




## Curriculum Vitae

Title	<b>Dr.</b>	First Name	<b>Laishram Rajendrakumar</b>	Last Name	<b>Singh</b>	Photograph
Designation		<b>Professor</b>				
Department		<b>Dr. B. R. Ambedkar Center for Biomedical Research (ACBR)</b>				
Address (Campus)		<b>Dr. B. R. Ambedkar Center for Biomedical Research, University of Delhi, Delhi – 110007, INDIA</b>				
Address (Residence)		<b>Warden House, 8.2 E Girls Hostel, Gautam Buddha University, Greater Noida, U.P. 201308.</b>				
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<b>Education:</b>						
Subject	Institution	Year	Details			
<b>Ph.D.</b>	<b>Jamia Millia Islamia, New Delhi</b>	<b>2006</b>	<i>Ph.D. Thesis topic:</i> Thermodynamic and Functional Activity Compensation of Methylamine Osmolytes and Urea Interactions with Proteins.			
<b>M.Sc.</b>	<b>Jamia Millia Islamia, New Delhi</b>	<b>1999</b>				
<b>B.Sc.</b>	<b>Manipur University, Imphal</b>	<b>1997</b>				
<b>Career Profile:</b>						
<b>July 2021 – present</b>	<b>Professor, Dr. B. R. Ambedkar Centre For Biomedical Research, University of Delhi.</b>					
<b>July 2015 - July 2018</b>	<b>Associate Professor, Dr. B. R. Ambedkar Centre For Biomedical Research, University of Delhi.</b>					
<b>July 2010 - July 2015</b>	<b>Assistant Professor, Dr. B. R. Ambedkar Centre For Biomedical Research, University of Delhi.</b>					
<b>Nov 2005 - March 2010</b>	<b>Postdoctoral Associate, Fox Chase cancer Center, Philadelphia, USA</b>					
<b>Administrative Experience</b>						
SAIF Electron microscopy facility	Member (DBT Nominated)					Administration
Admission Committee, DU	Member	2017				Administration
Pre CSIR-NET Crash Course	Co-ordinator	2016			Administration/Teaching	
Admission for Sports Quota	Observer	2016-2018			Administration	
DU Entrance Test	Observer	2016-2018			Administration	
FYUP Revision	Convener (various subjects)				Course Design	

CBCS (Undergraduate)	Convener (various subjects)		Course Design
CBCS (Post-graduate)	Convener (various subjects)		Course Design
Institute of Eminence (Delhi University)	Member		Course Design
e-procurement (Departmental)	Co-ordinator		Administration
GEM (Departmental)	Co-ordinator		Administration
Examination Co-ordinator (Departmental)	Superintendent		Administration
MSc & PhD Entrance Examination (Departmental)	Co-ordinator		Administration
Silver Jubilee Celebration of ACBR (Departmental)	Co-ordinator		Administration
Human Ethics committee (IHEC)	Member Secretary		Administration
Animal Ethics committee	Member		Administration

#### Other Departmental Experiences

CIF In-charge	--	2013-2019	Administration
Library In-charge	--	2013-2019	Administration
Bill Committee	Member	2010-2012	Administration
AMC Committee	Member	2013-2015	Administration
Technical Committee	Member		Administration
Purchase Committee	Member	2013-2019	Administration
North East Committee	Chairperson	2013-2019	Administration

### PROFESSIONAL CAREER

#### MAJOR CONTRIBUTIONS :

- Protein folding, aggregation and functional rescue of mutant proteins by chemical and molecular chaperones
- Protein covalent modifications by glycation agents and homocystein: their toxicity, nature of oligomers and preventive strategies
- Understanding the structural allostery of anti-oxidant enzymes
- Use of Bertezomib and Hsp70 inducers for the treatment of homocystinuria

#### Research Interests / Specialization: **Protein Folding/ Misfolding**

- **Neurodegeneration:** specially focussed on developing inhibitors amyloidogenic proteins  
**Transthyretin- Familial Amyloid Neuropathy**  
**a-synuclein - Parkinson's disease**  
**Amyloid-beta - Alzheimer's disease**
- **Homocystinuria:** understanding protein misfolding and gain of toxic functions caused by covalent modification of proteins by homocystein and homocystein thiolactone and development of strategies to inhibit this undesired modification.
- **Hyperglycemia:** We are specially interested in investigating the protein misfolding and gain of toxic functions caused by covalent modification of proteins by advanced glycation end products and strategies to inhibit the processes.

