Arunaa Nagarajan Ganesan

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EDUCATION

Carnegie Mellon University — **Pittsburgh, USA**
MS in Biotechnology and Pharmaceutical Engineering — *Aug 2023 - Dec 2024*
GPA: 3.76/4.00

PSG College of Arts and Science — **Coimbatore, India**
BSc in Biotechnology — *Sep 2020 - Aug 2023*

TECHNICAL SKILLS

Laboratory Skills: Molecular techniques: Primary T-cell culture, Flow cytometry, ELISA, Enzyme-Linked ImmunoSpot (ELISpot), Cytotoxicity assays (LDH), T-cell proliferation assays, Immunofluorescence microscopy, PCR, UV spectrometry, Western Blot, Good laboratory practices, Restriction Digestion, Immunoprecipitation, NTA (Nanoparticle Tracking Assay), Scanning Electron Microscopy.
Microbial Techniques: Isolation using Streaking and plating, Cell-Culture, Staining techniques, Tissue culture.
Data analysis: GraphPad Prism, FlowJo, Python.

WORK EXPERIENCE

Investigating Tumor-Infiltrating Lymphocytes in Glioblastoma — **Pittsburgh, PA**
Research Volunteer (For Credit) – Glioblastoma T-cell Therapy - Kohanbash Lab — *July 2024 - Present*

- Isolated and expanded tumor-infiltrating lymphocytes (TILs) from patient-derived tumor samples and evaluated their cytotoxicity using myeloid cell lines in mouse models, for immunotherapy research.
- Conducted T-cell priming with tumor-associated antigens (TAA) via dendritic cell-mediated presentation, using flow cytometry to analyze T-cell activation and compare the killing efficiency of TILs with naive T-cells from healthy donors through LDH assays, ELISpot, and ELISA to measure cytokine release and cell lysis.
- Screened the reactivity of T-cells against 12 different peptides to assess antigen-specific T-cell activation, optimizing peptide selection for potential adoptive T-cell therapy, while employing FlowJo for detailed analysis of flow cytometry data and GraphPad Prism for data visualization and statistical analysis.

Investigating cell-cell communication in bacteria using EVs — **Pittsburgh, PA**
Graduate Research Assistant, Hiller Lab, Carnegie Mellon University — *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 peptides to quantify the impact of modified EVs.
- 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 — **Coimbatore, India**
Pharmaceutical Intern, Centre for Bioscience and Nanoscience Research — *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.

PROJECTS

Fluorescent protein expression in *E.coli* — **Pittsburgh, PA**
Carnegie Mellon University — *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.

Analyzed the SARS-CoV-2 Genome Using NCBI and UCSC Genome browser — **Coimbatore, India**
PSG College of Arts and Science — *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