Curriculum Vitae

Name: Prof. Nadimpalli Siva Kumar

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Area Of Research: Glycobiology, Cell and Molecular Biology, Nanobiotechnology

Academic appointments

DAAD Visiting Professor, University of Bremen, Germany (April 2024-March 2025)
Emeritus Professor, Biochemistry Department, School of Life Sciences December 2023 onwards
Dean, School of Life Sciences July 2022 to November 2023
Senior Professor, Department of Biochemistry (February 2019)
Professor, University of Bremen, Germany (DAAD Visiting Professor March to July 2019)
Professor, Department of Biochemistry (November 2004)
Reader, (Associate Professor) Department of Biochemistry (August 1998) Senior Lecturer, School of Life Sciences (September 1991)
Lecturer, (Assistant Professor) School of Life Sciences (September 1986)

Administrative appointments

Chairman, MoU Committee, University of Hyderabad
Director, Office of International Affairs (2018- June 2022)
Coordinator MHRD SPARC Program, University of Hyderabad (2019-2021) Coordinator NPTI Program UoH and University of Goettingen Germany (2019-2023) Coordinator MHRD, Study in India, (2018 onwards)
Member of the LPPMC (Local Programme Planning and Management) committee of HRDC, UoH – February 2020 for 2 years.
Coordinator of the DAAD, New Passage to India (2019-2023) University of Goettingen
Coordinator University of Muenster MoU (2017-2022)
Head Biochemistry Department (2014-2017- 3years)
In-charge Dean, School of Life Sciences (Several Weeks, ~4-5 months: during 2014-17, to date) Coordinator of the GIAN Course – Glycoconjugates: Role in Biology and Biomedical Relevance November 2017 Prof. Dr. Dr. h.c. Kurt von Figura, Goettingen, Germany
Coordinator of the UGC-SAP-DRS-1, Department of Biochemistry (2016-2021-5 years) Coordinator of the DST-FIST Program, Department of Biochemistry (2014-2017) Coordinator –School level) Centre for Nanotechnology (2010-2017)
Steering Committee Member (Asian Community of Glycoscience and Glycotechnology) Steering Committee Member, TRendys in Biochemistry (Since 2016)

Coordinator of the **NAMASTE** (Networking & Mobility Actions for Sustainable Technology Program) of the EU, being coordinated by the University of Goettingen (2013-2017) Project Coordinator of the First International Research Training Group in Molecular and Cellular Glycosciences, (UGC-India and DFG-Germany) 2009-2017.

Board Memberships

Member of the College for Integrated Studies School Board (3 years) Member of the School Board of Life Sciences (Since 2004)
Member of the Academic Council, University of Hyderabad (since, 2004)
Member of the School Board of Engineering Science and Technology School (2017-2020)
Member of the Department Council (CASEST, School of Physics, 2018-2020)
Member JNU-CCMB Academic Committee (2016-2018-2 years)
Member of the School Board, School of Life Sciences, Pondicherry Central University (2016- 2019)
Member, Board of Studies, Biotechnology Department, GITAM University, Visakhapatnam (2018-2021)
Member of Academic Committee, Bhavan's Post Graduate College of Science, Secunderabad (2018-2020) 2 years
Member, Board of Studies, Biochemistry Department, MS University, Baroda (2017 to date)
DBT Nominee … Vivimed Labs, Hyderabad, 3 years
DBT-IBSC Nominee …Yapan Bio Private Limited, Hyderabad

Professional Societies

Life member, Society of Biological Chemists, India Member, Society for Glycobiology, USA Chair, 6th Asian Community of Glycoscience and Glycotechnology, 2014 December, University of Hyderabad, India)
Chair, 12th ACGG Meeting, School of Life Sciences, University of Hyderabad 8-11 November, 2023.
Convener, **TR**endys in Biochemistry, India (2016 onwards along with Prof. Anand K. Kondapi)

Recent 2025 April onwards

Special invitation for Talks, Participation in Scientific meetings

Invited to deliver **Prof. T.M. Radhakrishnan** and **Smt. T.M. Bharathi** Endowment Lecture in the Biochemistry Department, Andhra University, Visakhapatnam as part of the centenary celebrations of the University. 2nd April, 2026. Talk on N- Glycosylation of proteins-Lysosomal Biogenesis in *Hydra vulgaris.*
Participated in the German–Indian Round Table (GIRT) Meeting: March 12, 2026.
Participated in the German-Indian Round Table (GIRT) Meeting: Interaction with Mr. Michael Hasper, the New Consul General of the Federal Republic of Germany in Chennai, November, 3rd, 2025.
Participated in the German–Indian Round Table (GIRT) Meeting: September, 25th, 2025.

Rajatotsav - the 25th Annual Day of the Dr. K. V. Rao Scientific Society, - Felicitated in CCMB, Hyderabad for the selfless dedication, integrity, and invaluable support as a Judge in the KVR Scientific Society for some years. September, 12th, 2025.