#### Scientific Credentials: Editors

(A) Journal Guest Editor: 1. Biomolecules (MDPI)

Name of Special issue: **"Osmolyte System and Neurodegeneration: From Physiology to Therapeutics"**

**(B) Book Editors**

1. Singh, Laishram Rajendrakumar, and Tanveer Ali Dar, eds. Proteostasis and Chaperone Surveillance. **Springer, 2015**
2. Singh, Laishram Rajendrakumar, and Tanveer Ali Dar, eds.. Cellular Osmolytes: From Chaperoning Protein Folding to Clinical Perspectives. **Springer, 2017**
3. Tanveer Ali Dar and Singh, Laishram Rajendrakumar eds. Protein Modificomics. **Elsevier, 2019**

**(C) Editorial Board Members in different Journals**

1. Nature Scientific Report
2. Current Protein Peptide Science, Bentham Science
3. Protein Peptide letters, Bentham Science

**Honours & Awards**

1. Recipient of **"Board of Director's Fellowship"** sponsored by Fox Chase Cancer Center, USA
2. **"Outstanding Scientist Award"** by VDGGOOD Professional Association, India
3. **"Springer-PSI Award"** 2019 for highest citation of an article
4. **Member-** National Academy of Sciences, India

**Publications: Journal Articles = 54, Book Chapter = 7, Edited Books = 3; Total = 64**

1. Kumari, Kritika; Warepam, Marina; Aniket, Bansal; Dar, TA; VN, Uversky and Singh L. R. The gut metabolite, trimethylamine N-oxide inhibits protein folding by affecting cis-trans isomerization and induces cell cycle arrest. Cellular and Molecular Life Sciences (2022) 79, 1 12. (Impact factor – 9.261)
2. Sharma, Gurumayum Suraj; Bhattacharya, Reshmee; Krishna, Snigdha; Alomar, Suliman Y.; Alkhuriji, Afrah; Warepam, Marina; Kumari, Kritika; Rahaman, Hamidur; Singh, Laishram. Structural and Functional Characterization of Covalently Modified Proteins Formed By Glycating Agent, Glyoxal. ACS Omega (2021) 6, 32, 20887-20894 (Impact factor – 3.51 ISSN 2470-1343)
3. Gurumayum Suraj Sharma, Reshmee Bhattacharya, **Laishram Rajendrakumar Singh**. Functional inhibition of redox regulated heme proteins: A novel mechanism towards oxidative stress induced by homocysteine. Redox Biology (2021) 46, 102080 (Impact factor – 11.79 ISSN 2213-2317)
4. Angamba Meetei Potshangbam, Apana Nandeibam, Thongamba Amom, Nongdam Potshangbam, Hamidur Rahaman, Ravindranath Singh Rathore, **Laishram Rajendrakumar Singh**, Aslam Khan. An in silico approach to identify potential medicinal plants for treating Alzheimer disease: a case study with acetylcholinesterase. J. Biomol. Struct. Des. (2020) 1521-1533.
5. Chowhan R.K., Rahaman H., **Singh L.R.** Structural basis of Peroxidase Catalytic Cycle of human Prdx6. Sci Rep. (2020) 10:17416
6. Mohd Younus Bhat, **Laishram Rajendrakumar Singh**, Tanveer Ali Dar. Taurine Induces an Ordered but Functionally Inactive Conformation in Intrinsically Disordered Casein Proteins. Sci Rep. (2020) 10: 3503.
7. Mudasir Ahmad Rather, Tanveer Ali Dar, **Laishram R. Singh**, Ghulam Mohammad Rather Mohsin Ahmad Bhat, Structural-functional integrity of lysozyme in imidazolium based

