

Dr. Raja CHINNAPPAN, Lecturer

Biochemistry and Molecular Medicine, Alfaisal University,
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AREA OF SPECIALIZATION

- Biosensor development for the sensitive detection of Clinical biomarkers, pathogenic microbial organisms, and potential contaminants such as toxins, hormones, antibiotics, and food allergens.

RESEARCH EXPERIENCE AND PROJECTS

Lecturer, Alfaisal University, Riyadh, Saudi Arabia,

2015 - Till date

Current Research

- Developing Point-of-care testing for the diagnosis of liver diseases
- Quantitative detection of human serum albumin sensor using specific fluorescent molecules
- Aptamer selection against anti-coagulant drug Dabigatran Etxilate
- Fluorometric graphene oxide-based detection of Salmonella enteritis using aptamer as a recognition element.
- Development of an immuno-biosensor for the detection of pathogenic bacteria from water and food
- Development of a Colorimetric biosensor for the detection of mastitis diseases from dairy products
- Protease-based biosensor for the identification of human pathogenic bacteria from clinical samples
- Detection of microRNA cancer biomarkers by FRET and RT-qPCR
- Aptamer-based biosensor development for the decontamination of antibiotics from environmental samples (wastewater)
- Aptasensor development for the sensitive detection of allergens from seafood.
- Development of biosensors for the sensitive detection of marine toxin contamination from water resources and seafood.

Teaching

- Methods in Molecular & Cellular Biology (MBS 502)(M.Sc)
- Principles and Applications of Optical Spectroscopy (M.Sc)
- Co-supervisor for Master's and Ph.D. Thesis
- Separation and purification Techniques (B.Sc)

- Spectroscopic techniques for characterization of organic compounds (B.Sc)
- Physical Methods and Instrumental analysis in chemistry (B.Sc)
- Introduction to Chemistry CHM 102 (For engineering)
- Chemistry in Everyday Life and Environment CHM 107 (For business)

▪ PATENTS

- **R. Chinnappan** S. Eissa, M. Aljohani , M. Zourob Full-length and truncated Anti-Coagulant Dabigatran Etxilate specific DNA aptamers for electrochemical and fluorescence sensing applications, **US Patent (2020)**
- S. Eissa, A. Siddiqua, **R. Chinnappan**, and M. Zourob, Electrochemical screening method for the selection of DNA aptamers against 11- deoxycortisol using gold electrode for target immobilization, **US patent, 2019.**

▪ BOOK CHAPTERS

- Shimaa Eissa, **Raja Chinnappan**, Mohammed Zourob. **2017.** Advances in Biosensor Technologies for Food Allergen Monitoring and Diagnosis in Food Allergy in Methods of detection and clinical studies. Ed. Anas Abdel Rahman, *CRC Press/ Taylor & Francis Group* **2017.**

PEER-REVIEWED PUBLICATIONS

1. **R.Chinnappan***, M.A Khan, T. Mohammad, S.M. Allwaibh, S. Easwaramoorthi, A. Yaqinuddin, S. Devansan, T.Mir, I. Hassan., A novel fluorescent probe, triphenylamine rhodamine-3-acetic acid (mRA), for the detection of Amyloid- β aggregates in Alzheimer's disease. *Front. Neurosci.* **2025**, 19:1653063.
2. S. Ahmed, E. Alshehri, S. Nazneen, F. Attia, D. Obeid, H. Almuzaini, A. Alzahrani, J. Salma, I. Fujitsuka, A. M. Assiri, D. C Broering, **R. Chinnappan**, A. Yaqinuddin, T. A. Mir., Current advances and prospects in biomaterials-guided tools for liver organoids research., *Engineered Regeneration*, **2025**, 6, 203–217
3. **R.Chinnappan**, L. Ramachandran, I. Uttam, M. Citartan, N. V. Ballal, N. K. Mani., From Biomarkers to Biosensors: Modern Approaches for the Detection of Matrix Metalloproteinases (MMPs).*Biosensors* **2025**, 15(9), 603
4. O. Alnaser-Almusa, M. Mahmoud, M. Ilyas, R. Adwan, F. Abul Rub, N. Alnaser-Almusa, F. Mustafa, S. Ahmed, A. Alzhrani, T. Mir, M.Alabudahash, **R. Chinnappan*** A.Yaqinuddin. Recent Advances in Aptamer-Based Biosensing Technology for Isolation and Detection of Extracellular Vesicles. *Front. cell dev. Biol.* **2025**. (Accepted DOI: 10.3389/fcell.2025.1555687).
5. S. Shaikh, L. Siddique, H.T. Khalifey, R. Mahereen, T. Raziq, R.M. Firdous, A. Siddique, I.M Shakir, Z. Ahmed, A. Akbar, E.A Alshehri, **R. Chinappan**, A. Alzhrani, T. Mir, A. Yaqinuddin. Brain organoid model systems of neurodegenerative diseases: recent progress and future prospects. *Front. Neuro. Sci.* **2025**, 19, 1604435

