CURRICULUM VITAE

Name : **Prof. ANGAYARKANNI NARAYANASAMY Ph.D**

Designation : Director - Biochemistry &
Director - SNSC Clinical Laboratory, Sankara Nethralaya

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Date of Birth : 7th June 1967

Education:

Sl No.	Institution Place	Degree Awarded	Year	Field of Study
1	Dr. ALMPGIBMS Madras University	Ph.D	1991-96	Medical Biochemistry
2	Dr. ALMPGIBMS Madras University	M.Phil	1989-90	Medical Biochemistry
3	Dr. ALMPGIBMS Madras University	M.Sc	1987-89	Medical Biochemistry
4	Bharathiar University	B.Sc.	1984-87	Biochemistry

Position:

Sl No.	Institution Place	Position	From (Date)	To (Date)
1.	Current Position: Sankara Nethralaya, Vision Research Foundation, Chennai – 600006.	❖ Director - Biochemistry & Director - SNSC Clinical Laboratory, Sankara Nethralaya, (Medical Research Foundation) ❖ Professor and Head of the Biochemistry Dept. ❖ Research in Ocular Biochemistry: Principal and co- investigators in projects. ❖ Authorized signatory for clinical biochemistry in SNSC Lab, MRF ❖ Quality Manager SNSC clinical Lab, MRF. ❖ Teaching Under and Post graduates M.S.(MLT), B.S. Optometry, MRF. ❖ Administrative role as Head of the Dept	**2022** 2002	**Till date**. 2021
2.	Mohammed Sathak college of Arts and Sciences, Chennai	Lecturer and Head In charge Teaching Biochemistry for the UGs and PGs in the Dept of Biochemistry.	1995	2000 2001-2002
3	The American College	Lecturer, Biochemistry	2000	2001

1. Clinical:

1. **Authorized signatory & Head:** Clinical Biochemistry (till date)
2. **Quality Manager** : QM, SNSC clinical Laboratory, MRF, Sankara Nethralaya,Chennai. (ISO 15189:2022)
3. **Director**: SNSC Clinical Laboratory, Sankara Nethralaya (Medical Research Foundation) since 2022
4. Completed International Lead Auditors & Management System Requirements Transition Certificate Course as per ISO 15189:2022 (NABL) in Aug 2023

2. Teaching/Training : current

- Teaching Biochemistry to UG and PG biochemistry (Optometry/ Medical laboratory Technology)
- Hands on summer training programme on various biochemical techniques (yearly)
- Internship project dissertation for post graduate students (yearly)PG Dissertations completed : 90
- BITS summer school students graduates dissertation (yearly)
- Ph.D Doctoral Committee member: 2023: SIRHER-Porur: 1 , Anna Univ: 1
- Member, Board of studies, Biochemistry: Univ of Madras, Chennai.
- Member, Board of studies, Medical Lab Technology, The Sankara Nethralaya Academy-Chennai

Ph.D. guideship: Dr.TN MGR University, University of Madras SASRA University, Thanjavur, BITS (Pilani)

Ph.D students guided: 7; on going :1

1. Dr.K.Coral: BITS,	2008
2 .Dr.SR.Bharathi Devi: BITS,	2010
3 .Dr.Selvi: BITS,	2013
4 .Dr.Saijyothi: BITS	2015 (Adjudged as the Best outgoing Ph.D of the year)
5. Dr.Sivasankar, SASTRA	2018
6. Dr. AnandBabu, SASTRA	2020
7. Ms.Rebecca TN.Dr.MGR Med.Uni	2023
8. Ms.Vijaya vani	Ms.Vijay vani (on going) TN. Dr.MGR Med.Univ

3. Research Output:

- Completed projects as PI/Co-PI :**20** (DST/DBT/CSIR/ICMR/VRF/commercial)
- On going project : **1**
- **Patent : 1**
- **Publications**:

  Research Papers published (peer reviewed): **74**

  Books /chapters :**4**

  Scientific Articles in Ophthalmic science: In house journal: **8**

4. Conferences:

International

Poster presentation: Association of Research in Vision and Ophthalmology (ARVO)- 2004, 2008, 2010 (Florida, USA); 2013(Seattle, USA). ASIA-ARVO 2017 at Brisbane, Australia.

Invited talk

- ASIA-ARVO 2007 – Singapore
- ASIA-ARVO 2009 –LVPEI, Hyderabad, India
- ASIA-ARVO 2013 – AIIMS New Delhi and Convener –Cell Biology Session.
- Phytocongress, 2015 SASTRA Univ
- OSKON 2015: MRF, Sankara Nethralaya, Chennai
- SYNERGY 2018, MRF, Sankara Nethralaya, Chennai

Organizing secretary /Resource person: conferences / workshops at National level

Organizing secretary :

- **Indian Eye Research Meeting, IERG, 2019,VRF, Chennai**
- **Workshop: Intellectual property, IERG 2019**
- **Synergy, 2018, MRF, Chennai**
- **Workshop- electrophoresis Techniques 2004;**
- **Organizing secretary, Symposium on Innovative trends in Health care, 2012 (J &J sponsored)**

Resource person:

- Workshop 2D Electrophoresis, and Mass spectrometry, AIIMS, New Delhi 2018
- Resource person: Workshop on cell biology – cell signalling at Lady Doak college Madurai 2017
- Resource person: 2D Electrophoresis – AMRF, Madurai 2016
- Resource person: Workshop on contact Lens wear and Tear, MRF, Chennai 2016

5. Memberships:

1. Member, Board of studies, Biochemistry, Univ of Madras;
2. Member: Indian Eye Research Group (IERG);
3. Member: Society of Biological Chemists (SBC-I), India.
4. Member: Board of Studies, Laboratory Tech Sciences Program, The Sankara Nethralaya Academy
5. Member, Clinical biochemistry association of Tamil nadu (CBAT)

6. Patent: 1

7. Honors/Awards:

1. SwarnalathaPunshi Award for the Best Basic Science Researcher at Sankara Nethralaya, 2011.
2. ICMR overseas fellowship for Biomedical scientists 2010 done at Univ of New Mexico. USA
3. Allergan Travel grant to attend the SERI-ARVO 2007 meeting
4. Awarded the Research Associateship by CSIR – 1996.
5. Received the PGIBMS Award-Gold Medal for Best Paper presentation at the Indian Association of Biomedical Scientists –1994.
6. Received Senior Research Fellowship by the CSIR – 1994.
7. Young Scientist Award by the Urolithiasis Society of India – 1993 National conference.
8. Qualified CSIR-UGC National Level Test for eligibility for Lectureship in Life Sciences in Univ / Colleges – 1992.