surface active ionic liquids. *Int. J. Biol. Macromol.* 2020, 15: 271-279

8. Arif Bashir, Younis Hazari, Debnath Pal, Dibyajyoti Maity, Samirul Bashir, **Laishram Rajendrakumar Singh**, Naveed Nazir Shah, Khalid Majid Fazili. Aggregation of M3 (E376D) variant of alpha1- antitrypsin. *Sci Rep.* 2020; 10: 8290.
9. Marina Warepam, Khurshid Ahmad, Safikur Rahman, Hamidur Rahaman, Kritika Kumari, **Laishram Rajendrakumar Singh**. N-Acetylaspartate Is an Important Brain Osmolyte. *Biomolecules.* 2020 Feb; 10(2): 286.
10. Shahnaj S, Chowhan RK, Meetei PA, Kakchingtabam P, Herojit Singh K, **Rajendrakumar Singh L**, Nongdam P, Fisher AB, Rahaman H. Hyperoxidation of Peroxiredoxin 6 Induces Alteration from Dimeric to Oligomeric State. *Antioxidants* 8 (2) 2019 (**Impact factor-4.52**; ISSN 2076-3921)
11. Sharma GS, Warepam M, Bhattacharya R, **Singh LR**. Covalent Modification by Glyoxals Converts Cytochrome c Into its Apoptotically Competent State. *Scientific Report* 9 (1): 4781 2019 (**Impact factor-4.52**; ISSN 2076-3921)
12. Dar PA, Mir SA, Bhat JA, Hamid A, **Singh LR**, Malik F, Dar TA. An anti-cancerous protein fraction from *Withania somnifera* induces ROS-dependent mitochondria-mediated apoptosis in human MDA-MB-231 breast cancer cells. *Int J Biol Macromol.* 135:77-87 2019 (**Impact factor-4.8**; ISSN: 0141-8130)
13. Meesha Sharma, Shafikur Rahman, Sheeza Khan, **Laishram Rajendrakumar Singh**. The extracellular protein, transthyretin is an oxidative stress biomarker. *Frontiers in Physiology* 10 (5) 2019. (**Impact factor-4.1**; ISSN: 1664-042X)
14. Tauheed Hasan, Reetika Arora, Aniket Kumar Bansal, Reshmee Bhattacharya and **Laishram Rajendrakumar Singh**. Disturbed homocystein metabolism is associated with cancer. *Experimental and Molecular Medicine*, 51(2):21, 2019. (**Impact factor-5.06**; ISSN 2092-6413)
15. Hasan T, Kumari K, Devi SC, Handa J, Rehman T, Ansari NA, **Singh L. R**. Osmolytes in vaccine production, flocculation and storage: a critical review. *Human Vaccine & Immunotherapeutics* 15 (2) :514-525 (**Impact factor-3.64**; ISSN: 2164-554X)
16. Sharma, Gurumayum Suraj, and **Laishram Rajendrakumar Singh**. "Conformational status of cytochrome c upon N-homocysteinylolation: Implications to cytochrome c release." *Archives of biochemistry and biophysics* 614 (2017): 23-27. (**Impact factor-3.60**; ISSN 1522-4724)
17. Sharma, G. S., and **Singh L. R**. "Polyols have unique ability to refold protein as compared to other osmolyte types." *Biochemistry (Moscow)* 82 (2017): 465-473. (**Impact factor-1.9**; ISSN: 1608-3040)
18. Mohd Younus Bhat, **Laishram Rajendrakumar Singh** and Tanveer Ali Dar. Trimethylamine N-oxide abolishes the chaperone activity of  $\alpha$ -casein: an intrinsically disordered protein. (2017) *Scientific Reports*, 2017 26; 7 (1):6572. (**Impact factor-4.52**; ISSN 2076-3921)
19. Rimpay Kaur Chowhan, Upendra Bhele, Hamidur Rahaman, and **Laishram Rajendrakumar Singh**. Understanding structural basis for redox regulation of Peroxiredoxin 6 using in silico approach. (2017) *J. of Proteins and Proteomics.* 8(4), pp. 195-204.
20. K Chowhan R, Ali F, Bhat Y, Rahman S, **Singh L. R.**, Ahmad F, A Dar T. Alanine counteracts the destabilizing effect that urea has on RNase-A. *Protein and peptide letters.* 2016 Sep 1;23(9):795-9. (**Impact factor-1.17**; ISSN : 1875-5305.)
21. Kumar, T., Sharma, G. S., & **Singh, L. R.** (2016). Homocystinuria: Therapeutic approach. *Clinica Chimica Acta*, 458, 55-62. (**Impact factor-2.73**; ISSN 1873-3492)
22. Kumar, T., Yadav, M., & **Singh, L. R.** (2016). Role of osmolytes in regulating immune system. *Current pharmaceutical design*, 22(20), 3050-3057. (**Impact factor-3.05**; ISSN : 1873-4286)
23. Dar, P. A., **Singh, L. R.**, Kamal, M. A., & Dar, T. A. (2015). Unique Medicinal Properties of *Withania Somnifera*: Phytochemical Constituents and Protein Component. *Current*