6. A. Yaqinuddin, A. Jabri, A. Mhannayeh, B. Taftafa, M. Alsharif, T. Abbad, J. Khan, A. Elsalti, **R. Chinnappan**, E.A. Alshehri, A. Alzhrani, D.A. Obeid, I. Fujitsuka, M. Khan, M. Rehman, T. Mir. Cardiac organoids: a new tool for disease modeling and drug screening applications. *Front. cardiovas. Med*, **2025**, 12, 1537730
7. F. Abul Rub, N. Moursy, N.Alhedeithy, J. Mohamed, Z. Ifthikar, M. A. Elahi, T. Ahmed Mir, M.U. Rehman, S. Tariq, M. Alabudahash, **R. Chinnappan***, A. Yaqinuddin. Modern emerging biosensing methodologies for the early diagnosis and screening of ovarian cancer, *Biosensors*, **2025**, 15 (4), 203
8. **R. Chinnappan***, T Mir, S Easwaramoorthi, G Sunil, A Feba, B Kanagasabai, S I Wani, M. Sandouka, A Alzhrani, S Devanesan, M S. AlSalhi, N K Mani, W Al-Kattan, Ahmed YaqnuddinI, A M Assiri, DC Broering. Molecular engineering of a fluorescent probe for highly efficient detection of human serum albumin in biological fluid, *Sens. Intl*, **2025**, 6, 100304
9. **R. Chinnappan***, T Makhzoum, M Arai, A Hajja, F Abul Rub, I Alodhaibi, M Alfuwais, M A Elahi, E A Alshehri, L Ramachandran, N K Mani, S Abraham, M Mir, K Al-Kattan, T Mir, A Yaqinuddin Recent Advances in Biosensor Technology for Early-Stage Detection of Hepatocellular Carcinoma-Specific Biomarkers: An Overview, *Diagnostics*, **2024**, 14 (14), 1519
10. SI Wani, TA Mir, M Nakamura, T Tsuchiya, A Alzhrani, S Iwanaga, K Arai, EA Alshehri, T Shamma, D A Obeid, **R Chinnappan**, A M Assiri, A Yaqinuddin, Y K Vashist, D C Broering. A review of current state-of-the-art materiobiology and technological approaches for liver tissue engineering. *Bioprinting*, **2024**, e00355
11. P Nisha, RM Shamma, S Devanesan, TA Mir, **R Chinnappan**, MS AlSalhi, T Alzahim. Development of highly porous seaweed impregnated facemask substrates for protecting people from microbial hazards. *Environmental Technology & Innovation*, **2024**, 36, 103764
12. L Ramachandran, F Abul Rub, A Hajja, I Alodhaibi, M Arai, M Alfuwais, T. Makhzoum, A.Yaqinuddin, K. Al-Kattan, A. M Assiri, D. C Broering, **R. Chinnappan***, T. Mir, N. K. Mani, Biosensing of Alpha-Fetoprotein: A Key Direction toward the Early Detection and Management of Hepatocellular Carcinoma, *Biosensors*, **2024**, 14 (5), 235
13. T El Hayek, OA Alnaser-Almusa, SM Alsalamah, MT Alhalabi, AN Sabbah, E. Alshehri, T. Mir, N. K. Mani, K. Al-Kattan, **R. Chinnappan***, A. Yaqinuddin, Emerging role of exosomal microRNA in liver cancer in the era of precision medicine; potential and challenges *Frontiers in Molecular Biosciences*, **2024**, 11, 1381789.
14. A Jabri, J Khan, B Taftafa, M Alsharif, A Mhannayeh, **R Chinnappan**, A. Alzhrani, S. Kazmi, M. Mir, A. Alsaud, A. Yaqinuddin, A. Assiri, K. AlKattan, Y. K Vashist, D. Broering, T. Mir. Bioengineered Organoids Offer New Possibilities for Liver Cancer Studies: A Review of Key Milestones and Challenges. *Bioengineering* **2024**, 2011 (4), 346
15. S. Alhogaila, **R. Chinnappan**, A.R.Y. Suaifan, K.M. Abu-Salah, K. Al-Kattan , D. Cialla-May, Popp Jürgen, M. Zourob, Rapid Colorimetric Quantitative portable platform for Detection of *Brucella melitensis* based on Fluorescent Resonance Energy Transfer Assay and Nanomagnetic particles *ACS omega*, **2024**, 9 (19), 20997-21005
16. I. Uttam, S. Sudarsan, R. Ray, **R. Chinnappan***, A. Yaqinuddin, K. Kattan, N.K. Mani A Hypothetical Approach to Concentrate Microorganisms from Human Urine Samples Using Paper-Based Adsorbents for Point-of-Care Molecular Assays, *Life* **2024**, 14, 38.