9. Awarded GATE Scholarship in life sciences (91 percentile) as JRF to do Ph.D. in a major project approved by the University Grants Commission (UGC) – 1990.

Journal Reviewer: IOVS, BJO, Eye, Curr Eye Res, Plos One, IJEB, IJBB , Ind J of Physiology and Pharmacology, Metabolism - Clinical and Experimental: Journal Diabetes & Metabolic Disorders, Journal of Diabetes, Biological Research, Proceeding in Nation Academy of sciences, India, Pharma boil, Ocular surface and many others.

Journal Editor:2 (2015)

a. Editorial Board of **International Journal of Ophthalmic Research** (ISSN 2409-5680). (2015)

b. Review Editor: Frontiers in Diabetes ISSN: 0251-5342 (Print), e-ISSN: 1662-2995 (Online)

8. Publications: 74

1. Elango, Jeyasooriya Ramdoss, Jayanthi Udayakumar, Snehal H. Bavaskar, Punitham Ranganathan, Bharathidevi Subramaniam Rajesh, Angayarkanni Narayanasamy, Jyotirmay Biswas. Diagnostic efficacy of elevated serum angiotensin-converting enzyme and lymphopenia between presumed sarcoid uveitis and presumed tubercular uveitis. International Journal of Ophthalmology, July 19, 2023, DOI:10.1007/s10792-023-02773-4 (Impact factor: 1.645)

2. Mamta Agarwal, Mridula Vijayaraghavan, Bharathselvi Muthuvel, Angayarkanni Narayanasamy. Biochemical Analysis of Aqueous Humor in an Elderly Patient with Multiple Myeloma Presenting First as Bilateral Chronic Uveitis. Ocular Immunology and Inflammation, July 10, 2023, DOI: 10.1080/09273948.2023.2229416 (Impact factor: 3.728)

3. Dhivya MA, Ovia M, Anand Babu K, Parveen Sen, Angayarkanni N, Bharathidevi SR. Elevated Serum Hydrogen Sulfide in Age Related Macular Degeneration. Journal of Ophthalmology, July 05, 2023, DOI:10.23880/oajo-16000281 (Impact factor: 1.974)

4. Rama Rajagopal, Anupriya Kohli, Angayarkanni Narayanasamy, Karthick Jayavel, Hemalatha Chidambaram. Glittering Christmas tree cataract – The role of Scheimpflug, anterior segment optical coherence tomography and biochemical analysis Indian Journal of Ophthalmology, Apr 28, 2023, DOI:10.4103/IJO_2692_22 (Impact factor: 0.977)

5. Dhanashree Ratra, Vineet Ratra, Narayanasamy Angayarkanni. Molecular and genetic changes in the tear film after vitreoretinal surgery. Indian Journal of Ophthalmology, Apr 15, 2023, DOI: 10.4103/IJO_2677_22. (Impact factor: 0.977)

6. Manish Gore , Ankit Tiwari , Devashree Jahagirdar , Angayarkanni Narayanasamy , Ratnesh Jain, Prajakta Dandekar. Three-dimensional spheroids of choroid-retinal vascular endothelial cells as an *in-vitro* model for diabetic retinopathy: Proof-of-concept investigation. Current Research in Pharmacology and Drug Discovery, May 21, 2022, DOI: 10.1016/j.crphar.2022.100111 *(International)* (Impact factor: 5.547)

7. Kannadasan Anand Babu, Parveen Sen, Jyotirmay Biswas, Narayanasamy Angayarkanni. Homocysteine promotes scavenger receptor CD36 mediated oxLDL uptake eliciting PON2 antioxidant defense response in ARPE-19 and THP-1 macrophage cells. Research Square, May 12th, 2022, DOI: https://doi.org/10.21203/rs.3.rs-1647955/v1 (Pre Print)

8. Manohar Rebecca, Krishnamoorthy Sripriya, M.Bharathselvi. B.Shantha, Lingam Vijaya, Narayanasamy Angayarkanni. Increased Desmosine in the lens capsules is associated with augmented elastin turnover in Pseudoexfoliation syndrome. EXP EYE RES, Dec 20, 2021, DOI: 10.1016/j.exer.2021.108898 (Impact factor: 3.46)

9. Dhanashree Ratra, Daleena Dalan, Nandini Prakash, Kuppan Kaviarasan, Sadagopan Thanikachalam, Undurti N Das, Narayanasamy Angayarkanni. Quantitative analysis of retinal microvascular changes in prediabetic and diabetic patients. Indian J Ophthalmol. 2021 Nov; 69(11): 3226–3234. DOI: 10.4103/ijo.IJO_1254_21 (Impact factor: 0.977)

10. Vignesh Menta, Shweta Agarwal, Ujjalkumar Subhash Das, Laxmi Moksha,Gurumurthy Srividya, Amrutha M Anandan , Bhaskar Srinivasan, Geetha Iyer, Thirumurthy Velpandian, Narayanasamy Angayarkanni. Ocular surface sphingolipids associate with the refractory nature of vernal keratoconjunctivitis: newer insights in VKC pathogenesis, Br J Ophthalmo,l Oct 5, 2021, DOI: 10.1136/bjophthalmol-2021-319324

11. Daleena Dalan, Prakash Nandini, Narayanswamy Angayarkanni, Kuppan Kaviarasan, Sadagopan Thanikachalam, Undurti N Das, Dhanashree Ratra. Interchangeability of Retinal perfusion indices in different-sized angiocubes: An optical coherence tomography angiography study in diabetic retinopathy. Indian J Ophthalmol, Mar 2020, DOI: 10.4103 /ijo.IJO_783_19.

12. Dhanashree Ratra, Rajesh Nagarajan, Daleena Dalan, Nandini Prakash, Kaviarasan Kuppan, Sadagopan Thanikachalam, Undurti Das, Angayarkanni Narayansamy. Early structural and functional neurovascular changes in the retina in the prediabetic stage. Eye (Lond),May 28,2020,DOI: 10.1038/s41433-020-0984-z.

