the field of autophagy. Autophagy 9:3, 1–4; March 2013; © 2013 Landes Bioscience

11. Anuradha Gosain, Rakhee Lohia, Anju Shrivastava and **Shweta Saran** (2012) Identification and characterization of peptide:N- glycanase from *Dictyostelium discoideum***.** BMC Biochemistry, 13:9.
12. Daniel J. Klionsky *et al* (2012) Guidelines for the use and interpretation of assays for monitoring autophagy. Autophagy 8(4): 445-544. (Invited author)
13. **S. Saran** and A. Goasain (2011) A Novel Peptide: *N*-glycanase from *Dictyostelium discoideum* ATLA 39, 55–99.
14. Divya R. Nair, Ratna Ghosh, Alzu Manocha, Debasisa Mohanty, **Shweta Saran,** Rajesh S. Gokhale (2011) Two Functionally Distinctive Phosphopantetheinyl Transferases from Amoeba *Dictyostelium discoideum.* Plos One, Volume 6, Issue 9, e24262
15. Elisa Alvarez-Curto, **Shweta Saran**, Marcel Meima, Jenny Zobel, Claire Scott, and Pauline Schaap (2008) cAMP production by adenylyl cyclase G induces prespore differentiation in D*ictyostelium* slugs Europe PMC Funders Group January 08.
16. Ghosh R, Chhabra A, Phatale PA, Samrat SK, Sharma J, Gosain A, Mohanty D, **Saran S**, Gokhale RS. (2008) Dissecting functional role of polyketide synthases in *Dictyostelium discoideum*: Biosynthesis of differentiation regulating factor MPBB J Biol Chem. 283: 11348-11354.
17. Elisa Alvarez-Curto, **Shweta Saran,** Marcel Meima, Jenny Zoebel, Claire Scott and Pauline Schaap Adenylyl cyclase G triggers prespore differentiation in *Dictyostelium* slugs (2007) https://openaccess.leidenuniv.nl/bitstream/handle/1887/12476/Back.pdf?sequence=12, chapter 1
18. Elisa Alvarez-Curto, **Shweta Saran**, Marcel Meima and Pauline Schaap (2007), cAMP production by adenylyl cyclase G induces prespore differentiation in *Dictyostelium* slugs. Development, 134(5):959-66.
19. **Saran S** and Schaap, P (2004) Adenylyl Cyclase G is activated by an Intramolecular Osmosensor. Mol Biol of the Cell 15: 1479-1486.
20. Muhia DK, Swales CA, Ludwig UE, **Saran S** Polly SD, Kelly JM, Schaap P, Krishna S and Baker DA (2003) Multiple splice variants encode a novel Adenylyl Cylase of possible plastid origin expressed in the sexual stage of the Malaria parasite *Plasmodium falciparum*. J Biol Chem 278: 22014-22022.
21. **Saran S**, Meima ME, Curto EA, Weening KE, Rozen DE and Schaap P (2002, published in sep/oct 2003) cAMP signaling in *Dictyostelium*: complexity of cAMP synthesis, degradation and detection. J of Muscle Res and Cell Motility 23: 793-802.
22. **Saran S** (2000) Programmed Cell Death, Curr. Sci. 78(5): 575- 586
23. **Saran S** (1999) Calcium levels during cell cycle phase correlates with cell fate of *Dictyostelium discoideum*. Cell Biol. International 23(6):399-405
24. **Saran S** (1998) Changes in endogenous polyamine levels are associated with differentiation in *Dictyostelium discoideum*. Cell Biol. International 22(7/8):577-582
25. Azhar M, Krefft M, **Saran S**, Weeks G and Nanjundiah V (1998) Calcium levels correlate with cell cycle phase and affect the level of cyclin B transcript in *Dictyostelium discoideum*. FEMS Microbiol Lett 161(1):193-199
26. Azhar M. **Saran S** and Nanjundiah V (1995) Spatial gradients of calcium in the slug of *Dictyostelium discoideum*. Current Science 68:337-342