17. A. Narasimhan, H. Jain, K. Muniandy, **R. Chinnappan**, N.K. Mani, Bio-analysis of Saliva Using Paper Devices and Colorimetric Assays, *J. Anal. Test*, **2024**, 8,114
18. S. Sudarsan, P. Shetty, **R. Chinnappan**, N. Mani: Tuning hydrophobicity of paper substrated for effective detection of Glucose and Nucleic Acid Assay on Paper Substrates, *Anal. Bio. Anal. Chem.* **2023**, 415, 6449.
19. **R. Chinnappan***, T.Mir, S. Alsalamah, T. Makhzoum, A. Alzhrani, K. Kattan, A. Yaqinuddin Low-cost point-of-care monitoring of ALT and AST is promising for faster decision-making and diagnosis of acute liver injury, *Diagnostics*, **2023**, 13, 2967
20. **R. Chinnappan***, T.Mir, S. Alsalamah, T. Makhzoum, A. Alzhrani, K. Alnajjar, S.Adeeb, N. Eman, Z. Ahmed, I. Shakir, K. Kattan, A. Yaqinuddin, Emerging biosensing methods to monitor lung cancer biomarkers in biological samples: A comprehensive review, *Cancers* **2023**, 13, 3414.
21. **R. Chinnappan***, T. Mir, S. Alsalamah, T. Makhzoum, S. Adeeb, K. AlKattan and A. Yaqinuddin, Aptasensors Are Conjectured as Promising ALT and AST Diagnostic Tools for the Early Diagnosis of Acute Liver Injury, *Life* **2023**, 13, 1273.
22. **R. Chinnappan**, Q. Ramadan and M. Zourob, Isolation and detection of exosomal Mir210 using carbon nanomaterial-coated magnetic beads, *J. Funct. Biomat.*, **2023**, 14, 441.
23. **R. Chinnappan**, Qasem. R, M. Zourob, An integrated lab-on-a-chip platform for pre-concentration and detection of colorectal cancer exosomes using anti-CD63 aptamer as a recognition, *Biosen. Bioelectron.* **2023**, 220, 114856.
24. S Alsalamah, K Alnajjar, T Makhzoum, N Al Eman, I Shakir, TA Mir, K Alkattan, **R Chinnappan***, A. Yaquinuddin. Advances in Biosensing Technologies for Diagnosis of COVID-19. *Biosensors*, **2022**, 12, 898.
25. N Alomran, **R Chinnappan**, J Alsolaiss, NR Casewell, M Zourob. Exploring the Utility of ssDNA Aptamers Directed against Snake Venom Toxins as New Therapeutics for Snakebite Envenoming. **2022**, *Toxins* 14 (7), 469
26. M. Alnajrani, M. Aljohani, **R. Chinnappan**, M. Zourob, O.Alsager. Highly sensitive and selective lateral flow aptasensor for anti-coagulant dabigatran etexilate determination in blood, **2022**, *Talanta*, 236, 122887.
27. N Alomran, **R Chinnappan**, J Alsolaiss, NR Casewell, M Zourob. Exploring the utility of ssDNA aptamers directed against snake venom toxins as new therapeutics for tropical snakebite envenoming. **2022**, *BioRxiv*. Doi: <https://doi.org/10.1101/2022.05.22.492967>
28. M. Aljohani, D. Cialla-May, J. Popp, **R. Chinnappan**, K. Al-Kattan, M. Zourob Aptamers: Potential Diagnostic and Therapeutic Agents for Blood Diseases. *Molecules*, **2022**, 27, 383.
29. FA. Azri, J. Selamat, R. Sukor, NA Yusof, NHA Raston, S. Eissa, M. Zourob, **R. Chinnappan**. Determination of minimal sequence for zearalenone aptamer by computational docking and application on an indirect competitive electrochemical aptasensor, *Analytical and bioanalytical chemistry*, **2021**, 413, 15, 3861-3872
30. M. Raji, **R. Chinnappan**, A Shibl, G Suaifan, K Weber, D Cialla-May, J Popp, EE Shorbagy, K Al-Kattan, M. Zourob. Low-cost colorimetric diagnostic screening assay for methicillin resistant *Staphylococcus aureus*. *Talanta*, **2021**, 225, 121946