13. Ramalingam Mani, P. S. Shobha, SaravananThilagavathi, PadmanabhanPrema, Natarajan Viswanathan, RatraVineet, RatraDhanashree, Narayanasamy Angayarkanni. Altered mucins and aquaporins indicate dry eye outcome in patients undergoing Vitreoretinal surgery. PLOS ONE - May 6, 2020. DOI:10.1371/journal. pone.0233517

14. Vijay Raja, Soniya Charles, MohankumarRamasamy, LuxitaaGoenkad,M.Kamatchi,Melvin George, JesuArockiaraj, VE Dhandapani, Angayarkanni Narayanasamy, Kanchana Mala. Cell cycle arrest in peripheral blood mononuclear cells: A non-invasive method for diagnosis of coronary artery disease Elesvier, May 2019. DOI:10.1016/j.procbio.2019.05.027

15. Case report on two diabetic donor eyes with no retinopathy: Clinicopathological and molecular studies. Subramaniam Rajesh Bharathi Devi, Karunakaran Coral, Karthikeyan Gayathree, Muthuvel Bharathselvi, Shanmuganathan Sivasankar Jyotirmoy Biswas1, Pukhraj Rishi2, Sundaram Natarajan3, Sengamedu Srinivasa Badrinath2, Narayanasamy Angayarkanni. Indian Journal of Ophthalmology, DOI: 10.4103/ijo.IJO_400_19.

16. Kaviarasan Kuppan, Jithu Mohanlal, Arif Mulla Mohammad, Kannadasan Anand Babu, Parveen Sen, Narasimha Das Undurti, Viswanathan Natarajan, Angayarkanni Narayanasamy, Elevated serum OxLDL is associated with progression of type 2 Diabetes Mellitus to diabetic retinopathy, Exp Eye Res., 2019. https://doi.org/10.1016/j.exer.2019.05.008

17. Kannadasan Anand Babu, Parveen Sen, Narayanasamy Angayarkanni. Oxidized LDL, homocysteine, homocysteinethiolactone and advanced glycation end products act as pro-oxidant metabolites inducing cytokine release, macrophage infiltration and pro-angiogenic effect in ARPE-19 cells. PLOS ONE - May 14, 2019 DOI:10.1371/journal.pone.0216899

18. Altered retinoid metabolism gene expression in chronic Stevens-Johnson syndrome. Gurumurthy Srividya, Narayanasamy Angayarkanni, Geetha Iyer, Bhaskar Srinivasan, Shweta Agarwal. Br J Ophthalmol 2019, DOI:10.1136/bjophthalmol-2018-312849

19. VSrinivasan, S Radhakrishnan, N Angayarkanni, KN Sulochana, Antidiabetic effect of free amino acids supplementation in human visceral adipocytes through adiponectin-dependent mechanism, The Indian journal of medical research 149 (1), 41.

20. Rebecca, Gayathri R, Bhuvanasundar R, Sripriya K, Shantha B, Angayarkanni N. Elastin modulation and modification by homocysteine: a keyfactor in the pathogenesis of Pseudoexfoliation syndrome?. Br J Ophthalmol. 2018 Sep 24. DOI: 10.1136/2018 - 312088.

21. Shanmuganathan S, Angayarkanni N. Chebulagic acid and Chebulinic acid inhibit TGF-β1 induced fibrotic changes in the chorio-retinal endothelial cells by inhibiting ERKphosphorylation.Microvasc Res.2018 Sep 4;121:14-23.DOI:10.1016/j.mvr.2018.09.001. PMID:30189210.

22. GeethaIyer, Shweta Agarwal, Bhaskar Srinivasan, Angayarkanni Narayanasamy. Isolation of acid from eye drop bottles being used by patients presenting with presumed scleritis. Indian J Ophthalmol. 2018 Aug. DOI: 10.4103/ijo.IJO_82_18.

23. S.Shanmuganathan, N Angayarkanni. Chebulagic acid Chebulinic acid and Gallic acid, the active principles of Triphala, inhibit TNFα induced pro-angiogenic and pro-inflammatory activities in retinal capillary endothelial cells by inhibiting p38, ERK and NFkB. **VasculPharmacol. 2018 Apr 17**. DOI: 10.1016/j.vph.2018.04.005.

24. S Gurumurthy1 , M Jain2 , K Mahalakshmi3 , G Swaminathan2 , R Raman2 and A Narayanasamy, A novel and less invasive technique to assess cytokine profile of vitreous in patients of diabetic macular oedemaEye (2018). 1-10. DOI: 10.1038/eye.2017.285

25. Shalini Muralikumar, Umashankar Vetrivel, Angayarkanni Narayanasamy and Undurti N. Das. Probing the intermolecular interactions of PPARγ-LBD with polyunsaturated fatty acids and their anti-inflammatory metabolites to infer most potential binding moieties. Lipids in Health and Disease (2017) 16:17 DOI: 10.1186/s12944-016-0404-3

26. RadhakrishnanSelvi, RenganathanBhuvanasundar, Narayanasamy Angayarkanni*, Amino acids mixture act as potent VEGF lowering agent in CHO-K1 cells exposed to high glucose, Archives of Medical Research, DOI: 2012 Apr;43(3):173-82.

27. Muthuvel Bharathselvi, Sayantan Biswas, Rajiv Raman, Radhakrishnan Selvi, Karunakaran Coral, Angayarkanni Narayanansamy, Sivaramakrishnan Ramakrishnan, Konerirajapuram N Sulochana, Ocular lesions from copper deficiency Response. Indian journal of medical research, Pg:431-432, Volume: 146, September'2017, MEDKNOW PUBLICATIONS & MEDIA PVT LTD

28. Srividya Gurumurthy,1Geetha Iyer,2 Bhaskar Srinivasan,2 Shweta Agarwal,2 Narayanasamy Angayarkanni1, Ocular surface cytokine profile in chronic Stevens- Johnson syndrome and its response to mucous membrane grafting for lid margin keratinisation, DOI:10.1136/bjophthalmol-2017-310373

29. R Indhushree, R Monica, K Coral, N Angayarkanni, R Punitham, Visual functions of workers exposed to organic solvents in petrochemical industries, Indian journal of occupational and environmental medicine 20 (3), 133.

30. Saijyothi Venkata Aluru, PhD, Agarwal Shweta, MBBS DO, Srinivasan Bhaskar, MS, Krishnan Geetha,S, Rajappa M. Sivakumar,MD, Tatu Utpal,PhD, Prema Padmanabhan,MS, Narayanasamy AngayarkanniTear Fluid Protein Changes in Dry Eye Syndrome Associated with Rheumatoid Arthritis: A ProteomicApproachThe Ocular Surface 2017, DOI: http://dx.doi.org/10.1016/ j.jtos.2016.09.005

31. AnandBabu K, Bharathidevi SR, Sripriya S, Sen P, Prakash VJ, Bindu A, Viswanathan N, Angayarkanni N, Serum Paraoxonase activity in relation to lipid profile in Age-related Macular Degeneration patients. Exp Eye Res. 2016; 152:100-112. doi: 10.1016/j.exer.2016.09.009.