- pharmaceutical design. 22(5), 535-40. (**Impact factor-3.05**; ISSN : 1873-4286)
24. Rahman, S., Warepam, M., **Singh, L. R.**, & Dar, T. A. (2015). A current perspective on the compensatory effects of urea and methylamine on protein stability and function. Progress in biophysics and molecular biology, 119(2), 129-136. (**Impact factor-3.42**; ISSN: 0079-6107)
  25. Warepam, M., & **Singh, L. R.** (2015). Osmolyte mixtures have different effects than individual osmolytes on protein folding and functional activity. Archives of biochemistry and biophysics, 573, 77-83. (**Impact factor-3.60**; ISSN 1522-4724)
  26. Sharma, G. S., Kumar, T., Dar, T. A., & **Singh, L. R.** (2015). Protein N-homocysteinylation: From cellular toxicity to neurodegeneration. Biochimica et Biophysica Acta (BBA)-General Subjects, 1850(11), 2239-2245. (**Impact factor-3.70**; ISSN 0304-4165)
  27. Rahman, S., Rehman, M. T., **Singh, L. R.**, Warepam, M., Ahmad, F., & Dar, T. A. (2015). Salt potentiates methylamine counteraction system to offset the deleterious effects of urea on protein stability and function. PloS one,10(3), e0119597. (**Impact factor-2.77**; ISSN **1932-6203**)
  28. Suraj Sharma, G., Ali Dar, T., & **Singh, L. R.** (2015). Reshaping the Protein Folding Pathway by Osmolyte via its Effects on the Folding Intermediates. Current Protein and Peptide Science, 16(6), 513-520. (**Impact factor-2.70**; ISSN: 1389-2037)
  29. Mittal, S., Chowhan, R. K., & **Singh, L. R.** (2015). Macromolecular crowding: Macromolecules friend or foe. Biochimica et Biophysica Acta (BBA)-General Subjects, 1850(9), 1822-1831. (**Impact factor-3.70**; ISSN 0304-4165)
  30. Sharma, G. S., Mittal, S., & **Singh, L. R.** (2015). Effect of Dextran 70 on the thermodynamic and structural properties of proteins. International journal of biological macromolecules, 79, 86-94. (**Impact factor-3.91**; ISSN: 0141-8130)
  31. Hasan, T., Ali, M., Saluja, D., & **Singh, L. R.** (2015). pH might play a role in regulating the function of paired amphipathic helices domains of human Sin3B by altering structure and thermodynamic stability. Biochemistry (Moscow), 80(4), 424-432. (**Impact factor-1.90**; ISSN: 1608-3040)
  32. De, S., Kumar, T., Bohre, A., **Singh, L. R.**, & Saha, B. (2015). Furan-based acetylating agent for the chemical modification of proteins. Bioorganic & medicinal chemistry, 23(4), 791-796. (**Impact factor-2.79**; ISSN: 0968-0896)
  33. Sharma, G. S., Kumar, T., & **Singh, L. R.** (2014). N-Homocysteinylation induces different structural and functional consequences on acidic and basic proteins. PloS One, 9(12), e116386. (**Impact factor-2.77**; ISSN 1932-6203)
  34. A Dar, T., A Sheikh, I., A Ganie, S., Ali, R., **Singh, L. R.**, Hua Gan, S., & A Zargar, M. (2014). Molecular linkages between Diabetes and Alzheimer's disease: Current scenario and future prospects. CNS & Neurological Disorders-Drug Targets, 13(2), 290-298. (**Impact factor-2.08**; ISSN: **1996-3181**)
  35. Kumar, T., Sharma, G. S., & **Singh, L. R.** (2014). Existence of molten globule state in homocysteine-induced protein covalent modifications. PloS One, 9(11), e113566. (**Impact factor-2.77**; ISSN 1932-6203)
  36. Mittal, S., & **Singh, L. R.** (2014). Macromolecular Crowding Induces Holo  $\alpha$ -Lactalbumin Aggregation by Converting to Its Apo Form. PloS One, 9(12), e114029. (**Impact factor-2.77**; ISSN 1932-6203)
  37. Mittal, S., & **Singh, L. R.** (2014). Macromolecular crowding decelerates aggregation of a  $\beta$ -rich protein, bovine carbonic anhydrase: a case study. Journal of biochemistry, 156(5), 273-282. (**Impact factor-2.35**; ISSN 1756-2651)
  38. Warepam, M., Sharma, G. S., Dar, T. A., Khan, M. K. A., & **Singh, L. R.** (2014). Structural characteristic of the initial unfolded state on refolding determines catalytic efficiency of the folded protein in presence of osmolytes. PloS One, 9(10), e109408. (**Impact factor-2.77**; ISSN 1932-6203)
  39. K Chowhan, R., Mittal, S., A Dar, T., A Kamal, M., & **Singh, L. R.** (2014). Ignored avenues in alpha-synuclein associated proteopathy. CNS & Neurological Disorders-Drug

Targets, 13(7), 1246-1257. (**Impact factor-2.08; ISSN: 1996-3181**)