31. HA. Alhadrami#, AM. Hassan, **R. Chinnappan**#, HA. Alhadrami W.H Abdulaal, E.I. Azhar and M.Zourob. Peptide substrate screening for the diagnosis of SARS-CoV-2 using fluorescence resonance energy transfer (FRET) assay, *Microchemica Acta*, **2021**, 88, 4.
32. **R. Chinnappan**, N.Zaghloul, R. AlZabn, A. Malkawi, A.A.Rahman, K.M Abu-Salah, M. Zourob. Aptamer selection and aptasensor construction for bone density biomarkers. *Talanta*. **2021**, 224, 121818.
33. S.Alhogail, **R. Chinnappan**, M. Alrifai, GARY. Suaifan, FJ. Bikker, W E. Kaman, K. Weber, D. Cialla-May, J. Popp, M B. Alfageeh, K Al-Kattan, M. Zourob. Simple and rapid peptide nanoprobe biosensor for the detection of Legionellaceae. *Analyst*, **2021**, 146, 11, 3568-3577.
34. **Chinnappan. R**, Alzabn . R, Fataftah . A, Alhoshani. A, Zourob. M. Probing high-affinity aptamer binding region and establishment of aptasensor platform for cylindropermopsin detection. *Analytical and bioanalytical Chemistry*, **2020** 412:4691–4701.
35. M.M. Aljohani, **R. Chinnappan**, O. A Alsager, R AlZabn, A Alhoshani , K. Weber, D Cialla-May, J Popp, M. Zourob Mapping the Binding Region of Aptamer Targeting small molecule: Dabigatran Etxilate, an Anti-Coagulant. *Talanta*, 2020, 218. 121132.
36. Alhadrami. H, Al-Amer. S, Aloraij. Y, Alhamlan. F, **Chinnappan. R**, Abu-Salah. K, Almatrrouk. S, Zourob. M.. Development of Simple, fast and cost-effective nano-based immunoassay method for detecting norovirus in food samples. *ACS Omega*, **2020** 21, 12162.
37. Azri, F.A., Eissa, S., Zourob, M. **R, Chinnappan**, R. Sukor, N.A Yousf, NHA Raston, A,Alhoshani, S. Jinap . Electrochemical determination of zearalenone using a label-free competitive aptasensor. *Microchim Acta* , **2020** 187, 266.)
38. S. Eissa, S. Alkhaldi, **R. Chinnappan**#, A. Siddiqua M. Abduljabbar A. M. Abdel Rahman, M. Dasouki M. Zourob Selection, Characterization, and electrochemical biosensing application of DNA aptamers for sepiapterin. *Talanta*. **2020**, 216, 120951
39. **R.Chinnappan**. A. Rahamn, R. AlZabn S. Kamath, A. L. Lopata, K M. Abu-Salah, M Zourob, Aptameric biosensor for the sensitive detection of major shrimp allergen, tropomyosin, *Food Chemistry*. **2020**, 314, 126133.)
40. **R. Chinnappan**, S. Eissa, A. Alotaibi, A. Siddiqua, O. Alsager, M. Zourob. In vitro selection of DNA aptamers and their integration in a competitive voltammetric biosensor for azlocillin determination in wastewater, *Analytica Chimica Acta*. **2020**, 1101, 149-156.
41. **R Chinnappan**, A Al Faraj, AM Abdel Rahman, KM Abu-Salah, F Mouffouk, M. Zourob. Anti-VCAM-1 and AntIL4R α Aptamer-Conjugated Super Paramagnetic Iron Oxide nanoparticles for Enhanced Breast cancer Diagnosis and Therapy. *Molecules*. **2020** 25, 3437
42. S. Eissa, A. Siddiqua, **R. Chinnappan**, and M. Zourob, Electrochemical SELEX protocol for selecting DNA aptamer against dedicator of cytokinesis 8 and its biosensing application, **2019** *Micro.Chem. Acta*, 186 (12), 828
43. Khalil A Roointan, T.A. Mir, S.I. Wani, K. Hussain, B. Ahmed, S. Abraham, A. Savardashtaki, G. Gandomani, M.Gandomani, **R. Chinnappan**, M. H Akhtar, Early