32. Ramakrishnan Gayathri, Karunakaran Coral, Ferdinamarie Sharmila,Sarangapani Sripriya, Krishnamoorthy Sripriya, Panday Manish, B. Shantha, George Ronnie,Lingam Vijaya & ***Angayarkanni Narayanasamy*.*** Correlation of Aqueous Humor Lysyl Oxidase Activity with TGF-ß Levels and LOXL1 Genotype In Pseudoexfoliation, DOI: 10.3109/02713683.2015.1125505.

33. Siva Sankar. S, Sumantaran VN, ***Angayarkanni***.N. Epigallocatechingallate and curcumin prevents TGFβ1 induced Epithelial to Mesenchymal transition in ARPE-19 cells. ***IJMR 2***017,DOI:10.4103/ijmr.IJMR_1583_15

34. BBharathidevii SR, AnandBabu K, Nishit J, Muthukumaran S, Umashankar V, Biswas J, ***Angayarkanni N*.*** Ocular distribution of the Antioxidant enzyme Paraoxonase and its alteration in Cataractous Lens and Diabetic Retina ***IJMR*** 2017, DOI: 10.4103/ijmr.IJMR_1284_14.

35. KN Sulochana, Bharathselvi M, Sayantan Biswas, Rajiv Raman, R Selvi, K Coral***, N Angayarkanni,*** S Ramakrishnan..Homocysteine and its metabolite Homocysteine-Thiolactone and Deficiency of Copper in patients with Age Related Macular Degeneration. **IJMR**2016, DOI:10.4103/0971-5916.192026.

36. Kaviarasan K, Jithu M, ArifMulla M, Tarun S, Sivasankar S, Undurti N, **Angayarkanni*N.** Low blood and vitreal BDNF, LXA4 and altered Th1/Th2 cytokine balance are potential risk factors for diabetic retinopathy. ***Metabolism clinical and Experimental*64**, 958-66,2015.

37. Bharathi Devi SR, Coral K, Sulochana KN, **Angayarkanni N***. Free Amino Acids Glycine and Glutamic Acid Inhibit Angiogenesis Induced by AGE in Bovine Retinal Endothelial Cells. ***J GlycomicsLipidomics***2015, 5:2

38. Coral K, Madhavan J, Pukhraj R, **Angayarkanni N***. High glucose induced differential expression of lysyl oxidase and its isoform in ARPE-19 Cells. ***Curr Eye Res.*** 2013;38(1):194-203.

39. Arora B, Angayarkanni N , J Nirmala, N Haldera, S Patnaika, Alok K. Ravia, T Velpandiana, Development and validation of a LC–MS/MS method for homocysteinethiolactone in plasma and evaluation of its stability in plasma samples, ***Journal of Chromatography*** B, 944 (2014) 49– 54.

40. JM Jasna; K Anandbabu; SR Bharathidevi; Angayarkanni N.Paraoxonase enzyme protects Retinal Pigment Epithelium from Chlorpyrifos Insult. ***PLoS One***. 2014 30;9(6):e101380. (PMID: 24979751)

41. Bharathi Devi SR, Coral K, Sulochana KN, ***Angayarkanni N*.*** Free Amino Acids Glycine and Glutamic Acid Inhibit Angiogenesis Induced by AGE in Bovine Retinal Endothelial Cells. J GlycomicsLipidomics 2015, 5:2

42. Sivasankar S, Lavanya R, Brindha P, ***Angayarkanni N****. Aqueous and Alcoholic Extracts of Triphala and Their Active Compounds Chebulagic Acid and Chebulinic Acid Prevented Epithelial to Mesenchymal Transition in Retinal Pigment Epithelial Cells, by Inhibiting SMAD-3 Phosphorylation. ***PLoS ONE 2015;*** 10(3): e0120512.

43. Agarwal S, ***Angayarkanni N,***Iyer G, Srinivasan B, Natarajan R, Charola S, Arumugam S, Padmanabhan P. Clinico-biochemical Correlation of the Effect of SubconjunctivalBevacizumab for Corneal Neovascularization. *Cornea.* 2014;33(10): 1016-21.

44. Biswas J, Ravi RK, ***Angayarkanni N,***Lilytherese K, Madhavan HN. Eales' disease - current concepts in diagnosis and management. J OpthalmicInflamm. Infect. 2013, 3:11.

45. Saijyothi AV, Shweta A, Bhaskar S, Geetha K Iyer, Sivakumar M.R, Utpal T, Prema P, Nirmala S, ***Angayarkanni N****. Lacrimal Proline Rich 4 (LPRR4) Protein in the Tear Fluid Is a Potential Biomarker of Dry Eye Syndrome. PLOS one. Dec 2012 | Volume 7 | Issue 12

46. Bharathselvi M, Selvi R, Coral K, Biswas, ***Angayarkanni N***, Ramakrishnan S, Sulochana KN. Accumulation of Homocysteine and its metabolite thiolactone with increased oxidative stress and copper depletion in circulation of patients with Eales' disease, ***Ann Clin Biochem.***2013;50; 4:330-8.

47. Umashankar V, Sathya BR, Kaviarasan K, Jithu M, Das UN, ***Angayarkanni N****. Agonistic effect of polyunsaturated fatty acids (PUFAs) and its metabolites on brain-derived neurotrophic factor (BDNF) through molecular docking simulation. Lipids in Health and Disease. 2012, 11:109.

48. Selvi R, Bhuvanasundar R, SaiJyothi AV, Sulochana KN, ***Angayarkanni N****. Amino acids potentiate tinsulin signaling in CHO-K1 at high glucose conditions. Arch Med Res, 2012;43:173-82.

49. Bharathi Devi SR, Suganeswari G, Sharma T, Thennarasu M, ***Angayarkanni N****. Homocysteine induces oxidative stress in young adult Central retinal vein occlusion. Br J Ophthalmol. 2012 Aug;96(8):1122-6. (PMID: 22628536)

50. Ramakrishnan S, Selvi R, Saijyothi AV, Biswas J, Bharathselvi M, ***Angayarkanni N.***Beneficial clinical and biochemical effects in patients with Eales disease on oral supplementation of antioxidant vitamins E and C.***Biomedicine***: 2012; 32(2):162 – 8

51. Selvi R, ***Angayarkanni N***, Biswas J, Ramakrishnan S. Total antioxidant capacity in Eales' disease, uveitis & cataract. *Indian J Med Res.* 2011;134:83-90.