Teaching

Practicals for I Semester Biochemistry Program - July 2025 to November 2025 session

3- Manuscripts writing and review of research articles - January 2026-July 2026 session

Awards / Fellowships / Honours [including Ph.D. students]

International

9. **DAAD** Visiting Professorship to teach at University of Bremen, Germany (**April 2024 to March 2025**)
8.**Fulbright**-Nehru International Education Administrators Seminar Award, 2023 September
7. **DAAD Visiting Professorship by invitation to teach** for one semester in an international Program Masters in Biochemistry and Molecular Biology (March to July 2019) in University of Bremen, Germany
6. Three Ph.D. students DAAD-Fellowships (2-Sandwich model-worked in Goettingen, Greifswald, One year each and 1 short term-Greifswald)
5. Two Ph.D. students best poster awards in International Meetings
4. Recipient of an **International Research Grant** supported by the Volkswagen research Foundation, Germany (2000-2006 I/78096., I/78193). Only Principal investigator from India **Prof. N. Siva Kumar:** German collaborators: Prof. Dr. Dr. h. c. K. von Figura, Goettingen University, Prof. Dr. Regina Pohlmann, University of Muenster, Germany. Total amount (2000- 2005) about Rs. 58 lakhs (Completed). (These projects are highly competitive in nature internationally and only the best would get the funding)
3. **Visiting Scientist fellowship** by Prof. Dr. K. von Figura, University of Goettingen, Goettingen, Germany, (1995, 1996 and 1997 Summertime 2, 3 months and 2 weeks)
2. **The German Academic Exchange Service Fellowship, Reinvitation program**, (May-July 1994) European Molecular Biology Laboratories, Heidelberg. Prof. Dr. B. Hoflack
1. **The German Academic Exchange Service Fellowship through UGC,** Government of India, worked in the laboratories of Prof. Dr. H. Ruediger, (1988 September to May 1989), University of Wuerzburg, Institut fur Pharmazie Und Lebensmettel Chemie, Am Hubland, Wuerzburg, 97074, Germany, and Prof. Dr. K. von Figura, (June 1989-June 1990) Institut fur Biochemie Und Molekulare Zellbiologie, Georg-August Universitaet, Gosslerstrasse 12D, Goettingen, 37073, Germany

National

11. **TR**endys in Biochemistry Oration Award 2022, JSS Medical College, Mysuru 06-07 January, 2023.
10. Kavyashree S.R. Award for Research Proficiency from the Biochemistry Department: Publication in International Journal of Biological Macromolecules(2019)

9. Kavyashree S.R. Award for Research Proficiency from the Biochemistry Department: Publication in International Journal of Biological Macromolecules (2019)
8. A. Ajith Kumar - Award for Research Proficiency from the Biochemistry Department: *Takifugu rubripes* cation independent Mannose 6-phosphate receptor: cloning expression and functional characterization of the IGF-II binding domain. Published in International Journal of Biological Macromolecules: (2018)
7. **Dr. Mohammad Javed Ali (LVPEI, Hyderabad)** has worked for his Ph.D. in Biochemistry under my guidance on a research topic, Glycobiology of The Lacrimal Drainage System and obtained his Ph.D. in 2018. He made significant contributions in eye research and was awarded the prestigious **Shanti Swarup Bhatnagar Prize for Science and Technology in Medical Sciences for the year 2019.**
6. **UGC Mid-Career Award – 2018**
5. **Awarded the Andhra Pradesh Scientist Award 2012** in Biological Sciences for the outstanding **teaching and research** contributions made in the field of Glycobiology
4. **Awarded the DBT,** Overseas associateship, 2008 to carry out research for 6 months (March-September, 2009) in the University of Goettingen, Goettingen, Germany. Collaborator – Dr. Bernhard Schmidt.
3. Awarded the **Prof. M. Sadhaksharaswamy Endowment Lecture Award 2007**, by the Society for Biological Chemists (India) for outstanding contributions in **teaching and research** in the field of biological chemistry and allied sciences.
2. Elected Fellow of the **Andhra Pradesh Akademi of Sciences**, India, March 2006
1. Recipient of **Indian National Science Academy Visiting Fellowship** (1995-1996) worked in the laboratory of Prof. N. Appaji Rao, at Biochemistry Department, Indian Institute of Science, Bangalore, India

Teaching and Research

Actively involved in teaching for Postgraduate students at the University of Hyderabad courses such as the Carbohydrate and Lipid Metabolism, Protein amino acid and Nucleotide Metabolism. Glycoconjugates: Role in Biology and Biomedical Relevance as an Elective course. Glycobiochemistry (University of Bremen). In addition to teaching courses, lab classes in the subjects concerned were also conducted.

Taken several classes as part of the HRDC Centre in UoH for teachers. Invited to GITAM College, Visakhapatnam to deliver lectures to their Master students in Biotechnology.

Research

Number of Projects completed: 18

(including one International supported by the Volkswagen Research Foundation, Germany 2000-2006,

One IRTG-MCGS, UGC supported and

UGC BSR- Mid career Award,

One EU Supported HARMONY project).

IoE Research Project – Completed March 2025

UoH-IoE-RC3-21-003 entitled "Towards understanding the structural and physiological functions of alpha-mannosidase, beta hexosaminidase from Snake Gourd (*Trichosanthes anguina*) seeds as a potential glycomics tools. Start date December 1st, 2021 until January, 2025. Rs. 49.95 lakhs

BUILDER-SLS Common Program - One of the CO PI - 5 years 2021 - ~ 10 crores

Number of Ph.D.'s supervised: **20 (one Yemen National)**

` **International students who worked in my lab (IRTG-MCGS) – 5 (Ph.D's), Master/Graduate interns - 7**

Postdocs Mentored – **7**

DST-NPDF

UGC Kothari-2019,

DST-SERB-Research Associates,

UPE Research Associate)

Two Postdocs worked in the IoE project (2021-2025)

Number of peer-reviewed Research publications – 98 + (Few more under preparation)