- detection of lung cancer biomarkers through biosensor technology: A review. *J.Pharm. Biomed. Anal.* **2019**, 164, 93.
44. **R Chinnappan**, R. Mohammed, A Yaqinuddin, K. Abu-Salah, M Zourob, *Highly sensitive multiplex detection of microRNA by competitive DNA strand displacement fluorescence assay*. *Talanta*, **2019**, 200, 487-493
 45. **R Chinnappan**, R AlZabn, KM Abu-Salah, M Zourob. An aptamer based fluorometric microcystin-LR assay using DNA strand-based competitive displacement, *Microchimica Acta*, **2019**, 186 (7), 435.
 46. **R Chinnappan**, R AlZabn, TA Mir, M Bader, M Zourob. Fluorometric determination of okadaic acid using a truncated aptamer, *Microchimica Acta*, **2019**, 186 (7), 406
 47. S Eissa, A Siddiqua, **R Chinnappan**, M Zourob. Electrochemical SELEX technique for the selection of DNA aptamers against the small molecule 11-deoxycortisol. *ACS Applied Bio Materials* **2019**, 2,6, 2624-2632.
 48. **R Chinnappan**, MM Aljohani, S Eissa, OA Alsager, K Weber, D Cialla-May, M.Zourob, In Vitro Selection of Specific DNA Aptamers Against the Anti-Coagulant, Dabigatran Etexilate, *Scientific Reports* **2018**, 8 (1), 13290.)
 49. S Alamer, S Eissa, **R Chinnappan**, P Herron, M Zourob; Rapid colorimetric lactoferrin-based sandwich immunoassay on cotton swabs for the detection of foodborne pathogenic bacteria, *Talanta*, **2018**, 185, 275-280
 50. M. AlJohani, **R. Chinnappan**, S. Eissa, T. Owaidah, D. Cialla-May, J. Poppo, M.Zourob. Development of Novel Nanobiosensor for Direct Measurement of the Oral Anticoagulant Agent: Dabigatran Etexilate. *Blood*, **2018**, 132 (Suppl 1), 1247-1247
 51. S Alamer, S Eissa, **R Chinnappan**, M Zourob, A rapid colorimetric immunoassay for the detection of pathogenic bacteria on poultry processing plants using cotton swabs and nanobeads., *Microchimica Acta*, **2018**, 185 (3), 164
 52. **R Chinnappan**, S AlAmer, S Eissa, AA Rahamn, KMA Salah, M Zourob, Fluorometric graphene oxide-based detection of Salmonella enteritis using a truncated DNA aptamer. *Microchimica Acta*. **2018**, 185 (1), 61.)
 53. S Eissa, **R Chinnappan**, M Zourob, Advances in Biosensor Technologies for Food Allergen Monitoring and Diagnosis, *Food Allergy: Methods of Detection and Clinical Studies*. **2017**.
 54. S Eissa, **R Chinnappan**, M Zourob, Ultrasensitive Label-free Electrochemical Immunosensors for Multiple Cell Surface Biomarkers on Liver Cancer Stem Cells, **2017**, *Electroanalysis* 29 (8), 1994-2000.
 55. **R Chinnappan** HA Alhadrami, S Eissa, AA Rahamn, M Zourob. High affinity truncated DNA aptamers for the development of fluorescence based progesterone biosensors, *Anal. Biochem.* **2017**, 525, 78-84.
 56. **R Chinnappan**, S Al Attas, WE Kaman, FJ Bikker, M Zourob, Development of magnetic nanoparticle based calorimetric assay for the detection of bovine mastitis in cow milk. *Anal.Biochem.* **2017**, 523, 58-64
 57. S Eissa, **R Chinnappan**, M Zourob. Label-free impedimetric immunosensors for liver cancer stem cells. *Procedia Tech.* **2017**, 27, 287-289