40. Khan, S., Bano, Z., **Singh, L. R.**, Hassan, M. I., Islam, A., & Ahmad, F. (2013). Testing the ability of non-methylamine osmolytes present in kidney cells to counteract the deleterious effects of urea on structure, stability and function of proteins. *PloS One*, 8(9), e72533. (**Impact factor-2.77; ISSN 1932-6203**)
41. Khan, S., Bano, Z., **Singh, L. R.**, Hassan, I., Islam, A., & Ahmad, F. (2013). Why is glycine not a part of the osmoticum in the urea-rich cells?. *Protein and peptide letters*, 20(1), 61-70. (**Impact factor-1.2; ISSN: 1875-5305**)
42. Mittal, S., & **Singh, L. R.** (2013). Denatured state structural property determines protein stabilization by macromolecular crowding: a thermodynamic and structural approach. *PloS one*, 8(11), e78936. (**Impact factor-2.77; ISSN 1932-6203**)
43. Rimpay Kaur Chowhan and **Laishram Rajendrakumar Singh**. Polyamines in modulating protein aggregation (2013) *Journal of Proteins and Proteomics*. (indexed but **no impact**, ISSN: 2524-4663)
44. Ahmad, F., & **Singh, L. R.** (2012, December). Compatible Osmolytes Are Like of SOS Thing in the Living Cells. In *Proc Indian natn Sci Acad* 78(4), 701-711. (**Impact factor-0.39; ISSN 03700046**)
45. **Singh, L. R.**, Poddar, N. K., Dar, T. A., Rahman, S., Kumar, R., & Ahmad, F. (2011). Forty years of research on osmolyte-induced protein folding and stability. *Journal of the Iranian Chemical Society*, 8(1), 1-23. (**Impact factor-1.59; 1735-2428**)
46. **Singh, L. R.**, Poddar, N. K., Dar, T. A., Kumar, R., & Ahmad, F. (2011). Protein and DNA destabilization by osmolytes: the other side of the coin. *Life sciences*, 88(3), 117-125. (**Impact factor-3.50; ISSN: 0024-3205**)
47. **Singh, L. R.**, Gupta, S., Honig, N. H., Kraus, J. P., & Kruger, W. D. (2010). Activation of mutant enzyme function in vivo by proteasome inhibitors and treatments that induce Hsp70. *PLoS Genetics*, 6(1), e1000807. (**Impact factor-5.54; ISSN 1553-7404**)
48. **Singh, L. R.**, Dar, T. A., Rahman, S., Jamal, S., & Ahmad, F. (2009). Glycine betaine may have opposite effects on protein stability at high and low pH values. *Biochimica et Biophysica Acta (BBA)-Proteins and Proteomics*, 1794(6), 929-935. (**Impact factor-2.60; ISSN: 1570-9639**)
49. **Singh, L. R.**, Dar, T. A., & Ahmad, F. (2009). Living with urea stress. *Journal of biosciences*, 34(2), 321-331. (**Impact factor-1.82; ISSN: 0973-7138**)
50. Jamal, S., Poddar, N. K., **Singh, L. R.**, Dar, T. A., Rishi, V., & Ahmad, F. (2009). Relationship between functional activity and protein stability in the presence of all classes of stabilizing osmolytes. *FEBS journal*, 276(20), 6024-6032. (**Impact factor-4.70; ISSN 1742-4658**)
51. **Singh, L. R.**, & Kruger, W. D. (2009). Functional rescue of mutant human cystathionine  $\beta$ -synthase by manipulation of Hsp26 and Hsp70 levels in *Saccharomyces cerevisiae*. *Journal of Biological Chemistry*, 284(7), 4238-4245. (**Impact factor-4.0; ISSN 1083-351X**)
52. Majtan, T., **Singh, L. R.**, Wang, L., Kruger, W. D., & Kraus, J. P. (2008). Active cystathionine  $\beta$ -synthase can be expressed in heme-free systems in the presence of metal-substituted porphyrins or a chemical chaperone. *Journal of Biological Chemistry*, 283(50), 34588-34595. (**Impact factor-4.0; ISSN 1083-351X**)
53. **Singh, L. R.**, Dar, T. A., Haque, I., Anjum, F., Moosavi-Movahedi, A. A., & Ahmad, F. (2007). Testing the paradigm that the denaturing effect of urea on protein stability is offset by methylamines at the physiological concentration ratio of 2: 1 (urea: methylamines). *Biochimica et Biophysica Acta (BBA)-Proteins and Proteomics*, 1774(12), 1555-1562. (**Impact factor-2.60; ISSN: 1570-9639**)
54. **Singh, L. R.**, Chen, X., Kožich, V., & Kruger, W. D. (2007). Chemical chaperone rescue of mutant human cystathionine  $\beta$ -synthase. *Molecular genetics and metabolism*, 91(4), 335-342. (**Impact factor-3.77; ISSN: 1096-7192**)
55. Dar, T. A., **Singh, L. R.**, Islam, A., Anjum, F., Moosavi-Movahedi, A. A., & Ahmad, F.