Number of invited talks and Conference presentations (India and Abroad) individual and by students from laboratory – 100 - Includes National and **I**nternational (since 1986 to date)

Journals where research work is published

Google Scholar Citations – 1200. Highest citations 86, Colloids Surfaces and Interfaces B, H index: 19., i10 index-36

FEBS.LETT (3.5), J.Cell Biol (11.7), J. Biol. Chem (6.3), Comp. Biochem & Physiol(2.0), Development, Genes, and Evolution (2.2), Colloids, Surfaces, and Interfaces B (5.9), Glycoconjugate J (2.3), Glycobiology(4.0), Int. J. Biol. Macromolecules(8.01), Biochimie(3.2), Current Protein and Peptide Science (3.1), Biochim. Biophys. Acta (4.4), Bioscience Reports(2.6),J. Chromatography (3.7), J. Biochemical and Biophysical Meth(1.3), Organic Biomolecular Chem(3.5), Glycobiology (4), Protein Expression & Purification (1.5), Phytochemistry(1.9), Bioscience, Biotechnology, Biochemistry(1.06), Current Science(0.51), Biochemistry Molecular Biology International (0.8), Graefes Arch Clin Exp Ophthalmol (2.249), Ophthal Plast Reconstr Surg (1.283), IJCMPR (1.6), Developmental Dynamics (3.25). Plant Physiology and Biochemistry (6.4)

Published papers (98) Nadimpalli Siva Kumar #-Corresponding author [> 84]

Under preparation and submission [3]

The research publications are mostly in the area of Protein Biochemistry and Glycobiology. Several new methods were developed for the largescale purification of plant and animal lectins and glycosidases. Purified protein structure and functions were elucidated using various biochemical, cell biological, molecular biological, immunological, biophysical, and Mass spectrometric techniques. Crystal structure for a galactose specific lectin purified in our lab was also elucidated.

Having developed simpler affinity methods to purify the mammalian Mannose 6-phosphate receptors that mediate transport of lysosomal enzymes to lysosomes, the lysosomal biogenesis pathway has been established by us to be conserved from fish to mammals, and current studies being focused on invertebrates has provided new insights into the evolution of the lysosomal biogenesis pathways which involves inter-organellar communications (ER to Golgi - to Endosomes - to Lysosomes). Current work is being carried out using the early cnidarian *Hydra vulgris* as a model system towards understanding lysosomal biogenesis. We first discovered the lysosomal enzymes and Mannose 6-phosphate receptors from this organism. Our studies contribute towards further establishing the evolutionary conservation of lysosomal biogenesis from early metazoan, Hydra to highly evolved Human.

Nanotechnology-based research involving preparation, characterization of protein and oligosaccharide nanoparticles gave new insights into the usefulness of these as drug delivery systems.

More recent work involving the human lacrimal system and the glycoprotein profiling of the human lacrimal gland has given new inputs on this unexplored tissue and paved way to further expand and extend these studies towards understanding the specific roles of some glycoproteins in the lacrimal gland tissue.

Both with individual projects and by the work of large number of dedicated, motivated, and hard- working students, these different publications were possible. A large number of students who graduated from this lab are actively engaged in research activities in companies, research institutes, research labs, universities both in India and abroad.

Recent Publications: Last 6 years [23]

Current Research work: (2018-2024)

Current and future work involves, understanding inter organellar communication and protein-

protein interactions (UGC-SAP), lysosomal enzyme targeting mechanisms in invertebrates with special emphasis on *Hydra Vulgaris* (DST-SERB), Proteomics of the protein body components from *Trichosanthes anguina* seeds (UGC-Mid Career Award), and other non-legume seeds. Further exploring the lysosomal biogenesis in the human lacrimal system (LVPEI collaboration), preparation and characterization and application of plant lectin, phosphorylated mannooligosaccharide nanoparticles towards utilizing them as tools for drug delivery. The study involves, lectin-glycosidase-protein body membrane proteins interactions and analysis of the glycan structures of the purified glycosidases (mannosidase and hexosaminidase). With the recently approved IoE project, we are understanding the physiological significance of galactose specific lectin from snake gourd seeds.

Internationalization at the UoH, as Director for International Affairs

- Developed and Coordinated the First International research Training Group in Molecular and Cellular Glycosciences with UoH and University of Muenster, Germany (2009-2017). MoU has been extended second time with the University of Muenster, and currently coordinator of the same. Coordinating regularly visits of University of Muenster undergraduate students to UoH (SLS and Chemistry School) for 3-month project works.
- Actively collaborated with Prof. Hans in Academia Sinica as part of UoH-AS collaborative program with SLS.
- As Director for International Affairs, strengthened Internationalization in the UoH and has been coordinating several programs of the MHRD at the UoH. Furthermore, also coordinating DAAD supported NAMASTE + Program with University of Goettingen.
- In the last two years a number of initiatives with international Universities have been formulated at the UoH as MoU's with top ranked Universities across the globe which should in the future facilitate exchange of students and faculties and strengthen internationalization at UoH under the IoE status.
- **Coordinated a European Commission supported International Project HARMONY on Strategies for Internationalization in Higher Education Institutions - European and Asian countries.**

RESEARCH SCHOLARS (Ph.D) SUCCESSFULLY GUIDED

20. Kavyashree S. R. (2020) *Biochemical and Biophysical characterization of glycosidases from the seeds of non-legumes (Annona squamosa and Trichosanthes anguina) and their interaction with lectins. [Recently completed as postdoc in IoE project]*