58. S.Alamer, **R. Chinnappan**, M. Zourob; Development of rapid immuno-based nanosensors for the detection of pathogenic bacteria in poultry processing plants, *Procedia Tech.* **2017** 27, 23-26
59. **R.Chinnappan**, A.Dubé, J-F.Lemay, D.Lafontaine. Fluorescence monitoring of riboswitch transcription regulation using a dual molecular beacon assay, *Nucl. Acid. Res.* **2013**, 41, e106
60. R. Chinnappan, A, Ng, S.Eissa, H.Liu, C. Tlili, M. Zourob, Highly sensitive aptamer based biosensor for microcystin detection, *Envi. Sci. Tech.* **2012**, 46, 10697-10703
61. A. Mazhorova, A. Markov, A. Ng, **R. Chinnappan**, M. Zourob, and M. Skorobogatiy Label-free bacteria detection using evanescent mode of a suspended core terahertz fiber, *Opt. Exp.* **2012**, 20, 5344.
62. W.J.Bock, P. Mikulic, **R.Chinnappan**, A. Ng, M.Tolba and M.Zourob, Long period grating based biosensor for the detection of *Escherichia coli* bacteria, S. M.Tripathi, *Biosen. Bioele.* **2012**, 35, 308.
63. S. Mateusz, W.J.Bock, P. Mikulic, **R. Chinnappan**, A. Ng, M. Tolba and M. Zourob, Detection of bacteria using bacteriophages as recognition elements immobilized on long-period fiber gratings, *Opt. Exp.* **2011**, 19, 7971.
64. S.Blouin, **R. Chinnappan**, and D. A. Lafontaine. Folding of the lysine riboswitch: importance of peripheral elements for transcriptional regulation. *Nucl. Acid. Res.* **2011**, 39, 3373.
65. **R. Chinnappan** , C.Lin, K. Acharya, J.L. Pellequer, R. Jankowiak. On stabilization of a neutral aromatic ligand by π -cation interactions in monoclonal antibodies. *Biophys. Chem.* **2011**, 154, 35.
66. B. Ilien, N. Glasser, J.P.Clamme, P. Didier, E. Piemont, **R. Chinnappan**, S.B Daval, J.L Galzi, Y. Mely. Pirenzepine promotes the dimerization of muscarinic M1 receptors through a three-step binding process, *J. Biol Chem.***2009**, 284, 19533.
67. J. Dietz, J. Koch, A. Kaur, **R. Chinnappan**, S. Stein, M.l Grez, A. Pustowka, S. Mensch, J. Ferner, R. Tampé, G. Divita, Y. Mély, H. Schwalbe & U. Dietrich. Inhibition of HIV-1 by a peptide ligand of the genomic RNA packaging signal Psi, *ChemMedChem.* **2008**, 3,749. .
68. **R. Chinnapan**[#], B. Miksa[#], N. Dang, M. Reppert, N. Tretyakova, N. M.Grubor and R Jankowiak. Spectral Differentiation and Immunoaffinity Capillary Electrophoresis Separation of Enantiomeric Benzo(a)pyrene Diol Epoxide-Derived DNA Adducts. *Chem. Res. Toxicol.* **2007**, 20, 1192.
69. **R.Chinnappan**, J Ferner, U. Dietrich, S. Avilov,D. Ficheux, J.L Darlix, H. de Rocquigny, H. Schwalbe, and Y. Me'ly, A Tryptophan-Rich Hexapeptide Inhibits Nucleic Acid Destabilization Chaperoned by the HIV-1 Nucleocapsid Protein. *Biochemistry.* **2006**, 45, 9254.
70. G.Julien, De R. Hugues, **R. Chinnappan**, G. Nicole, F. Damien, D.Jean-Luc, Y. Mely. During the early phase of HIV-1 DNA synthesis, nucleiocapsid protein directs