(2007). Guanidinium chloride and urea denaturations of  $\beta$ -lactoglobulin A at pH 2.0 and 25 C: the equilibrium intermediate contains non-native structures (helix, tryptophan and hydrophobic patches). *Biophysical chemistry*, 127(3), 140-148. (**Impact factor-1.87**; ISSN: 0301-4622)

56. Moza, B., Qureshi, S. H., Islam, A., **Singh, L. R.**, Anjum, F., Moosavi-Movahedi, A. A., & Ahmad, F. (2006). A unique molten globule state occurs during unfolding of cytochrome c by LiClO<sub>4</sub> near physiological pH and temperature: structural and thermodynamic characterization. *Biochemistry*, 45(14), 4695-4702. (**Impact factor-2.99**; ISSN 1520-4995)
57. Haque, I., Islam, A., **Singh, L. R.**, Moosavi-Movahedi, A. A., & Ahmad, F. (2006). Stability of proteins in the presence of polyols estimated from their guanidinium chloride-induced transition curves at different pH values and 25° C. *Biophysical chemistry*, 119(3), 224-233. (**Impact factor-1.87**; ISSN: 0301-4622)
58. **Singh L. R.**, Inamul Haque and Faizan Ahmad (2005) Counteracting Osmolyte Trimethylamine N-Oxide Destabilizes Proteins At pH Below its pKa: Measurements of Thermodynamic Parameters of Proteins in the Presence and Absence of Trimethylamine N-Oxide. *J. Biol. Chem.* 280, 11035-11042. (**Impact factor-4.0**; ISSN 1083-351X)
59. Haque, I., **Singh, L. R.**, Ahmad, F., & Moosavi-Movahedi, A. A. (2005). Testing polyols' compatibility with Gibbs energy of stabilization of proteins under conditions in which they behave as compatible osmolytes. *FEBS letters*, 579(18), 3891-3898. (**Impact factor-2.99**; ISSN 1873-3468)
60. Haque, I., **Singh, L. R.**, Moosavi-Movahedi, A. A., & Ahmad, F. (2005). Effect of polyol osmolytes on  $\Delta G_D$ , the Gibbs energy of stabilisation of proteins at different pH values. *Biophysical chemistry*, 117(1), 1-12. (**Impact factor-1.87**; ISSN: 0301-4622)

#### **Book Chapters:**

1. Rimpay Kaur Chowhan, Tanveer Ali Dar, **Laishram Rajendrakumar Singh** (2015) Proteopathies: Molecular, Biological and clinical Perspectives. (on Proteostasis and Chaperone Surveillance, Springer, 139-169 (2015) ISBN 978-81-322-2467-9)
2. Gurumayum Suraj Sharma, Marina Warepam, **Laishram Rajendrakumar Singh** and Tanveer Ali Dar (2015). Small molecule osmolytes can modulate proteostasis. (on Proteostasis and Chaperone Surveillance, 39-59 (2015) Springer, ISBN 978-81-322-2467-9)
3. Mohd Younus Bhat, Tanveer Ali Dar, and **Laishram Rajendrakumar Singh**. Casein Proteins: Structural and Functional Aspects. IntechOpen, ISBN: 978-953-51-2537-2. MILK PROTEINS (2016): 1-19.
4. Bhat, Mohd Younus, **Laishram Rajendrakumar Singh**, and Tanveer A. Dar. "Modulation of Protein Aggregation/Fibrillation by Osmolytes." *Cellular Osmolytes*. Springer, ISBN 978-981-10-3707-8 Singapore, 2017. 121-142.
5. Khan, Sheeza, Tanveer A. Dar, and **Laishram Rajendrakumar Singh**. "Clinical Implications of Osmolytes in Various Human Diseases." *Cellular Osmolytes*. Springer, ISBN 978-981-10-3707-8 Singapore, 2017. 161-193.
6. Gurumayum Suraj Sharma, Reshmee Bhattacharya, **Laishram Rajendrakumar Singh**. Protein covalent modification by homocysteine: consequences and clinical implications "Protein Modificomics" Elsevier, ISBN: 9780128119501 (281-311, 2019)
7. Aniket Kumar Bansal, **Laishram Rajendrakumar Singh**, Majid R. Kamli. Posttranslational modifications associated with cancer and their therapeutic implications "Protein Modificomics" Elsevier, ISBN: 9780128119501 (203-227, 2019)

