AYUSH
AGGARWAL

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SUMMARY

PhD candidate (**thesis submitted**) in the field of skin pigmentation, skilled in computational as well as experimental biology, looking for computational postdoctoral opportunities.

EDUCATION

PhD candidate | CSIR-Institute of Genomics and Integrative Biology, Delhi
AUGUST 2017 – PRESENT
Supervisor – Dr Vivek T Natarajan

Thesis – Understanding cell fate decisions governing melanocyte cell state transitions.

B.E. BIOTECHNOLOGY | Netaji Subhas Institute of Technology (Delhi University)
2011 – 2015
Relevant courses – Molecular Biology, Recombinant DNA Technology, Intro to C and SQL

Thesis – Therapeutic Potential of Some Selected Plant Species

KEY SKILLS

- Big (omics) data analysis and visualization
- R/Shiny programming and High-Performance computing
- Mammalian and bacterial cell culture
- Flow cytometry
- Single cell/ChIP sequencing and analysis
- High content imaging and analysis (ImageJ scripting)
- Others like ChIP, qPCR, ICC etc.

EXPERIENCE

PhD candidate | CSIR-Institute of Genomics and Integrative Biology, Delhi
AUGUST 2017 – PRESENT
Research Experience

- Designing and execution of experiments
- Dry Lab Experience
  - Analyzed **single-cell, bulk RNA, and ChIP sequencing** data, starting from bcl files to final figures, using R and high-performance computing.
  - Analyzed multiple publicly available single-cell and bulk RNA sequencing and ChIP-seq data using R.
  - Developed a **shiny web application** (MelDat) for exploration of multiple melanocyte related bulk and single-cell datasets including an option to visualize your own data. https://ayushagg.shinyapps.io/MelDat/

- Wet Lab Experience
    - Performed **single-cell RNA/multiomics and ChIP sequencing** from start to end including culturing of cells, library preparation, and sequencing.
    - Gained expertise in **mammalian and bacterial cell culture** and techniques like (imaging) **flow cytometry, high content imaging, ICC, ChIP, qPCR**, and molecular cloning etc.
- Training
    - Trained PhD and undergraduate students in cell culture, cloning and single-cell data analysis.
- Volunteer experience
    - IGIB open day for high school and undergraduate students.
- Other
    - Created and maintaining the lab website and handling lab's data submission on public platforms.

Project Fellow | CSIR-Institute of Genomics and Integrative Biology, Delhi

OCTOBER 2015 – JULY 2017

Supervisor – Dr Rajesh S Gokhale

My aim was to understand the transcriptional regulation of genes involved in fatty acid metabolism in Mycobacterium spp. for which around 20 GFP reporter clones containing the promoters of relevant genes were created and electroporated into *M. smegmatis* to understand the transcriptional activation of fatty acid metabolism genes under different conditions including biofilm.

PUBLICATIONS

- One of my first author manuscript is currently under preparation.
- Aggarwal, A., Nasreen, A., Sahoo, S., Faruq, M., Pandey, R., Jolly, M.K., Singh, A., Gokhale, R.S., Natarajan, V.T., 2023. Melanocytes Exhibit Distinct Cell States Governed by A Gene Regulatory Network Under Stochastic Influence. https://doi.org/10.1101/2023.05.10.540111 (in communication)
- Sultan, F., Basu, R., Murthy, D., Kochar, M., Attri, K.S., Aggarwal, A., Kumari, P., Dnyane, P., Tanwar J., Motiani R.K., Singh, A., Gadgil, C., Bhavesh, N.S., Singh, P.K., Natarajan, V.T., Gokhale, R.S., 2022. Temporal analysis of melanogenesis identifies fatty acid metabolism as key skin pigment regulator. **PLoS Biol** 20(5): e3001634
- Sharma, B., Subramaniam, Y.J., Raja, D.A., Aggarwal, A., Sivasubbu, S., Natarajan, V.T., 2022. Reverse Genetic Approach to Identify Regulators of Pigmentation using Zebrafish. **JoVE J. Vis. Exp.** e62955.
- Dhawan, U.K., Bhattacharya, P., Narayanan, S., Manickam, V., Aggarwal A., Subramanian, M., 2021. Hypercholesterolemia Impairs Clearance of Neutrophil Extracellular Traps and Promotes Inflammation and Atherosclerotic Plaque Progression. **Arteriosclerosis, Thrombosis, and Vascular Biology.** 41, 2598–2615.
- Oh S, Abdelnabi J, Al-Dulaimi R, Aggarwal A, Ramos M, Davis S, Riester M, Waldron L, 2020. HGNChelper: identification and correction of invalid gene symbols for human and mouse [version 1; peer review: 2 approved, 1 approved with reservations]. **F1000Research**. 9:1493
- Raja, D. A., Subramaniam, Y., Aggarwal, A., Gotherwal, V., Babu, A., Tanwar, J., Motiani, R. K., Sivasubbu, S., Gokhale, R. S., & Natarajan, V. T. (2020). Histone variant dictates fate biasing of neural crest cells to melanocyte lineage. **Development**, dev.182576.