hybridization of the TAR complementary sequences via the ends of their double-stranded stem. *J. Mol. Bio.* **2006**, 356, 1180.

71. **R. Chinnappan**, K. Ananthanarayanan and P. Natarajan. Studies on the photophysical characteristics of poly(carboxylic acid)s bound protoporphyrin IX and metal complexes of protoporphyrin IX. *Eur. Polym. J.* **2006**, 42, 495.
72. P. Natarajan and **R. Chinnappan**, Studies on the dynamics of poly(carboxylic acids) with covalently bound thionine and phenosafranine in dilute aqueous solutions, *Eur. Polym. J.* **2005**, 41, 2496.
73. P. Natarajan and **R. Chinnappan**, Studies on interpolymer self-organisation behaviour of protoporphyrin IX bound poly(carboxylic acid)s with complimentary polymers by means of fluorescence techniques. *Eur. Polym. J.* **2004**, 40, 2291.
74. P. Natarajan and **R. Chinnappan**, Novel features of the interpolymer self-organisation behaviour investigated using covalently linked protoporphyrin IX as fluorescent probe in the macromolecules. *Eur. Polym. J.* **2001**, 37, 2207.

Research Funding

1. **SIDACTION** Postdoctoral Research Grant, Paris, France- 2004
2. IRG Research Grand (PI) 2016, Alfaisal University, Kingdom of Saudi Arabia
3. IRG Research Grand (PI) 2018, Alfaisal University, Kingdom of Saudi Arabia
4. Al Queel Liver Disease Fund (Co-PI) 2023, KSA
5. IRG Research Grand (Co-PI) 2023, Alfaisal University, Kingdom of Saudi Arabia
6. IRG Research Grand (Co-PI) 2024, Alfaisal University, Kingdom of Saudi Arabia
7. IRG Research Grand (PI) 2025, Alfaisal University, Kingdom of Saudi Arabia

Recent Seminars and Conferences

1. Invited Talk: Nanomaterials in Sensing Technology workshop- presented the research work at Universiti Sains Malaysia, Penang, **Malaysia**, July 2018
2. Invited Talk: Aptamer Selection workshop Universiti Sains Malaysia, Kota Bharu, **Malaysia**, October 2018
3. 3rd Middle East Society of Therapeutic Radiation Oncology Congress, Alfaisal University, Riyadh, KSA. November **2024**
4. Workshop on High-end Microscopic techniques, KFSHRC, Riyadh, KSA- November **2024**

5. 2nd International conference on Medical education, KFSHRC, Riyadh, KSA, May **2025**
6. Advancement of Diagnostics & Therapeutics Technology in Medical and Health, Webinar: Institute for Research in Molecular Medicine (INFORMM) Universiti Sains Malaysia, July **2025**

Previous Employment

Research and Development Chemist, Carmel Industries Inc, Canada 2012 - 2014

- Formulation and production of solvent and aqueous-based paints
- Formulation of inks for permanent and temporary markers
- Developed new formula for solid paint crayons for industrial applications
- Preparation of livestock markers and paint markers
- Prepared MSDS for the new products

Research Scientist, GDG Environment Ltd and INRS, Varennes, Canada 2010 - 2012

- Set up a new research and development laboratory for GDG Environment Ltd.
- Microcystin target molecules are bioconjugated on the sepharose beads and the activity of immobilized microcystins was estimated using phosphatase enzymatic assay.
- The high-affinity aptamers were selected by the SELEX. The bound aptamers were separated and PCR amplified.
- PCR products of the DNA aptamers from final rounds were cloned into pCR2.1-TOPO vector using TOPO TA cloning kit. The ssDNA inserts were amplified and sequenced.
- The dissociation constant of the aptamers for their corresponding targets was determined by the titration method.
- Cultured E.Coli bacteria and T4 bacteriophage for the development of label free E.coli detection by optical methods.