#### **DETAILS OF RESEARCH PROJECTS:**

A. University awarded projects				
2011 -12	Investigating the effects of multiple osmolytes on protein structure and folding	DU	2.5 lakhs	Completed
2012 -13	Investigating the protein folding in osmotically stressed cells: structural and thermodynamic study	DU	2.5 lakhs	Completed
2013 -14	Investigating the protective role of osmolytes to delay protein N-homocysteinylation	DU	2.8 lakhs	Completed
2014 -15	Investigating if N-homocysteinylation has different consequences on proteins having different physico-chemical properties	DU	3.0 lakhs	Completed
2015 -16	Investigating reactivity, structural and functional consequences due to protein covalent modification by homocysteine modification by homocysteine	DU	3.0 lakhs	Completed
B. Other agencies - National and international				
2011 -14	Mechanism of allosteric regulation of a unique bifunctional antioxidant enzyme peroxyredoxin-6 on post-translational modification.	DBT (PI)	27.30 Lakhs	Completed
2011-14	Toll like receptors and signalling mechanisms of <i>T. vaginalis</i> isolates from symptomatic and asymptomatic infected women	DBT (co-PI)	32.5 lakh	Completed
2013 -16	Understanding the differential structure-function relationship of three paired amphipathic helices (PAH Domains) of human SIN3B protein and their role in differential interaction with transcription factors	CSIR (co-PI)	18 Lakhs	Completed
2014-17	Effect of multiple osmolytes on protein stability, structure and function	CSIR (PI)	19 Lakhs	Completed
2013 -16	Biophysical characterization of glycosylated and non-glycosylated forms of <i>Withania somnifera</i> glycoprotein, a therapeutically important protein from <i>Withania somnifera</i> (Ashwagandha), (RGYI)	DBT (co-PI)	34.95 Lakhs	Consultancy project
2012-15	Effect of macromolecular and osmolytic crowders on protein structure and folding.	DST (PI)	40.01 Lakhs	Completed
2017-2019	Protein covalent modification by homocysteine: Understanding the reactivity, toxicity, structural and functional consequences.	DBT (PI)	30.42 lakh	Ongoing
2014-16	Investigating the role of fractional surface area in counteracting urea's effect on protein stability and function	DST	20 lakh	Consultancy (completed)
2015-16	Screening and characterization of peptide based inhibitors of beta-lactamases: an alternative approach to target antibiotic resistance	DST SERB	29.7 lakh	Consultancy (completed)
<b>Invited Talks</b>				
1. Delivered talk on "A Unique Molten Globule State Occurs during Unfolding of Cytochrome-c by LiClO <sub>4</sub> at physiological pH" at Manipur University, Imphal, India (2004).				



2. Delivered talk on “Hsp26 deletion rescues inactive missense mutant proteins” at Neural & Behavioral Sciences, Penn State University College of Medicine, Hershey, Pennsylvania, USA (2008).
3. Delivered talk on “Manipulation of Molecular Chaperones to Restore Function to Mutant Proteins” at Department of Cellular and Molecular Physiology, Penn State College of Medicine, Hershey, Pennsylvania, USA (2009).
4. Delivered talk on “Strategies to Restore Function to Disease Causing Missense Mutant Proteins” at Fox Chase Cancer Center, Philadelphia, PA (2009).
5. Delivered SURP lecture on Protein Aggregation and Diseases, ACBR, Delhi University (2014).
6. 2nd International Conference on “Frontiers in industrial and applied Biotechnology” held at Invertis University, Bareilly, Uttar Pradesh in August (2015).
7. 10th symposium on “Frontiers in Biomedical Science” organized by Dr. B. R. Ambedkar Center for Biomedical research, University of Delhi in October (2015).
8. SURP lecture on Protein Misfolding Diseases and Treatment Strategies, ACBR, Delhi University (2016)
9. Delivered talk on “Strategies to restore function to disease causing missense mutant proteins” at 2<sup>nd</sup> National Seminar on ‘Current Trends in Life Sciences’ organized by Centre for Biological Sciences and Central University of South Bihar in February (2017).
10. Delivered talk on “Strategies to restore function to disease causing missense mutant proteins” at National Seminar on ‘Biotechnology in Health Care: Challenges and Opportunities’ organized by Department of Biotechnology, Faculty of Science, Jamia Hamdard in March (2017).
11. Delivered talk on “Strategies to rescue mutant protein function” at SURP program ACBR, Delhi University (2017)
12. Delivered talk on “Protein N-homocystinylation: from Functional loss to Apoptosis” at Seminar in Biophysics organised by jamia Millia Islamia, (2017)
13. Delivered talk on “Strategies to Restore Function to Disease Causing Missense Mutant Proteins” 4<sup>th</sup> International Conference on Emerging Trends in Protein Science & Proteomics: GenoPro2017 organised by Invertis University, Bareilly (2018)
14. Delivered talk on “Challenges and Opportunities in Biotechnology for the sustainable development” Department of Biotechnology, Invertis University, Bareilly (2018)
15. Delivered talk on “The Chemical Chaperone, TMAO fails to refold proline rich proteins” at National Seminar entitled “**Biotechnology Research in India: Current Status and Future Prospects**” organised by Department of Biotechnology, School of Chemical and Life Science, Jamia Hamdard (2019)
16. Delivered talk on “Protein Folding Problems: what can we learn from it” organised by Kiroromal college, Delhi University (2020).