27. **Saran S**, Nakao H, Tasaka M, Iida H, Tsuji FI, Nanjundiah V and Takeuchi I (1994) Intracellular free calcium level and its re-sponse to cAMP stimulation in developing *Dictyostelium* cells transformed with jelly fish apoaequorin cDNA. FEBS Letters 337:43-47
28. **Saran S**, Azhar M, Manogaran P, Pande G and Nanjundiah V (1994) The level of Ca2+-chlortetracycline fluorescence in freshly starved amoeba of *Dictyostelium discoideum* as a predictor of cell fate. Differentiation 57:163-169
29. Nanjundiah V and **Saran S** (1992) Spatial patterning in *Dictyostelium discoideum*. J. of Biosciences 17:353-394
30. Kanungo M S and **Saran S** (1992) Methylation of DNA of brain and liver of young and old rats. Indian Journal of Biochemistry and Biophysics 29:49-53
31. Kanungo M S and **Saran S** (1991) Methylation, acetylation and phosphorylation of the bases of DNA of young and old rats. Indian Journal of Biochemistry and Biophysics 28:96-99
32. Prabhakaram M, **Saran S,** Singh A, Chakarvorty S and Singh SN (1987) Lactate and Succinate dehydrogenase in the cardiac and breast muscles of birds: a comparison in flying and non-flying birds. Cellular and Molecular Biology 33:111-115

RESEARCH GUIDANCE

Supervision of doctoral thesis, under progress

S No	Name	Thesis title	Supervisor	Date of joining
1.	S Rafia	Characterization of sestrin gene and its involvement in autophagy using *Dictyostelium discoideum* as a model organism.	SS	July 2009
2.	Rakesh Kumar	Characterization of the translationally controlled tumour protein (TCTP1) of *Dictyostelium discoideum*	SS	July, 2011
3.	Bhumika Madan	Identification and characterization of PUF proteins from *Dictyostelium discoideum*.	SS	July, 2011 Discontinued
4.	Ranjana Maurya	Analysis of AMP activated protein kinase (AMPK)in *Dictyostelium discoideum*	SS	July, 2011
5.	Punita Jain	Role of sirtuins in autophagy using *Dictyostelium discoideum* as a model system.	Co- Anju Srivastava, Dept of Zoology, Univ of Delhi	23.05.2012
6.	Priyanka Sharma	Role of Spermidine in the Autophagy in *Dictyostelium discoideum*	SS	July, 2012

7.	Pooja Bhadoriya	Cloning and expression analysis of *huntingtin* gene from *Dictyostelium discoideum.*	Co Geeta Kaikar, IGNOU Delhi	January, 2013
8.	Mukul Jain	Understading the role of polyQ repeats in *Dictyostelium discoideum.*	Co Bano Saidulla IGNOU Delhi	July, 2013
9.	Neha Gupta	Identification, Characterization and Functional Analysis of *EI24* Gene in *Dictyostelium discoideum*	SS	July 2012 (direct PhD)
10.	Nalini Singh	Understanding the role of calcium in autophagy using *Dictyostelium discoideum* as a model system.	SS	July, 2013
11.	Karan Singh Rajput	Characterization of PUF proteins from *Dictyostelium discoideum*.	SS	July, 2013
12.	Badlamundu Bhanu Pratap	Not yet decided	SS	July, 2014

PhD degrees awarded

S No	Name of the student	Thesis title	Supervisor	Year of award
1.	Dr Anuradha Gosain	Caspase independent cell death in *Dictyostelium discoideum* with respect to transglutaminases	Co Anju Srivastava, Dept of Zoology, Univ of Delhi, Delhi	2012
2.	Dr Pynshkhem Bok Swer	Exploring the TOR signalling pathway in *Dictyostelium discoideum*	SS	2012
3.	Dr Rishikesh Kumar	Role ornithine decarboxylase in the development and differentiation programme of *Dictyostelium discoideum*	SS	2013
4.	Dr Himanshu Mishra	Homeobox genes in development and differentiation of *Dictyostelium discoideum*	SS	2013
5.	Dr Rakhee Lohia	Role of Histone Deacetylases During Growth, Development and Differentiation of *Dictyostelium discoideum*	Co Dr P K Burma, Dept of Genetics Univ of Delhi S Campus	2014
6.	Abhishek Singh	Analysis of the STRAP protein from *Dictyostelium discoideum*.	SS	2015

Supervision of awarded MPhil degrees

S. no.	Name of student	Title of thesis	Year of award
1.	Rishikesh Kumar	Role of polyamines in *Dictyostelium discoideum*	2007
2.	Pynskhem Bok Swer	Induction of autophagy by rapamycin in *Dictyostelium discoideum*	2007
3.	S Rafia	Induction of autophagic cell death by histone deacetylase inhibitor and the role of DdHdaA	2011

