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: Immunofluorescence microscopy, PCR, UV spectrometry, Western Blot, Good laboratory practices, Restriction Digestion, Immunoprecipitation, NTA (Nanoparticle Tracking Assay), Scanning Electron Microscopy, Primary T-cell culture, Flow cytometry, ELISA, Enzyme-Linked ImmunoSpot (ELISpot), Cytotoxicity assays (LDH), T-cell proliferation assays, single-cell RNA sequencing (scRNA-seq)
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 Assistant – Glioblastoma T-cell Therapy & Cancer vaccine - Kohanbash Lab — *July 2024 - Present*

- Processed pediatric glioblastoma patient blood samples and isolated peripheral blood mononuclear cells (PBMCs).
- Isolated Tumor-Infiltrating Lymphocytes (TILs) from murine tumor samples to study the tumor microenvironment and immune responses and Expanded TILs targeting 12 neoantigens for glioblastoma for therapeutic applications.
- Performed flow cytometry on TILs and tumor samples using markers such as CD3, CD103, CD127, and PD-1 to identify T cell subsets and immune checkpoint expression and exhaustion.
- Conducted single-cell RNA sequencing on 1,000+ TILs, revealing a significant upregulation in key immune response genes, correlating with enhanced anti-tumor cytotoxicity compared to unprimed T cells.
- Executed high-throughput cell-based assays, including ELISA, ELISpot, Sulforhodamine B (SRB), and cell viability assays, as well as cytotoxicity assays like LDH, for TILs and characterized the T cell reactivity against tumor and cytotoxic effect of TILs against tumor cells.
- Maintained rigorous standards for biosafety and experimental reproducibility to ensure high-quality research.

Engineering EVs with Surface Quorum Sensing Peptides for Cell Communication — **Pittsburgh, PA**
Graduate Research Assistant: Hiller Lab, Carnegie Mellon University — *Jan 2024 - Jun 2024*

- Developed and optimized protocols for high-yield isolation of extracellular vesicles (EVs) from Streptococcus pneumoniae using ultracentrifugation and size-exclusion chromatography techniques and cryopreserved them.
- Applied molecular biology techniques, including PCR, gene cloning, and gene knockout, to engineer bacterial strains for targeted EV studies, enabling the analysis of modified EVs for cellular uptake & cellular communication.
- Conducted quantitative assays (Picogreen, Ribogreen, BCA) to measure protein and nucleic acid concentrations, and nanoparticle tracking analysis (NTA) to evaluate EV size and cargo composition for EV engineering.
- Optimally incorporated quorum-sensing peptides onto EV surfaces and assessed their impact on cell signaling.

Discovered novel antimicrobial compounds from natural source: Rosa indica — **Coimbatore, India**
Pharmaceutical Intern: Natural source, 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.

PUBLICATION

- **Defining approaches to mitigate toxicological impacts of pyrogallol on exposure to biological systems**   Link