#### **Publication in Proceedings (in referred journals)**

1. Sharma, Gurumayum Suraj, and Laishram Rajendrakumar Singh. "Insights Into The Mechanism Of Protein Functional Loss Upon Covalent Modification By Homocysteine Thiolactone." The FASEB Journal 31.1 Supplement (2017): 603-4.
2. Shruti Mittal, Laishram Singh (2015) Macromolecular Crowding Enhances the Efficiency of the Chemical Chaperone, Betaine in Inhibiting Protein Aggregation. The FASEB Journal, 29,

1 Supplement, 881.8

3. Marina Warepam, Laishram Singh (2015) Role of N-Acetylaspartate in Alzheimer Disease. The FASEB Journal, 29, 1 Supplement, 881.9
4. Rimpay Kaur Chowhan, Md Hamidur Rahaman, and Laishram Rajendrakumar Singh (2013) Exploring allosteric regulation of Peroxiredoxin6, Journal of Proteins and Proteomics, 4(2), 31.
5. Rimpay Kaur Chowhan, Sudhir Kumar Pal, and Laishram Rajendra Kumar Singh (2015) First comprehensive in silico identification of deleterious nsSNPs of human peroxiredoxin6 and their structural and functional characterization, Journal of Proteins and Proteomics, 6(1), 111.
6. D Sachdev, M Chopra, LR Singh, D Saluja - Sexually Transmitted Infections, 2013 Understanding the Molecular Mechanism of mtrR in the Regulation of Antimicrobial Resistance in Neisseria Gonorrhoeae Using in Vitro and In Silico Studies, 89, Supplement 1, A68-A68
7. Marina Warepam and Laishram Rajendrakumar Singh (2012) Mixtures of osmolytes on the effect of protein stability and refolding yield, Journal of Proteins and Proteomics, 3(2), 54.
8. Marina Warepam and Laishram Rajendrakumar Singh (2013) Various additives have opposite effects on the protein aggregation process that proceeds via nucleation dependent and independent pathways, Journal of Proteins and Proteomics, 4(2), 54.
9. Gurumayum Suraj Sharma and Laishram Rajendrakumar Singh (2013) Homocysteinylation induced-protein aggregation: Not all homocysteinylation results into protein aggregation, Journal of Proteins and Proteomics, 4(2), 32.
10. Tarun Kumar and Laishram Rajendrakumar Singh (2013) Proline: A stress protectant can delay protein N-homocysteinylation, Journal of Proteins and Proteomics, 4(2), 32.
11. Shruti Mittal and Laishram Rajendrakumar Singh (2012) Glycine relieves RNase A from crowding induced functional inhibition, Journal of Proteins and Proteomics, 3(2), 45.
12. Shruti Mittal and Laishram Rajendrakumar Singh (2013) Calcium behaves as a chaperone in relieving crowding induced protein aggregation, Journal of Proteins and Proteomics, 4(2), 17.

#### Conference attended (Last five years)

1. Participated in the 36<sup>th</sup> Annual Meeting of the Indian Biophysical Society held at University of Madras in 2012
2. Participated in the "International Interdisciplinary Science Conference (IISC)" held at Jamia Millia Islamia in 2012
3. Participated in the National conference on "Recent trends in Protein Structural Biology" held at Jamia Millia Islamia in December 2013
4. Participated in the National symposium on "Frontiers of Biophysics, biotechnology & Bioinformatics" held at University of Mumbai in January 2013
5. Participated in the 9<sup>th</sup> Symposium on "Frontiers in Biomedical Research" held at University of Delhi in April 2014

#### Teaching Experience: 11.8 years

(Subjects/Courses Taught):

#### Postgraduates:

Theory and Practical class for **Biochemistry**  
Theory and Practical class for **Instrumentation**  
Theory class for **Medicinal Chemistry**  
Theory class for **Concepts in Drug Discovery**  
Theory class for **Human Physiology**

**Doctoral:**

Ph.D. Course Work: **One complete Module**

**Undergraduates:**

In the form of internship for the ACBR students, IAS fellows and other University students

**Professional Societies Memberships**

**Indian Biophysical Society**  
**American Chemical Society**  
**Proteomic Society of India**

**Students and Trainees**

**No. of Students who have completed Ph.D. (as Supervisor): 6**

**No. of students who completed Ph.D. (as co-supervisor) : 3**

**No. M. Sc. project Students trained: 51**

**No. Undergraduate students trained: 25**