19. Rohit Sai Reddy Konada (2019) *Biochemical characterization of lysosomal enzymes from the invertebrates Lamellidens corrianus and Hydra. [USA Postdoc]*

18. Dr. Mohammad Javed Ali (2018) *Exploring the glycobiology of lacrimal gland.[Head Dacryology, LVPEI-2019, SS Bhatnagar Awardee in Medical Sciences]*

17. PoornaManasa B (2018) *Characterization of functional domains of MPR 300 protein and lysosomal α- fucosidase from molluscs. Identification, purification, cloning and characterization of MPR proteins from hydra vulgaris.[Research scientist, Dubai]*

16. Ajith Kumar A (2017) *P-type lectins and their interacting partners from fish and echinoderms.[DBT Post doc IISc, Bengaluru]*

15. Ismail Khan (2014) *Preparation and characterization of nano particles of phosphorylated oligosaccharides.[Working in a company in Hyderabad]*

14. B.S. Gnanesh Kumar (2013) *Amino acid and N-glycan sequence analysis of Lablab bean (Dolichos lablab) Lectins, α-Mannosidase and Jack bean (Canavalia ensiformis) α-*

Mannosidase [Scientist at CFTRI, Mysuru]

13. A. Venugopal (2013) *Biochemical characterization of β-Hexosaminidases, Cathepsin D, α-L-Fucosidase and a Lactose-specific lectin from the invertebrate mollusc (Unio).[Patent Administrator-Ministry of Commerce GoI, Chennai]*

12. Mohammad Mansour Saleh Saif (2013) *Biochemical characterization of some selected seed matrices: analysis of these for the removal of toxic metals from aqueous media.[Returned to Yemen-Faculty]* ***- International***

11. Merino Visa (2012) *Biochemical characterization of cathepsin D and α-fucosidase from starfish: Mannose 6-phosphate receptors (MPR300) from fish and starfish also interact with human IGF-II [Woman Scientist, Kohima, Nagaland]*

10. T. Kiran Kumar (2011) Studies on some biologically important proteins from the seeds of *Moringa olifera* [*Faculty in CURAJ, Rajasthan*]

9. A. Praveen Kumar (2009) *Functional characterization of the goat and chicken MPR 46 protein. Molecular cloning of the mollusc MPR 46 protein [Working in USA in a company]*

8. Y. Sivaramakrishna (2008) *Functional characterization of the cation independent Mannose 6-phosphate/IGF-II receptor protein [Working in USA-Company]*

7. R. Nagender Rao (2008) *Purification and characterization of a galactose specific seed and vegetative lectin from the Dolichos lablab [Scientist in Delhi]*

6. V. Lavanyalatha (2005) *Functional characterization of some legume, non- legume and animal lectins* [At home]

5. V. Suryanarayana Raju (2004) *Molecular cloning, sequencing of fish Mannose 6-phosphate Receptors (MPR 300 and 46) Identification of MPR 300 like polypeptides in Arthropoda and Annelidae [Returned from USA started own company]*

4. K. Suresh (2003) *Mannose 6-phosphate receptors from goat and Chicken: Molecular cloning of goat receptors. [Working in USA as Director for a Company]*

3. Y. Radha (2002) *Studies on some biologically important proteins from the invertebrate Unio* [Not known]

2. Y. Udaya Lakshmi (2000) *Studies on Mannose 6-phosphate receptors from non-mammalian vertebrates, invertebrates [Research Director – Precision antibody producing company, Baltimore, USA]*

1. B.T. Rajasekhar (1997) *Studies on Lectins, lectin receptors and glycosidases from the seeds of Indian lablab beans [In USA working for a company]*

Publications:

98 + -published --**>50** – Lysosomal enzymes and their receptors, **30** – Lectins and Glycosidases, **4**-Nanobiotechnology, Remaining on Proteins/glycoproteins

2023-International Glyco-26 Meeting

3. Nadimpalli Siva Kumar – Keynote Speaker at the International Meeting Glyco-26 (27th August to 1st September, 2023) at Academia Sinica, Taipei, Taiwan.

Students presented posters at the: Glyco 26 Meeting at Academia Sinica, Taipei, Taiwan, August-Sept, 2023.

2. Vuthradhi Siva Ranjani and Nadimpalli Siva Kumar(2023) Anovelα-galactosidasefromtheseeds of *Momordicacharantia* is possibly a bifunctional enzyme with N-acetylgalactosamine transferase activity.

1. Lakshmi Surekha Krishnapati [#], Poorna Manasa Bhamidimarri [1], Julia Gries, Vuruputuri Mahathi, Siva Kumar Nadimpalli (#,1 – equal contribution) Lysosomal α-Fucosidase from *Hydravulgaris.*

Cloning, sequencing and biochemical characterization reveals its relatedness to the human enzyme.