52. Saijyothi AV, Fowjana J, Madhumathi S, Mahadevan R, Thennarsu M, Prema P, ***Angayarkanni N***.Tear fluid small molecular antioxidants profiling shows lowered glutathione in keratoconsu. Experimental Eye Research, 2012;103:41-6.

53. Barathi S, M. Charanya, S. Muthukumaran, ***Angayarkanni***N.Comparative modeling of PON2 and analysis of its substrate binding interactions using computational methods. *J OculBiol Dis inform*, 2011; 3(2): 64-72.

54. Barathi S, ***Angayarkanni N*.*** GLUT-1 Expression In Bovine Retinal Capillary Endothelial Cells And Pericytes Exposed To Advanced Glycation End Products. – *Invest Ophthalmol Vis Sci. 2010*;51:6810–6814

55. Saijyothi AV, ***Angayarkanni N***. Two Dimension Electrophoretic analysis of Human tears: Collection method in Dry Eye Syndrome", *ELECTROPHORESIS*. 2010; 31;3420-27.

56. Verma A, Biswas J, Selvi R, ***Angayarkanni N***. Intra-ocular expression of vascular endothelial growth factor (VEGF) and pigment epithelial-derived factor (PEDF) in a case of Eales' disease by immunohistochemical analysis: a case report. *Int. Ophthalmology*. Jan 2010.

57. Selvi R, ***Angayarkanni N***, Asma B, Seethalakshmi T, Vidhya S. Amino acids influence the glucose uptake through GLUT4 in CHO-K1 cells under high glucose conditions Molecular and Cellular Biochemistry 2010

58. Barathi S, ***Angayarkanni N***, Aarthi P, Sulochana KN, Rishi P, Maneesh D, Velpandian T, Charanya, M, Muthukumaran S. Homocysteinethiolactone and Paraoxonase - novel markers of Diabetic Retinopathy. Diabetes care. 2010;33:2031–7.

59. Barathi S, Sumantran VN, ***Angayarkanni N*.*** GLUT-1 Expression In Bovine Retinal Capillary Endothelial Cells And Pericytes Exposed To Advanced Glycation End Products. *Invest Ophthalmol Vis Sci. 2010* Dec;51(12):6810-4. (PMID: 20702825)

60. Barathi S, ***Angayarkanni N****, Pasupathi A, Sulochana KN, Rishi P, Maneesh D, Velpandian T, Charanya, M, Muthukumaran S. Homocysteinethiolactone and Paraoxonase - novel markers of Diabetic Retinopathy. ***Diabetes care***. 2010 Sep;33(9):2031-7. (PMID : 20551012)

61. ***Angayarkanni N****, Selvi R, Pukraj R, Biswas J, Bhavesh SJ, Tink JT. Ratio of the Vitreous Vascular Endothelial Growth Factor and Pigment Epithelial-Derived FactorinEales Disease. ***J OculBiol Dis Infor***. 2009; 6;2(1):20-8. (PMID:20072643)

62. Saijyothi AV, ***Angayarkanni N***, Vidhya S, et al. Tear ascorbic acid levels and the total antioxidant status in contact lens wearers. Indian J. Ophthalmol: 2009;57:289-292.

63. Jayachandran VV, ***Angayarkanni N***, Coral K et al., Diffusion of lidocaine buffered to an optimal pH across the endotracheal tube cuff-an in vitro studies *Indian J. Anaesth*. 2008;52(5):536-40

64. Coral K, ***Angayarkanni N***, Gomathy N, Bharathselvi M, Pukhraj R, Rupak R. Homocysteine levels in vitreous of proliferative diabetic retinopathy and rhegmatogenous retinal detachment- its modulating role on LOX activity. *Invest Ophthalmol Vis Sci.*50(8):3607-12.

65. Coral K, ***Narayanasamy A*,***Madhavan J, et al.Lysyl oxidase (LOX) activity in the ocular tissues and the role of LOX in proliferative diabetic retinopathy and rhegmatogenous retinal detachment.*Invest Ophthalmol Vis Sci.*2008;49:4746-52.

66. A***ngayarkanni N***, Barathi S, Seethalakshmi T, et al. Serum PON1 Arylesterase activity in relation to Hyperhomocysteinemia and Oxidative stress in young adult Central Retinal Venous Occlusion patients Eye 2008;:969-74.

67. Selvi R, Thomas A, ***Angayarkanni* N *et al***. Increase in Fe^{3+}/Fe^{2+} ratio and iron-induced oxidative stress in Eales' disease and presence of ferrous iron in circulating transferring. *Curr. Eye Res.* 2007;32:677-83.

68. Barathi S, Vadhana P, ***Angayarkanni N,***Ramakrishnan. Estimation of Hydrogen sulphide in the human lymphocytes. *Ind. J. Biochem. Biophys,*2007;44:179-82.

69. ***Angayarkanni N***, et al. Hyperhomocysteinemia, as well as low methionine stress are risk factors for central retinal vascular occlusion in India population.*InvestOphthalmol Vis Sci.*2007;48:1441-6.

70. Ramakrishnan S, Sulochana KN, Lakshmi S, Selvi R, ***Angayarkanni N***. Biochemistry of homocysteine in health and diseases. *Ind. J. Biochem. Biophys*, 2006;43:275-83

71. Coral K, Raman, Rathi S, Rajesh M, Sulochana KN, ***Angayarkanni N***,et al. Plasma Homocysteine and Total Thiol Content in patients with Exudative ARMD.*Eye* 2006;20:203–7

72. Sulochana KN, Ramprasad S, Coral K, Lakshmi S, Punitham R. ***Angayarkanni N***, Ramakrishnan S. Glycation and glycoxidation studies on the isolated human vitreous collagen: in vitro *MedSciMonit.* 2003; 9(6) BR220-224.

73. Effect of gamma-glutamyl carboxylation of renal microsomes on calcium oxalate monohydrate crystal binding in hyperoxaluria.***Angayarkanni N***, Selvam R. Nephron. 1999;81(3):342-6.