Major Research Projects

1. Saran S: Characterization of the energy sensor AMPK and its role in starvation induced autophagy using *Dictyostelium discoideum* as a model system. **DST,** 2016-2019---- ongoing
2. **Saran S**: Clearance of PolyQ aggregates via sirtuin dependent autophagy **UPE**, 2014-2019. – ongoing
3. **Saran S:** Cloning, Expression and functional analysis of the STRAP protein from *Dictyostelium discoideum*. **CSIR**, India, 2013 to 2016.--ongoing
4. **Saran S:** Mechanism of spermidine and resveratrol induced autophagy using D. discoideum as a model system. **UGC**, India, 2013 to 2016.-- ongoing
5. **Saran S:** Understanding the role of siruins and autophagy in longevity using *Dictyostelium discoideum* as a model system **ICMR**, India, 2013 to 2016.-- ongoing
6. **Saran S: DST PURSE**, 2009-2014. –ongoing
7. **Saran S:** An alternative approach towards the understanding of Huntington disease using *D. discoideum* as a model system. **DBT**, India, 2011 to 2016.--ongoing
8. **Saran S:** Temporal and spatial expression patterns of TOR during growth and development of *Dictyostelium discoideum* **CSIR**, India, 2010-2013.--completed
9. **Saran S:** Epigenetic control of cell differentiation with respect to histone deacetylases in *Dictyostelium discoideum* **DST**, India, 2008-2011.--completed
10. **Saran S:** Role of polyamines in the development and differentiation of *Dictyostelium discoideum,* **UGC**, India, 2008-2011.--completed
11. **Saran S: UGC networking**, 2007-2012. --completed
12. **Saran S: Capacity buildup**, 2008-2012. --completed
13. **Saran S:** Autophagy in *Dictyostelium discoideum*: The role of the Tor (target of rapamycin) gene, **CSIR**, India, 2005-2008. --completed
14. **Saran S:** Analysis of Caspase independent Cell death pathway: The role of Transglutaminase enzyme using *Dictyostelium discoideum* as a model system, **DBT**, India, 2005-2008. --completed
15. **Saran S**: Seed Money, Jawaharlal Nehru University, 2005-2006 --completed
16. **Saran S**: Seed Money, University of Delhi, 2003-2004--completed
17. **Saran S:** Cell death in *Dictyostelium discoideum*, **DST**, India, (1995-1998). –completed

LECTURES DELIVERED OUTSIDE JNU

i. JNUTA's programme on Nobel Prize 2012, 4th of March, Monday from 4 pm at the Committee Room #203, School of International Studies. “Nobel in Medicine”.

ii. Group discussion meeting at Almora, May 22-31, 2012 on "Groups and Individuals" under the auspices of ICTS and TIFR, Bangalore.

iii. Indian Society for Developmental Biology at Jaipur, 2012.

iv. Department of Biotechnology, Panjab University on March 25th, 2011

v. "Current Trends in Life Sciences: The Indian Scenario" organized by University of Delhi, CPDHE/UGC-ASC 15.2.11 to 9.3.11. (28th February 2011)

vi. Lectures at IISER, Mohali on March 25th, 2011

vii. Lectures in developmental biology at Department of Zoology, University of Delhi. (every year)

viii. Lectures in developmental biology at Department of Genetics, University of Delhi, South Campus.

ix. Talk at Department of Genetics on "Contemporary Model Systems in Genetic Research" for UGC – SAP Seminar on September 1, 2010

x. Talk on "Science of Genetics moves on with newer Model systems" organized by the Department of Genetics, UDSC on August 12, 2010

xi. Invited lecture in an International symposium on "alternate animal models in Biological Research: present and future perspectives in Toxicology" at Indian Institute of Toxicology research, Lucknow from October 29-31, 2010.

xii. Invited lecture in a symposium on "Contemporary model systems in Genetic research" at University of Delhi, South Campus, September 1, 2010.

xiii. Invited speaker in an international symposium on "Biology of Yeasts and Filamentous Fungi" (and allied organisms) at the CCMB in December 11-14, 2009.

xiv. Interdisciplinary Discussion Meeting on the general theme of Phenotypic Plasticity at Trivandrum, December 16-20, 2009

xv. All India Cell Biology, Feb 2-4, 2007, Department of Zoology, University of Delhi.