Under Communication - 3

101. Lakshmi Surekha Krishnapati [#], Poorna Manasa Bhamidimarri [1], Julia Gries, Vuruputuri Mahathi, Siva Kumar Nadimpalli (#,1 – equal contribution) (2025) Lysosomal α-Fucosidase from *Hydra vulgaris.* Cloning, sequencing and biochemical characterization reveals its relatedness to the human enzyme. *Under Communication.*

100. Sneha Banerjee[1,#], Kavyashree Sakharayapatna Ranganatha[2,#], Lakshmi Surekha Krishnapati[2], Michael Mormann[3], Nadimpalli Siva Kumar[2,*], Musti J. Swamy[1,*] (2025) Characterization of Class II α-mannosidase from *Trichosanthes anguina* seeds: Partial amino acid sequencing and Biophysical studies. *Under Communication to Int. J. Biol.Macromolecules.*

99. Vuthradhi Siva Ranjani and Nadimpalli Siva Kumar (2025) A novel α-galactosidase from the seeds of *Momordica charantia* is possibly a bifunctional enzyme with N-acetylgalactosamine transferase activity. *Under communication.*

Last 6 years Publications: 23 [2018-2024] 98-76

98. Kowshik Kukkemane,[1,3*] Lakshmi Surekha Krishnapati,1a Ratna Mahathi Vuruputuri,1a Kavyashree Sakharayapatna Ranganatha,1 Nadimpalli Siva Kumar[1,2*](2024) Purification and Biochemical Characterization of BetaHexosaminidase B from Freshwater Cnidarian Hydra vulgaris IndPune **Trends in Carbohydrate Research**, Vol.16, No.3(2024) 60-75

97. Kavyashree Sakharayapatna Ranganatha,[1] Kowshik Kukkemane[1,2] and Nadimpalli Siva Kumar[1]*(2023) Tissue-Specific Profile and Activity Patterns of Glycosyl Hydrolases from *Trichosanthes Anguina* (Snake Gourd) **Trends in Carbohydrate Research**, Vol.15, No.4 (2023) 1-22

96.Shivaranjani Vutharadhi, Kavyashree Sakharayapatna Ranganatha, Siva Kumar Nadimpalli (2023) *Momordica charantia* seed proteins - Purification, biochemical characterization of a class II α-mannosidase isoenzyme and its interaction with the lectin and protein body membrane. **Int. J. Biol. Macromolecules** 248, 1 September, 126022

95. Vutharadhi Shivaranjani and Siva Kumar Nadimpalli# (2023). "Isolation of Momordica charantia seed Lectin and glycosidases isolated from the protein bodies: Lectin-glycosidase (β- hexosaminidase) protein body membrane interaction reveals possible physiological function of the lectin". **Plant Physiol.Biochem**., 197, April, 107663

94. SK Nadimpalli, PM Bhamidimarri, LS Krishnapati, S Ghaskadbi, (2021) New insights into the evolutionary conservation of a lysosomal alpha-fucosidase from Hydra vulgaris-A biochemical investigation on the early metazoan. **GLYCOBIOLOGY** 31 (12), 1721-1721

93. Kavyashree Sakharayapatna Ranganatha, Ashapogu Venugopal, Dinesh Kumar Chinthapalli, Rajagopal Subramanyam, Siva Kumar Nadimpalli# (2021) Purification, biochemical and biophysical characterization of an acidic α-galactosidase from the seeds of *Annona squamosa* (custard apple) **Int.J.Biological Macromolecules** 175, 558-571.

92. A Kumar, VK Hinge, A Venugopal, SK Nadimpalli, CP Rao (2021) Lectins-glycoconjugates interactions: Experimental and computational docking studies of the binding and agglutination of eight different lectins in a comparative manner **bioRxiv**

91. Konada, Rohit Sai Reddy, Krishnapati, Lakshmi Surekha., Ashapogu, Venugopal., Lin, Chung-Hung., Nadimpalli, Siva Kumar (2020), Comparative analysis of β-hexosaminidase and acid phosphatase from Hydra vulgaris Ind-Pune, H. vulgaris Naukuchiatal and H.

magnipapillata sf-1: Localization studies of acid phosphatase and β-hexosaminidase from H. vulgaris Ind-Pune, **Comparative Biochemistry and Physiology Part B: Biochemistry and Molecular Biology**, Pergamon,239,110365.

90. Venugopal, Ashapogu., Mondal, Saradamoni, Ranganatha, Kavyashree Sakharayapatna, Datta, Debparna, Kumar, Nadimpalli Siva, Swamy, Musti J, (2020), Purification and biochemical/biophysical characterization of two hexosaminidases from the fresh water mussel, *Lamellidens corrianus*, **International Journal of Biological Macromolecules**, Elsevier,149,754-766.

89. Konada, Rohit Sai Reddy., Venugopal, A., Nadimpalli, Siva Kumar., (2020), Purification, biochemical and biophysical characterization of lysosomal β-D-glucuronidase from an edible freshwater mussel, *Lamellidens corrianus*, **International Journal of Biological Macromolecules**, Elsevier,152,465-472.

88. Krishnapati Lakshmi Surekha1,2*, Samiksha Khade1, Diptee Trimbake1, Rohan Patwardhan1, Siva Kumar Nadimpalli2, Surendra Ghaskadbi1* (2021), Differential expression of BMP inhibitors gremlin and noggin in Hydra suggests distinct roles during budding and patterning of tentacles, **Developmental Dynamics**, 249, 1470-1485. DOI10.1002/dvdy.238.

87. Amit Kumar, Vijay Kumar Hinge, Ashapogu Venugopal, Siva Kumar Nadimpalli, Chebrolu Pulla Rao (2020) Lectins-glycoconjugates interactions: Experimental and computational docking studies of the binding and agglutination of eight different lectins in a comparative manner .bioRxiv 2020.05.01.070102;
doi: https://doi.org/10.1101/2020.05.01.070

86. Sakharayapatna Ranganatha, Kavyashree., Venugopal, Ashapogu., Nadimpalli, Siva Kumar., (2019), Class II α-mannosidase from *Trichosanthes anguina* (Snake Gourd) seeds: Purification and biochemical characterization. **Int. J. biol.macromolecules**139, 734-743.