74. Enhanced renal vitamin-K-dependent gamma-glutamyl carboxylase activity in experimental rat urolithiasis. ***Angayarkanni N***, Selvam R. Eur Urol. 1998;33(1):116-20.PMID: 9471053

In-house Journals:

1. Barathi S, Angayarkanni N. Establishment of primary cultures of bovine retinal capillary endothelial cells and pericytes for in vitro studies. Insight 2007;XXV(3):54-7.
2. Nishanthi M, Coral K, Angayarkanni N, Ramakrishnan S. Estimation of Taurine and its relevance in retina. Insight 2007;XXV(1):6-9.
3. Angayarkanni N, Saijyothi AV, Coral K, Punitham R, Krishnakumar K, Madhava Rao, Ramakrishnan. Dried blood spot (DBS) for vitamin A analysis – a field friendly method. Insight 2005;XXIII(1):20-24.
4. S. Barathi, N. Angayarkanni, K. Coral, S. Ramakrishnan. Variation of oxidants and antioxidants with gender and age. Insight 2004;XXII(2)49-53.
5. Ramakrishnan S, Vasanthi SB, Punitham R, Coral K, Rajini KP, Sen PR, Angayarkanni N. Hyperlipemia and LipaemiaRetinalis-a case report. Insight 2004;XXII(2)58-59.
6. Angayarkanni N, R. Selvi, S. Ramakrishnan, Measurement of Total antioxidant capacity in Eales' disease, uveitis and cataract. Insight 2004; XXII(1): 11-16
7. Angayarkanni N, R. Punitham, S. Ramakrishnan, Manisha Agarwal. Central retinal vein occlusion and homocysteinemia Insight 2004; XXII(1): 17-24.

Book Publications:

1 .**Angayarkanni N**, K.Coral, SR. Bharathidevi , Ocular biochemistry chapter in "Pharmacology of Ocular **Therapeutics"e, Springer Publications , 2016.**

2 .**Angayarkanni N**, K.Coral, SR. Bharathidevi, A chapter on "Toxicology," in Dr. Santhanam'S Text book of occupational optometry , First Edition, SN, 2015 pp 219-39.

3. RamakrishnanS,**Angayarkanni N**, Basic Biochemistry Nursing, BI Publication, 2007
4. Manual of Medical Laboratory techniques, **Angayarkanni et al** Chapter in clinical Biochemistry, Jaypee Brothers Medical Publishers (P) Ltd, 2011.

On going funded Research Project :1

S NO	PROJECT/FUNDIG AGENCY	AMOUNT IN RS.	PERIOD / YEARS	INVESTIGATOR
1.	Exploring The Interplay of The Sex Steroid Hormone Intracrinology With The Sphingolipid Metabolism in The Pathogenesis of Vernal Keratoconjunctivitis **As Co-PI**	12,07,160 I st Year Grant	15.05.2023 - 14.05.2025 2 Years	Co-PI

<u>Completed Research Projects</u> as Principal Investigator/Co-PI: 25

S NO	PROJECT/FUNDIG AGENCY	AMOUNT IN RS.	PERIOD / YEARS	INVESTIG ATOR
1	Effect of the Metabolites relevant to pathogenesis of Age Related Macular Degeneration on the phagocytic machinery of the Retinal Pigment Epithelial Cells and screening of therapeutic molecules: An *in vitro* study ”27(0329)/17/EMR-II	27,96,000	01.05. 2017 –31.12. 2020 3 ½ years	PI
2	Tear Levels of Dopamine , melatonion and serotonin in Myopia /MRF ,Chennai Funded	60,000/-	0ne year as Co-I 2020-21	Co-PI
3	Functional Characterization of Lacrimal Proline rich 4protein (LPRR4) DST-SERB FILE NO. EMR/2016/000929	41,21,800	15 .02.2017-01.03.2020 3 years	PI
4	A pilot study to evaluate the expression of tropoelastin intracellularly and its aggregation extracellularly to probe the disease mechanism of PXF.	23,39,098/-	01.01.2016 – 31.12.2020 5 Years, DST/INSPIRE FELLOWSHIP	Mentor/PI
5.	Clinical Correlation of the Tear Chemokines and the sphingolipids in children with vernal keratoconjunctivitis”. ICMR : ID#:5/4/6/09/OPH/15-NCD-II	36,53,600	01.02.2018-01.03.2020 2 Years	PI
6	To evaluate prevalence of dry eye following retinal surgery **Co-PI**: Dr.N.Angayarkanni Alcon/Novartis MRF Project	9,00,000	24.4.17 to Mar 2018 1 year	Co-PI
7.	Markers of progression of pre diabetes to diabetic retinopathy: screening of neurotrophic grwoth factors and the cytokines Co-PI: Dr.N.Angayarkanni Novartis MRF Project	22,20,000	17.12.17 to Nov18 1 year	Co-PI
8	Vitreous Cytokine analysis in Diabetic retinopathy Alcon/Novartis-Medical Research Foundation **Co-PI:**Dr.N.Angayarkanni	3,00,000	2016-2017	Co-PI

9	Contact Lens wear induced changes in KC patients at the level of Redox status, inflammatory cytokines and collagen cross linking **As PI:**(ICMR. 5/4/6/16/oph11/11-NCD-II)	19,70,000	1.8.2012 -2015 3 yrs	PI
10.	Anti angiogenic potential of the plant derived polyphenols, Elagic, Gallic, Chebulagic and Chebilinic acids : an in vitro study in retinal endothelial cells. **As PI:**(CSIR, 27/0287/13-EMR II)	23,14,000/-	24.4.13-2016 3 yrs	PI
11	Screening of the AMD patients for PON polymorphism and its functional correlation at the level of the PON activity, OxLDL and Homocysteine in the blood . **AS PI:**DBT R13630/BRB/10/776/2010	43,31,000	14.9.2011-2014 3 yrs	PI
12.	Investigation Into The Role Of Lipids, BDNF and VEGF in Diabetic Retinopathy **As PI** DBT, R11627/MED/30/157	31,91,016/-	1.3.2010- 2013 3 yrs	PI
13	Effects of pesticide chlorpyrifos on the human RPE cell line (ARPE-19). Effects of cytoprotective agents on chlorpyrifos induced toxicity. **As PI.** ICMR.5/8/418(Env)/08-NCD-	20,45,780	1.4.2010- 2013 3 years	PI
14.	Experimental study on the potential anti-glycating effects of a novel mixture of amino acids on hyperglycemia induced retinal changes **As PI** CSIR 27(0215)/09/EMR II	23,26,000 /-	Nov 2009- 2012 3 years	PI
15.	Identifying compounds which potently inhibit Matrix Metalloproteinase 2, 9: Therapeutic applications for retinal diseases. **As PI** CSIR 27(0219)/09/EMR II	24,76,000/-	Nov 2009 – 2012 3 years	PI
16.	Tear Proteomics profile in Rheumatoid arthritis patients associated with and without **As PI** DES. DBT, PR 10412/MED/ 30/82/2008	41,13,000/-	2008 – 2011 3 years	PI