xvi. International *Dictyostelium* Conference, 2006, at Hotel La Fonda, Santa Fe, New Mexico, USA from Sept 17-22, 2006 "cAMP production by adenylyl cyclase G induces prespore differentiation in Dictyostelium slugs"- Elisa Alvarez-Curto, Allyson Ritchie, Shweta Saran, Marcel Meima and Pauline Schaap—presented by Pauline

xvii. 6th, Frontiers in Biomedical Research symposium to be held on 30th Nov to 2nd, December, 2006 organized by Ambedkar Center, University of Delhi

xviii. Annual Symposium of the Indian Society of Developmental Biologists, December 2004, on Symposium on Development, Epigenetics and Plasticity JNCAR, Bangalore.

xix. Gordon Research Conference on Cellular Osmoregulation: Sensors, Transducers and regulators, August 10-15, 2003, at Roger Williams University, Bristol, RI.

xx. Wellcome Trust Meeting, Dundee March 2003

xxi. International Dictyostelium Conference, November 22-27, 2002, Palermo, Italy

xxii. All European Christmas Meet on Dictyostelium, London, December 2001

xxiii. Dicty Meet, London, UK (Host: Robert Insall), December, 2001

xxiv. Delivered the oration lecture for Swami Pranava-nanda Science Award , Meeting of the Society of Developmental Biologists, Bhubhaneshwar, February, 1997

xxv. Foundation Day Symposium of Molecular Biology Unit, BHU February, 1995

xxvi. Department of Botany, Kyoto University, Japan (Host: Dr. K. Okamoto) August, 1993
xxvii. Discussion Meeting on Genetic and Epigenetic Control in Development, IISc, Bangalore January, 1993
xxviii. Fakultat fur Biologie, Universitat Konstanz, Germany (Host: Dr. Deiter Malchow) September, 1992

MEMBERSHIP OF BOARDS/COMMITTEES OUTSIDE JNU

i. Member of the core pre NET-JRF Exam committee, CSIR since 2005
ii. Governing body member of Miranda House, Delhi University, 2014-till date
iii. Governing body member of Kirorimal College, Delhi University-2013-till date
iv. Executive council member of Indian Society of Cell Biology 2011-13.
v. Life member of Indian Society of Cell Biology
vi. Indian Society of Developmental Biology
vii. Life member of Indian Society of Gerontology
viii. Doctoral committee at NII, Delhi University

MEMBERSHIP OF BOARDS/COMMITTEES IN JNU

i. Academic Council member, 2013-2015
ii. Member doctoral committee I of SLS
iii. Admission committee chairperson, SLS, 2009, 2012 2013, 2014
iv. Member XI plan, CAS documents, Infrastructure development, space etc
v. Redressal Committee (for M.Phil/Ph.D), 2012
vi. Member GAC (MSc)- since 2006 till date
vii. Member project/seminar evaluation of MSc amd MPhil/PhD students
viii. Admission committee member, since 2006 except in 2008-09
ix. Member CIF, SLS, since 2009
x. Incharge of imaging facility, SLS, JNU

NUMBER OF NATIONAL/ INTERNATIONAL SEMINAR/WORKSHOP ORGANIZED

i. Organized the Academic Staff College (SLS, JNU) January 2013
ii. Member of organizing committee for a "National Symposium on microbes in health and agriculture", March 12-13, 2012 at SLS, JNU
iii. Organized the RAMAN PONNI LECTURE IN MOLECULAR BIOLOGY (endowed by Dr A. R. Subramanian, Germany) on *Evolution of Structural Biology in India: A personal perspective* by Prof M. Vijayan Honorary Professor/Distinguished Biotechnologist Molecular Biophysics Unit Indian Institute of Science, Bangalore on Thursday, 28th January, 2010 at 3:00 PM
iv. Organized the course on "Basic of Microscopy and Image analysis" from November 17th to 19th, 2009 by the 100x Imaging Inc at SLS, JNU.
v. Member in organizing the All India Cell Biology, Feb 2-4, 2007, Department of Zoology, University of Delhi
vi. TV programme (30 min documentary) on me (Women scientist of India) series telecast on DD Urdu by television programme company

vii. Reviewed animal development course book of IGNOU (two books), 2008