85. Ranganatha, Kavyashree Sakharayapatna., Sahoo, Lipsa, Venugopal, Ashapogu., Nadimpalli, Siva Kumar., (2019), Purification, biochemical and biophysical characterization of a zinc dependent α-mannosidase isoform III from Custard Apple (Annona squamosa) seeds, **International journal of biological macromolecules**, Elsevier,138,1044-1055.

84. Surekha, K.L., Khade, S., Trimbake, D., Patwardhan, R., Nadimpalli, S.K. and , S., (2019), Differential expression of BMP antagonists, gremlin and noggin in hydra: antagonism between Wnt and BMP pathways, **bioRxiv**, Cold Spring Harbor Laboratory.

83. Kumar, Ajith., Nadimpalli, Siva Kumar., (2018), Takifugu rubripes cation independent mannose 6-phosphate receptor: Cloning, expression and functional characterization of the IGF- II binding domain, **International journal of biological macromolecules**, Elsevier,113,59-65.

82. Bhamidimarri, Poorna Manasa., Krishnapati, Lakshmi Surekha., Ghaskadbi, Surendra., Nadimpalli, Siva Kumar., (2018), Mannose 6-phosphate-dependent lysosomal enzyme targeting in hydra: a biochemical, immunological and structural elucidation, **FEBS Letters**, ,592,8,1366-1377.

81. Ali, Mohammad Javed., Schicht, Martin., Heichel, Jens., Nadimpalli, Siva Kumar., Paulsen, Friedrich., (2018), Electron microscopic features of the lacrimal sac mucopeptide concretions, **Graefe's Archive for Clinical and Experimental Ophthalmology**, Springer Berlin Heidelberg,256,7,1313-1318.

80. Kumar, Aravindakshan Ajith., Kumar, Nadimpalli Siva., (2018), Biochemical Characterization of a Lysosomal α-Mannosidase from the Starfish *Asterias rubens*, **The protein journal**, Springer US,37,4,361-368.

79. Ali MJ, Kumar NS, Brauer L, Paulsen F and Schicht M., (2018), Expression of Surfactant Proteins in the Human Canaliculus: Evidence and Potential Insights into the Tear Flow Dynamics, **Ophthal Plast Reconstr Surg**, Wolters Kluwer.

78. Ismail Khan, Ashapogu Venugopal and Nadimpalli Siva Kumar., (2018), Development of oligosaccharide/sugar coupled Fe3O4 nanoparticle matrices-Potential use in the purification of lectins and glycoproteins, **International Journal of Current Medical and Pharmaceutical Research**, MCI,4,6,3398-3404.

77. Ali, MJ, Venugopal, A, Kavyashree, S.R, Jagannadham, M.V., and Siva Kumar, N.,

(2018), Soluble Glycoproteins of the Lacrimal Sac: Role in Defense with special Reference to Prolactin Inducible Protein (PIP), **ORBIT**, Taylor and Frances.

76. Ali, Mohammad Javed., Venugopal, Ashapogu., Ranganath, Kavyashree Sakharayapatna., Kumar, Nadimpalli Siva., (2018), Lysosomal enzymes and mannose 6-phosphate receptors in the lacrimal drainage system: Evidence and its potential implications, **Indian journal of ophthalmology**, Wolters Kluwer--Medknow Publications,66,11,1595.

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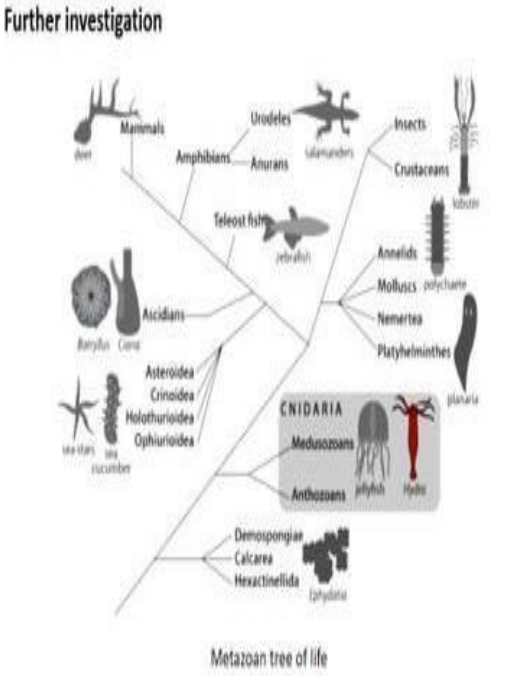
On going research:

Evolution of Lysosomal Biogenesis pathway in the Animal Kingdom - From Primitive Metazoan Hydra to Complex Mammals, Human