Senior Research Associate, Sherbrooke University, Sherbrooke, Canada 2007-2010

- Developed a fluorescence-based follow-up for the riboswitch transcription-controlled gene expression in real-time
- The DNA template of the RNA riboswitch was ligated into the DNA plasmid and study the riboswitch functions in-vivo.
- Used single-round transcription assay for the study of riboswitch activities using p³² radio-labeled nucleotides.
- Carried out Selective 2'Hydroxyl Acylation analyzed by the Primer Extension (SHAPE) for determination of RNA secondary and tertiary structures.
- HPLC was used for the purification of homemade fluorescently labeled oligonucleotides

Research Associate, Kansas State University, USA

2006 - 2007

- Purified different types of monoclonal antibodies using the protein-A/G gel-packed affinity column chromatography.
- Used advanced KrF excimer and tunable dye laser instruments and carried out the experiments at cryogenic conditions (liquid helium, 4K, -269°C)
- The difference in the affinity constants of isomers of benzo(a)pyrene diol epoxide DNA adducts and antibody immunocomplexes were differentiated using the high-resolution fluorescence line narrowing spectroscopy (FLNS) at cryogenic condition (4K)
- Immunoaffinity capillary electrophoretic separation of isomers of benzo(a)pyrene diol epoxide DNA adducts was achieved
- Experimentally proved the stabilization of the immunocomplexes of aromatic ligands and the antibodies stabilized by the Pi-Cation interactions using FLNS spectroscopy.

Postdoctoral Research Fellow, Chemnitz University of Technology, Germany 2005

- Variation of optical properties of the quantum dot nanoparticles with size distribution.
- photoluminescent blinking of QDs was studied using confocal and wide-field fluorescence microscopes.
- Influence of organic molecular interaction of the photoluminescence properties of quantum dot nanoparticles.

Postdoctoral Research Fellow, Louis-Pasteur University, Strasbourg, France 2003 - 2004

- Inhibition of HIV-1 nucleocapsid (NCp) protein chaperone activity by small peptides
- Characterization (UV-Vis, fluorescence, pH study) of short peptides which inhibit NCp
- TAR and cTAR annealing kinetic pathways have been studied using real-time FRET
- DNA/RNA and protein binding studies
- Molecular mechanisms of Bodipy-pirenzepine binding to an enhanced green fluorescent protein (EGFP): fluorescence Single-photon counting study
- Peptide-siRNA binding interaction by in-situ tryptophan fluorescence

EDUCATION

Ph. D. Chemistry, University of Madras, India 2004

Thesis Title: Studies on the dynamics of fluorophore-bound macromolecules and their self-organization behaviors in aqueous solutions.

M. Sc. Chemistry, University of Madras, India 1997

Thesis Title: Effect of solvent on the fluorescence properties of dimeric acridinedione dyes.

B. Sc. Chemistry, University of Madras, India 1995

AWARDS, MERITS AND MEMBERSHIPS

- **SIDACTION** Postdoctoral fellowship award, France 2004

- Associate Member-American Association for Cancer Research Since 2006
- Internal Research Grand Award –Alfaisal University 2016
- Internal Research Grand Award –Alfaisal University 2018
- Research Excellence Award –Alfaisal University 2019
- Patent award -Alfaisal University 2020
- Patent award -Alfaisal University 2022
- Research Excellence Award –Alfaisal University 2023
- Al Queel Liver Disease Fund Award 2023
- Internal Research Grand Award –Alfaisal University 2025
- **Top 2% scientists** recognized by Stanford University and Elsevier 2025