17.	Role of LOX and homocysteine in the aqueous humor and plasma of patients with pseudoexfoliation syndrome **As PI** ICMR, 52/3/2008-BMS	21,00,000	2008 – 2011 3 years	PI
18.	Activities of lysyl oxidase and matrix metalloproteases in cultured bovine RPE cells-role of retinoids in their regulation **As PI** DBT: R4853/BRB/10/358/2004	21,26,000/-	2008-2011	PI
19	Effect of free amino acids on the insulin mediated signal transduction pathway in cultured CHO cells. **As PI** DST : BT/PR 10412/MED/30/82/2008	14,25, 000/-	2007-2010	PI
20	Studies on thiolation and homocysteinylation of serum proteins in the two retinal diseases – ARMD and ED. ICMR52/16/2007-BMS	6,09600/-	2009-2011 2years	Co-PI
21.	A study on the molecular mechanisms of amino acids at the level of signal transduction in RPE cells retinal capillary endothelial cells and Pericytes. **As PI**: ICMR, 52/18/2002-BMS	12,00,000 /-	2006-2009 3 yrs	PI
22.	Biochemical factors associated with Hyperhomocysteinemia in patients with CRVO – A prospective pilot study at SN.**VRF funded As PI**	4 ,00,000/- VRF	2004-2006 2 years	PI
23.	Vitreous Cytokine analysis in Diabetic retinopathy Funded by Allergan (MRF) **As Co-PI**	3,00,000	2016-2017 1 years	Co-PI
24	Regulation of LOX expression in Lens epithelial cells and trabecular endothelium **As PI:**(ICMR, 52/15/2011-BMS)	24,80,085	2015 – 2017 2 Years	PI
25	Identification of ocular inflammatory Mediators in Steven johnsons syndrome PI: Dr. Srividya (DST, Women Scientist Scheme- A) **As PI/Mentor:** Dr.N.Angayarkanni	32,23,000	2015 – 2018 3 yrs	Mentor

	COMPLETED as CO-I			
1	Adiponectin as a "Therapeutic target" for ocular angiogenesis -ICMR,5/4/6/6/09 NCD II"	23,88,920	2010-2012 (2 yrs)	CoI:
2.	Vitamin E and C supplementation in Eales disease. VRF funded	2,00,000	2004-2006 2 years	CoI:
3	Double blind placebo study on AAM supplementation. Funded by Tablets India funded.	9,00,000	2004-2006 2 years	CoI:

14. Invited talks- National or International conducted in India: oral

1. Invited speaker, Clinical Biochemistry Association of India, (CBACON 2023), Chennai, "Quality and competence for better patient care."
2. Delivered a Lecture on " Clinical Chemistry and Laboratory Science Techniques" at University of Madras, Taramani Campus on 17.03.2022
3. Invited talk in SIRCON, National conference by Inflammation society at MRF, Chennai, "Inflammation in Age-related macular degeneration"
4. Gave an Invited talkon3rd National Hands-on-Workshop on "Advanced Bio-Analytical Techniques From Method Development to Data Interpretation" with a special reference to Metabolomics, Lipidomics and Proteomics, entitled "2D based experiments using Mass spectroscopy for clinical applications" from17th Dec to 19th Dec **2018** at the Ocular Pharmacology & Pharmacy Division, Dr. R. P. Centre for Ophthalmic Sciences, AIIMS, New Delhi.
5. Participated in the brainstorming session of the workshop, Valorisation of Bio-active components from plants" at Mumbai organized by the French Institute of the French embassy.
6. Delivered a Lecture on, "The Biochemistry of Diabetic Retinopathy" at Karpagam Academy of Higher Education (Deemed to be Univ., Echanary– Coimbatore on 03.04.18)
7. Gave an Invited talk at IERG-2018, entitled "Delineating the pathophysiology of Elastosisin Pseudoexfoliation Syndrome: *ex vivo a*nd *in vitro* studies in Lens Epithelium"on 27.07.18 – 29.07.18 at Hyderabad
8. Gave an Invited talk at SYNERGY 2018, entitled "Tear Proteomics in Dry Eye" on 25th July 2018 at Chennai
9. Gave an Invited talk at International Lab Professional Week,entitled "American Diabetes Association (ADA) Guidelines for Diabetes care: Role of Laboratory" at Cancer Institute on 21st April 2018.
10. Delivered a lecture on "Anti-fibrotic, Anti-angiogenic and Anti-inflammatory Activities of Chebulagic acid, Chebulinic acid and Gallic acid, The Active Principles of Triphala in the Microvascular Endothelial cells in Vitro" at IERG-ARVO 2017 at Aravind Eye Hospital Madurai - July 2017.
11. Gave an invited talk at "Animal Cell Culture Techniques- 2017" in the Lady Doak college, Madurai at National Level Workshop on 04.09.17, Madurai.
12. Gave an invited talk at TSNA seminar "Emerging trends in Laboratory diagnostics Series II" titled " HPLC: A high precision analytical tool for clinical application" on 06.05.17, Chennai
13. Delivered a lecture on "Progression to Diabetic Retinopathy: A threat in Diabetics'' at Annamalai University on 14.03.17, as part of UGC-SAP activities, seminar Series on Recent Trends in Cancer, Diabetes and associated disorders.

14. Gave an invited talk on "Back to Basics Course: Ocular Biochemistry" in the IERG meeting on 30th July 2016 held at L V Prasad Eye Institute, Hyderabad, India.

15. Gave a plenarylectureon "Biochemistry in the validation of Ayurvedic drugs: Mechanistic studies in wound healing property of Triphala: In vitro studies in RPE" in Indian Traditional Medicine - A Conglomeration of Ancient Knowledge and Modern Science at SASTRA University, Thanjavur on 21st July 2016.

16. Presented a guest lecture entitled "The Steps of the Literature Review process" in the SN workshop – Strategies for Writing – Literature Reviews on 10th June 2016, organized by the SN Academy.

17. Cytokines in Steven Johnson syndrome (Oral as Faculty), OSKON International meet, MRF, Sankara Nethralaya, 12th July 2015.

18. Lowered levels of brain derived neurotropic factors (BDNF) in Diabetic Retinopathy (Oral) at IERG ARVO India 2015 meeting at Hyderabad on 25th -26th July 2015.