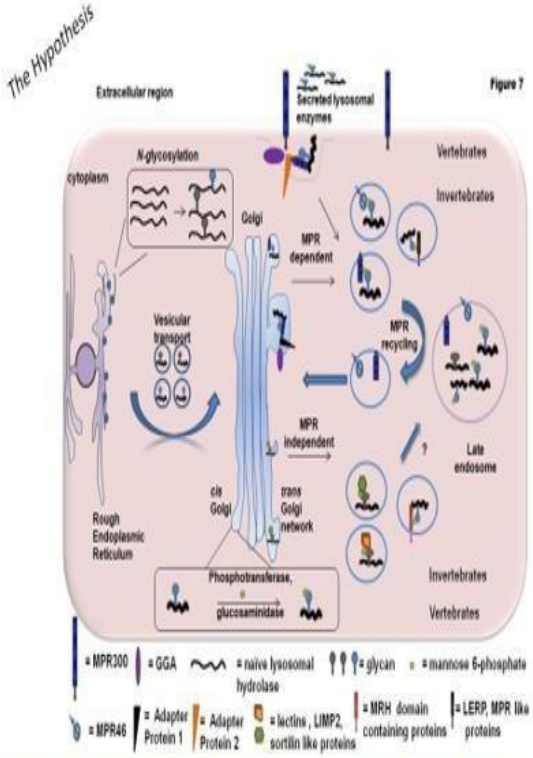
Developed affinity methods to purify in large scale Mannose 6-phosphate receptors MPR46 (cation dependent receptor) and MPR300 (cation independent receptor) from goat liver tissue. Raised antisera to these purified receptors and developed an ELISA to quantify the receptors in different mammalian tissues and non-mammalian vertebrate tissues. The affinity gels were used to purify homologous Mannose 6- phosphate receptors proteins from birds, reptiles, amphibians and fish. Genes for these have been cloned and expressed in MPR deficient cell lines to understand their functions. Also chicken embryonic fibroblast, fish embryonic fibroblasts, *xenopus* oocytes were all used to conclusively establish the structural and functional roles of these receptors. Since these receptors selectively target lysosomal enzymes, several lysosomal enzymes have been also purified from these species and their biochemical characteristics elucidated. In the invertebrates echinodermates and molluscs as well as snail cells were used to confirm the existence of both receptors together with several lysosomal enzymes.

However, *Drosophila* lacks MPR46 but has a truncated MPR300 which does not bind phosphomannan-Sepharose and also fails to bind lysosomal enzymes.

This gave a conclusive support that possibly molluscs are the starting point for the existence of both receptors in evolution and involved in lysosomal biogenesis. Recently we discovered that the metazoan *Hydra vulgaris*, has the human equivalent MPR46 but also a truncated MPR300 with the ligand binding sequences similar to those in Humans. This discovery resolved that MPR46 is the most ancient in evolution and MPR300 arrived by gene duplication as evolution progressed. This study unequivocally established that the lysosomal biogenesis pathway a very important cellular event in eukaryotic cells is conserved from the simplest metazoan Hydra to the most complex Humans. Additional evidence for this emerged when we isolated, purified several other lysosomal glycosidases from Hydra vulgaris such as the alpha-fucosidase, beta-N-Acetylhexosaminidase, identified beta-glucuronidase, acid phosphatase and Cathepsin D. Additionally a receptor tail interacting protein with an apparent molecular mass of about 50 kDa was detectable in Hydra using an antibody for the human Tail interacting protei (TIP 47). Furthermore the different lysosomal glycosidases of Hydra also showed cros-reativity with mammalian enzyme antibodies suggesting close similarity among these enzymes. These data thus support that cnidarian Hydra vulgaris has lysosomal biogenesis machinery similar to mammals and the pathway is thus conserved from early metazoans to highly evolved mammals.

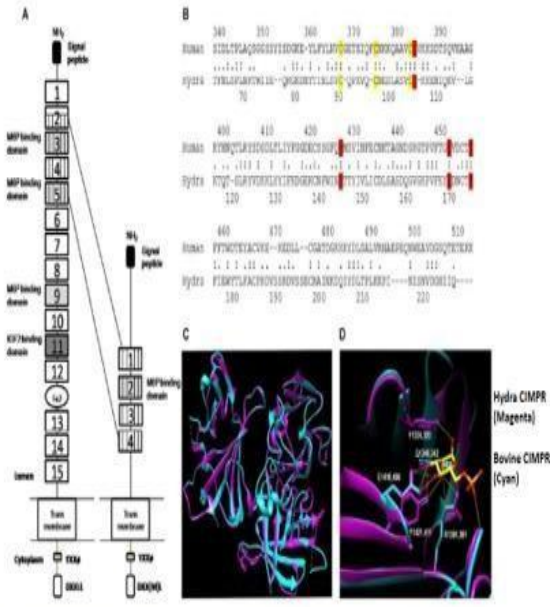


Hydra as a model system for lower invertebrate studies



Siva kumar N and Poorna Manasa B. 2015. Lysosomal enzyme and their receptors in invertebrates : an evolutionary perspective. Current protein and peptide science.16(1):49-65

Schematic and structural analysis of hydra CIMPR



PM Bhamidimarri, LS Krishnapati, S Ghaskadbi and SK Nadimpalli (2018) FEBS Lett, 592(8)

Legume and Non-Legume Plant Lectins and Glycosidases - Structure function relationships – Towards understanding glycobiology of Protein bodies and their biogenesis

We were interested to also work on several legume and non-legume lectins and developed affinity methods to purify several lectins from plants as well as from some animal species. Two distinct sugar specific lectins from *Dolichos lablab* seeds have been affinity purified. DLL-I (glucose/mannose specific) and DLL-II (galactose specific) lectins, primary sequence determined and the glycan structure analysis have been performed. Additionally crystal structure of DLL-II has been carried out. Extensive biophysical characterization of the purified lectins has also been done. These studies allowed us to understand their structure-function relationships.

