

Arunaa Nagarajan Ganesan

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EDUCATION

Carnegie Mellon University

MS in Biotechnology and Pharmaceutical Engineering

GPA: 3.76/4.00

Pittsburgh, USA

Aug 2023 - Dec 2024

PSG College of Arts and Science

BSc in Biotechnology

Coimbatore, India

Sep 2020 - Aug 2023

TECHNICAL SKILLS

Laboratory Skills: Molecular techniques: PCR, Gel-electrophoresis, UV spectrometry, SDS PAGE, Southern Blot, Good laboratory practices, Restriction Digestion, Thin Layer Chromatography (TLC), RP-HPLC (Reverse Phase - High Performance Liquid Chromatography), NTA (Nanoparticle Tracking Assay), ELISA, Scanning Electron Microscopy.

Microbial Techniques: Isolation using Streaking and plating, Cell-Culture, Staining techniques, Tissue culture.

Bioinformatics tools: BLAST, CLUSTALW, MEGAX, Protein scale analysis: PROTSCALE, 3D structure visualization: SPDBV, RASMOL, Protein Structure Prediction: Phyre2.

WORK EXPERIENCE

Investigating cell-cell communication in bacteria using EVs

Graduate Research Assistant, Hiller Lab, Carnegie Mellon University

Pittsburgh, PA

Jan 2024 - Jun 2024

- Developed and Optimized method for high-yield isolation of EVs (Extracellular-vesicles) from *Streptococcus pneumoniae* using ultracentrifugation and Size-Exclusion chromatography techniques.
- Leveraged quantitative assays (Picogreen, Ribogreen, BCA) to optimize protein and nucleic acid concentrations of isolated EVs & performed NTA (nanoparticle tracking assay) to measure the size of EVs and analyze EV cargo.
- Engineered the surface of EVs by incorporating quorum-sensing (QS) peptides & employed luminescence-based assays to quantify the impact of the modified EVs on bacterial cell-cell communication.
- Successfully performed knock-in mutagenesis in D39 strain to integrate a gene of interest to test the EV uptake.

Discovered novel antimicrobial compounds from natural source

Pharmaceutical Intern, Centre for Bioscience and Nanoscience Research

Coimbatore, India

Jul 2022 - Aug 2022

- Analyzed chemical profiles of Rosa indica leaves using UV spectroscopy (conjugated structures). Performed TLC & identified 33.33% more bands in the ethanol vs. methanol extract, suggesting potential antimicrobial content.
- Evaluated the antimicrobial activity of the extracts by employing Well diffusion & Broth Dilution Assay.
- Utilized a C18 column in Reverse phase High-Performance Liquid Chromatography (RP-HPLC), to confirm and further identify the antimicrobial contents in the Rosa indica leaf extract with ethanol as the mobile phase.
- Collaborated with industry experts to validate & review the results obtained, ensuring the findings aligned with industry standards. Conducted extensive literature review on natural products & its pharmaceutical applications.

PROJECTS

Fluorescent protein expression in *E.coli*

Carnegie Mellon University

Pittsburgh, PA

Jan 2024 - Mar 2024

- Engineered *E.coli* to express an unknown fluorescent protein by constructing a plasmid, transforming cells, and inducing expression. Characterized the unknown protein, using SDS- PAGE & UV Vis spectroscopy.
- Identified the unknown fluorescent protein using PCR, sequencing, and fluorescence microscopy.
- Analyzed the combined data using Benchling software and validated the findings from NCBI data.

Modification of Secondary Metabolite Production in Bacteria

PSG College of Arts and Science

Coimbatore, India

Sep 2022 - Jan 2023

- Increased secondary metabolite biosynthetic gene clusters (smBCG) in *Streptomyces sp* employing physical stress.
- Conducted growth analysis and quantified the results through assays and TLC for overall metabolic profile.

Analyzed the SARS-CoV-2 Genome Using NCBI and UCSC Genome browser

PSG College of Arts and Science

Coimbatore, India

May 2022 - Jun 2023

- Employed BLAST and CLUSTALW for pairwise and multiple sequence alignments & characterized viral strains.
- Conducted protein structure prediction using Phyre2 to understand potential drug targets for COVID-19 virus.

PUBLICATION

- Defining approaches to mitigate toxicological impacts of pyrogallol on exposure to biological systems [Link](#)