- Grover, R., Burse, S.A., Shankrit, S., Aggarwal, A., Kirty, K., Narta, K., Srivastav, R., Ray, A.K., Malik, G., Vats, A., Motiani, R.K., Thukral, L., Roy, S.S., Bhattacharya, S., Sharma, R., Natarajan, K., Mukerji, M., Pandey, R., Gokhale, R.S., Natarajan, V.T., 2019. Myg1 exonuclease couples the nuclear and mitochondrial translational programs through RNA processing. Nucleic Acids Res. 47, 5852–5866.

CONFERENCES AND WORKSHOPS

- Selected for oral presentation at Genes 2023 - Single-Cell Genomics Moving Forward (2023)
- Aggarwal, A, Singh, A, Gokhale, RS, Natarajan, VT. (2022). Uncovering the shades of grey in the black and white lives of melanocyte | Poster presentation at IGIB Science Festival
- Virtual workshop "The Linux Command Line: From Basic Commands to Shell Scripting" (2021) organized by Bioinformatics Core, University Medical Center, Hamburg.
- EMBL-EBI virtual course "Single-cell RNA-seq analysis using R" (2021) including giving a lightning talk.
- Aggarwal, A, Singh, A, Gokhale, RS, Natarajan, VT. (2019). Low density culturing of B16 stochastically induces melanocyte cell state transitions | Poster presentation at All India Cell Biology Conference
- IITM-EBI workshop on Mathematical Modelling at IIT Madras and presented a poster of my work (2019).

ACCOLADES

- BMES-Cell and Molecular Bioengineering (CMBE) Graduate Student Travel Award | 2023
- 56th rank in joint CSIR-UGC test for Junior Research Fellowship (NET) | 2016
- 94.59 percentile in graduate aptitude test in engineering (GATE-BT) | 2016
- Merit scholarship award for performance in final year examination of B.E. | 2015-16
- 317 score in GRE general test | 2014
- 19999 rank out of 1.1 million students in All India Engineering Entrance Examination | 2011

UNDERGRADUATE PROJECTS AND INTERNSHIPS

- Bachelor Thesis Project, Netaji Subhas Institute of Technology, New Delhi
  FEBRUARY 2015 – JUNE 2015
  "Therapeutic Potential of Some Selected Plant Species" under the supervision of Dr. Akhilesh Dubey and Prof. Ashok K. Dubey
- Summer Training, Netaji Subhas Institute of Technology, New Delhi
  JUNE – JULY 2013 and JULY 2014
  Extraction of phytochemicals and their analysis using thin layer chromatography, and isolation and screening of bio-surfactant producing microorganisms under the supervision of Prof. Ashok K. Dubey

OTHER ACTIVITIES

- Volunteer, GENMEDSKIN 2016, International Conference on the theme "Genomic Medicine in Skin Research" organized by Systems Biology Group, CSIR-IGIB
- Volunteer, Largest Practical Science Lesson, India International Science Festival, 2015
- Organized and participated in technical/cultural festival during under-graduation

REFERENCES

Dr. Vivek T. Natarajan

Associate Professor, Academy of Scientific and Industrial Research

Senior Principal Scientist, CSIR – IGIB, Delhi, India

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Dr. Rajesh S. Gokhale

Secretary, Department of Biotechnology, Government of India

Formerly Scientist VII, National Institute of Immunology

rsg@nii.ac.in

Dr. Manikandan Subramanian

Group Leader, Cardiovascular Inflammation

Deputy Director of Research, The William Harvey Research Institute

Barts and The London School of Medicine

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CONTACT

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