Some non-legume seeds contain proteins that effectively bind heavy metals and one such protein has been identified as the primary agent that can bind cadmium and can be used to remove toxicity of heavy metals from aqueous solutions. This *Moringa olifera* Coagulant protein

Plant glycosidases are important proteins that serve various functions in plants, seeds. Some of them can be used as exploratory tools in glycomics studies. Therefore, studying a wide variety of glycosidases is important. We have used legumes seeds, non-legume seeds and purified to homogeneity several plant glycosidases and biochemically characterized the same. For some glycan structure analysis has also been done. These research findings have been published in international journals of high repute and high impact factors (> .6.0)

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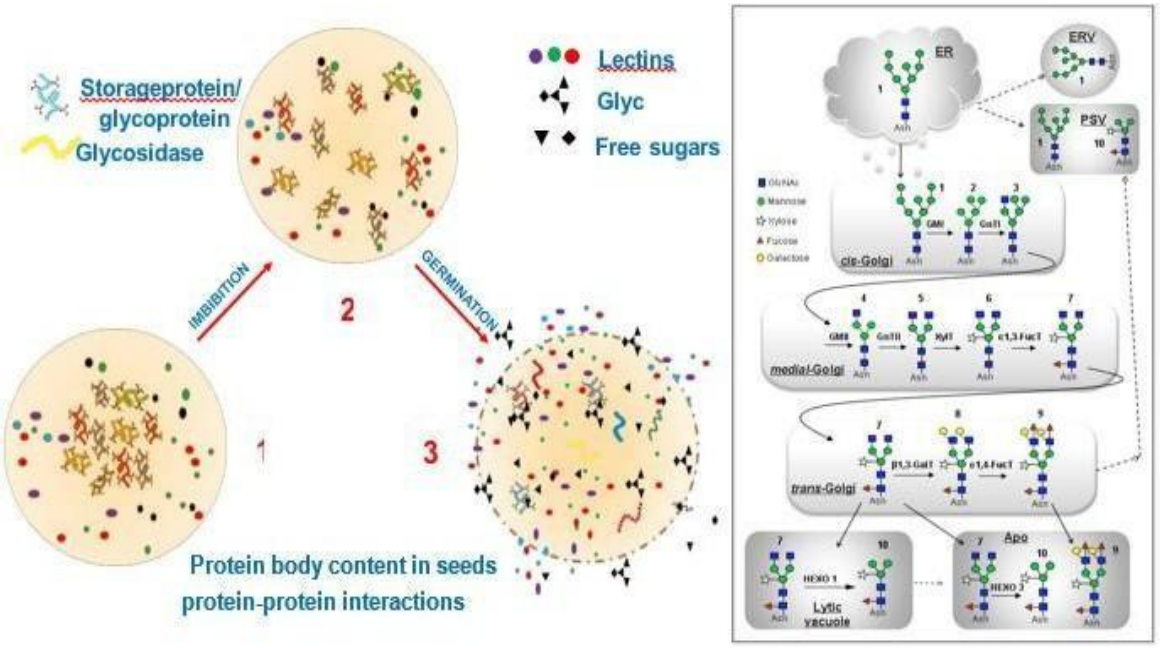
As a logical extension of this work, small research projects, involving preparation and affinity purification of different sugar specific lectins and immobilization of these lectins to Affigel are underway. It is proposed to use these different lectin-affigels to isolate, purify glycosidases from plants and animals in a single step from the soluble extracts.

Preparation of phosphorylated manno oligosaccharide and Mannan nanoparticles 2025 onwards – collaboration with Prof. Anand K Kondapi

In order to have reliable, precise and selective targeting of drugs/proteins into different cell types nanoparticle-based delivery systems are efficient. Having the expertise in working with oligosaccharide, currently mannan and phosphorylated manno oligosaccharide nanoparticles are being prepared for specific targeting of drugs into diseased cell types.

Yeast Phosphonomannan kindly provided by Dr. M E Slodki, Bioploymer Research Center, USDA, Peoria, Illinois is hydrolyzed with acid and boiled for 1 hour to partially degrade the complex polysaccharide. After, centrifugation, the clear supernatant is neutralized using saturated barium hydroxide and subjected to ethanol precipitation. After an overnight incubation in cold, the Phosphomannan core precipitated is collected by centrifugation and the pellet resuspended in water, dialyzed and lyophilized and used as the source for nanoparticle preparation. Yeast Mannan (SIGMA) is directly used. While Yeast Mannan has already been tested in experiments, phosphorylated manno oligosaccharide has not yet been tested.



Protein Body Biogenesis in Plants – Understanding Role of Lectin in ordered biogenesis and degradation In Legume and Cucurbitaceae seeds

N- Glycosylation in Plants Role of various glycosidases

Ongoing: Active participant in the ongoing DBT BUILDER Project given to the Faculty of School of Life Sciences (2022-2026).

Teaching and research activity completed at the University of Bremen (2024-2025)
International Masters program Biochemistry and Molecular Biology.

Teaching Glycobiochemistry to Master students.
Selected topics in Methods and Models paper
Practicals for the students

Thesis supervision:
Supervision of thesis: - II-year Master students in Masters program in Bremen.
1. Pancreatic cell (INS 1) lysosomal enzymes. Evidence for Beta N-acetylhexosaminidase as a lysosomal enzyme and its specific interaction with different sugar specific lectins (ongoing June 2024 to December, 2024).

2.Regulation of YAP expression in Beta cell inflammation (August 2024 to February, 2025)

Examiner for three other Master student thesis (October, 2024-February 2025).