AYUSH
AGGARWAL

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SUMMARY

Final year PhD candidate in the field of skin pigmentation biology, skilled in bioinformatics as well as experimental biology, looking for bioinformatics postdoctoral opportunities

EDUCATION

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

Thesis – Understanding the 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 HPC
- Mammalian and bacterial cell culture
- Flow cytometry
- Single-cell 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 and bulk RNA 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 for exploration of multiple melanocyte related bulk and single-cell datasets including an option to visualize your own data
- Wet Lab Experience

- Performed single-cell RNA sequencing using 10x genomics kit from start to end including culturing of cells to library preparation to 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 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 fatty acid metabolism gene regulation 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

- Two of my first author manuscripts are currently under preparation
- 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

- 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

- 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 (AIEEE) | 2011

UNDERGRADUATE PROJECTS AND INTERNSHIPS

- Bachelor Thesis Project, Netaji Subhas Institute of Technology, New Delhi
  FEBRUARY 2015 – JUNE 2015
  Worked on the project entitled "Therapeutic Potential of Some Selected Plant Species" under the supervision of Prof. Akhilesh Dubey and Prof. Ashok K. Dubey
- Summer Training, Netaji Subhas Institute of Technology, New Delhi
  JULY 2014
  Learnt the basic techniques of extraction of phytochemicals and their analysis using thin layer chromatography, under the supervision of Prof. Ashok K. Dubey
- Summer Project, Netaji Subhas Institute of Technology, New Delhi
  JUNE 2013 – JULY 2013
  Learnt the techniques required for 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-Institute of Genomics and Integrative Biology
- Volunteer, Largest Practical Science Lesson, India International Science Festival, 2015
- Organized and participated in technical/cultural festival during under-graduation