19. An insight into our sight : Radiant Spectrum of molecular methods and diseases in ophthalmology "at Quiad-E-MillathGovt college for women on 12th Feb 2015. She will be talking on the Molecular mechanism in Diabetic Retinopathy.

20. Role of Clinical Proteomics in Metabolic Disorders and or Toxicology' in National Seminar on 'Clinical Proteomics for Veterinary and Allied sciences, 2014 at Rajiv Gandhi Institute of Veterinary Education and Research, Pondicherry.

21. ASIA-ARVO 2013 -New Delhi; LOX and its paralogues in keratoconus in Cell Biology session "Proteomics tool " at Stanley Medical college, Chennai ,2013

22. "Homocysteine in retinal diseases", at PGIBMS, (Univ of Madras) on 17.2.14.

23. "Tear Dynamics ".in the Contact lens workshop, SN 2013, 2014

24. Specific criteria for accreditation of medical laboratories NABL 112 (A feedback on the draft)" at Andhra chamber of commerce Organized by Value added 2014

25. Update on the research contributions to diagnostics in the SN Alumni on 2013

26. "Laboratory Accreditation" Seminar conducted by –SN Academy, 2013

27. "Aberrant expression of lysyl oxidase beget weakened collagen cross- links in keratoconus" Moderator for the session" Cell Biology and the Eye at ASIA ARVO conference at The Ashok Convention Centre, New Delhi. Oct 2013

28. "Homocysteine in Retinal pathologies" at the "Vitamin B12 and one carbon metabolism in Health and Diseases" at the CSIR-Institute of Genomics and Integrative Biology (New Delhi, India) on 10 March 2013. organized by CSIR-IGIB.

29. "Quality in Research" at BarathiWomens college on 10.1.12.

30. ASIA ARVO 2011 – Chennai India (Mitochondrial oxidative stress in Diabetic Retinopathy

31. Paraoxonase (PON) in Diabetic Retinopathy. 18thIERG Hyd. 2010.

32. "Diabetic retinopathy" at the Vivekananda College 2010.

33. ASIA ARVO 2011 – Chennai India "Mitochondrial oxidative stress in Diabetic Retinopathy"

34. Lysyl oxidase activity and Homocysteine levels in patients with Pseudoexfoliation Syndrome - ASIA ARVO at Hyderabad,2009.

35. Vitreous levels of vascular endothelial growth factor and Pigment epithelium-derived factor in Eales' disease. Bajaj International Conference **, C**hennai.

36. Lysyl oxidase activity and homocysteine levels in vitreous. - IERG annual meeting 2008, Aravind Eye Hospital, Madurai.

37. Serum Paraoxanase levels in relation to Hyperhomocysteinemia and Oxidative stress in CRVO and ARMD. SERI-ASIA ARVO 2007 at Singapore.

38. Lysyl oxidase activity in cultured bovine retinal pigment epithelial cells to stress conditions. SBC(I) Annual Scientific Meeting, 2006.

39. Membrane bound ATPases in retinal pigment epithelial cell cultures exposed to hyperosmotic mannitol. SBC(I) Annual Scientific Meeting, at Central Drug Research Institute along with Lucknow University, Lucknow held from, 2005.

40. Plasma VEGF levels in Eales disease patients. SBC(I) Annual Scientific Meeting, L.V. Prasad Eye Institute, Hyderabad , 2005.

41. Does hyperhomocysteinemia mediate oxidative stress in CRVO? IERG Annual Meeting, The Taj Fisherman's Cove, Chennai on 20 August 2004.

42. Hyperhomocysteinemia, oxidative stress and total thiols in retinal inflammatory diseases- ARMD, Eales' and CRVO" ARVO, Fort Lauderdale, USA ,2004.

43. Possible Involvement of elevated homocystine levels and diminished thiol pool for the development of ARMD. IERG Meeting, Hyderabad ,2003.

44. Activation of Insulin Receptor Tyrosine Kinase by amino acids and maintenance of normal cell Morphology in CHO cells treated with Glucose. IERG Annual Meeting, Hyderabad on 26.7.2003.

45. "NABL- our experience" at the Labcon 2009 nation conference on Laboratory at Madurai Meenakshi Mission hospital on Feb 09.

46. Lysyloxidase activity and Homocysteine levels in patients with Pseudoexfoliation Syndrome. ASIA ARVO –2009 at Hyderabad.

47. Biosensors in health care at the Madras Medical Mission as part of the Laboratory Professionals day celebrated on 29.4.2006

48. .Hyperhomocysteinemia in ocular diseases. SBC(I) Annual Scientific Meeting, Annamalai Nagar Chapter, Annamalai University on 26.2.2006.

49. International Conference on New Horizon in Biotechnology, CSIR, Trivandrum, Apr.2001, "Biology and Biotechnology of Cyanotoxin Producing Marine Microalga Phormidiumsp".

Ph.D work presentations as Research scholar

50. The National Conference of the Urolithiasis Society of India, Meerut, Oct. 1991. ' γ –glutamyl carboxylase activity in rat kidney'.

51. The National Conference of the Urolithiasis Society of India, Chennai, 1993. 'Role or γ–glutamyl carboxylase activity in stone forming condition'.

52. Annual meeting of the Society of Biological Chemists, India, Jan. 1993. '*Effect of Lipid peroxidation on microsomal oxalate binding'*.

53. Conference of the Indian Association of Biomedical Scientists, Ooty, India, Dec.1994. '*Role of vitamin K-dependent γ–glutamyl carboxylase activity in experimental stone forming condition'*. ***Best Paper Award (IABMS award)***

54. Urolithiasis Society of India – VIII National Conference and International Symposium of Human Stones, Trance metals and Free Radicals, Udaipur, India, Sep. 1995. '*Enhancement of microsomal calcium oxalate binding by γ–glutamyl carboxylation and peroxidation'*.

55. Symposium on Free radicals in Health & Diseases, Dr.A.L.M. Post – Graduate Institute of Basic Medical Sciences, Chennai , India, 1999. : **Best PAPER Award**

56. National Symposium on Relevance of Plant Biochemistry and Biotechnology - Modern Trends, IARI,Centre for Plant Biochemistry and Molecular Biology, Madurai, Mar. 2001, *"Role of 'Gla' Proteins in experimental Kidney Stone formation"*.

Leadership program: (Institutional) in 2005

Meetings 2023: Laboratory Directors Conclave, KIMS, Hyderabad

Dr. N. Angayarkanni

Oct ’2023