ABOUT DR. ARCHANA RATH

Dr. Archana Rath is a doctorate in Reproductive Immunology and Molecular Biology from the prestigious National Institute of Immunology, New Delhi. She has experience of working in diverse reputed research organization like Quest Institute of Life Sciences, Nicholas Piramal Ltd and Advanced Centre for Treatment, Research and Education in Cancer (ACTREC). She has been working as a full time faculty in the Department of Biotechnology, University of Mumbai, since October 2008. She has recently been awarded a Major Research Project grant from the prestigious Science and Engineering Research Board, Department of Science and Technology (**SERB, DST**). She has also successfully completed a major research project funded by the Board of Research in Nuclear Sciences, Department of Atomic Energy (**BRNS, DAE**) entitled: *'Isolation and molecular characterization of antibiotic resistance in non-pathogenic organisms from food'.* Currently she is working on analysing antimicrobial resistance (**AMR**) associated with food and environment. Specifically she is interested in studying antimicrobial resistance patterns at the molecular level in microbial population using conventional techniques as well as metagenomics. Another area of research that is being explored in her lab is to exploit inherent defence mechanisms of microbes to counteract antibiotic resistance. Her lab would also be focussing on identifying naturally occurring novel antimicrobials and explore the possibility of nanotechnology to modify the effect of antimicrobials. The lab is also in the process of developing an Antimicrobial Resistance based bioinformatics tool. In the last few years, more than 25 M.Sc. and M.Phil. students have taken up this challenging area of research as their project/ thesis topic. Dr. Rath is a recognized Ph.D. guide in the subject of Biotechnology. Currently, three Ph.D. research students and a Project fellow under the DST-PURSE Scheme of University of Mumbai are working under the guidance of Dr. Rath. Students with CSIR-UGC/NET or equivalent qualifications can directly contact her at arath09@gmail.com. Her broad research interests include antibiotic resistance and antimicrobials, food microbiology and biotechnology, environmental biotechnology, nanotechnology for containment of AMR and production of value added products for sustainable development.

Academic & Administrative roles *(partial list)*

1. Head of the Department of Biotechnology, University of Mumbai.
2. Chairperson, Ad-hoc Board of Studies in Biotechnology, University of Mumbai.
3. Hon'ble Vice Chancellor's Nominee in the Purchase Committee, University of Mumbai.
4. University of Mumbai Nominee, Board of Studies in Biotechnology, Thakur College of Science & Commerce, Mumbai.
5. Acted as Invited External Evaluator/ Moderator for IIT-Mumbai for M. Tech. Thesis, MGM Institute of Health Sciences, Immunology papers for St. Xavier's College, Mumbai.
6. Acted as a Member of the Syllabus Committee for development of semester and credit based Syllabus of PG & UG programme of Life Sciences.
7. Internal and External Evaluator for various PG Examinations, University of Mumbai.
8. Life Member of Indian Science Congress Association (ISCA) and Indian Society of Cell Biology (ISCB)

Ongoing/ Recent Completed Research Projects:

Title of the Project	Name of the Funding Agency	Duration	Amount (in Rs.)	Overheads (in Rs.)
A study on the prevalence and molecular profiling of virulence genes in multiple antibiotic resistant *Escherichia coli* isolated from retail food	**SERB, DST**	May 2019-May 2022	**42,82,360***	3,89,000
Isolation and molecular characterization of antibiotic resistance in non-pathogenic organisms from food	**BRNS, DAE**	April 2013-December 2016	**25,38,350**	1,59,950
Isolation and Molecular Characterization of Antibiotic Resistant Microorganisms from Different Water Bodies	**DST-PURSE** Scheme, UoM	April 2017 onwards	**7,30,000** *(received till date)*	-

Includes financial provision for SSR & Lab Visit (details provided below)

Opportunities for Under-Graduate/ Post-Graduate Students:

1. **Scientific Social Responsibility (SSR)** under DST-SERB Project – Financial Provision for one dissertation student to work under the project who will be provided a fellowship of Rs. 5,000 per month under this scheme.
   Students wishing to work under this scheme can contact Dr. Rath on her email ID arath09@gmail.com.
2. **Lab Visit for college/ school students** in the PI's institution – Financial Provision for college/school students to come for a one-day visit to see the research facility available in the lab.
3. **Antimicrobial Resistance Database** (AMRDB) – Dr. Rath's lab is in the process of developing a surveillance based database for Antimicrobial Resistance in the environment. Students pursuing/completed B.Sc./ M.Sc. in Bioinformatics/Biotechnology/Life Sciences & allied fields interested to be part of the project can contact her via e-mail.

Latest Publications on Antibiotic Resistance:

1. Naik O, Shashidhar R, Rath D, Bandekar JR, **Rath A** (2018). Characterization of multiple antibiotic resistance of culturable microorganisms and metagenomic analysis of total microbial diversity of marine fish sold in retail shops in Mumbai, India. *Environ. Sci. Pollut. Res.* DOI: 10.1007/s11356-017-0945-7. https://link.springer.com/article/10.1007/s11356-017-0945-7

2. Naik O, Shashidhar R, Rath D, Bandekar JR, **Rath A** (2017). Metagenomic analysis of total microbial diversity and antibiotic resistance of culturable microorganisms in raw chicken meat and mung sprouts (*Phaseolus aureus*) sold in retail markets of Mumbai, India. *Curr. Sci.* 113(1):71-79. http://www.i-scholar.in/index.php/CURS/article/view/152753

Special Reviews on research publications from the lab

1. The research work appeared as a short story in **a televised show, "Science Monitor" on "Rajya Sabha TV",** Vigyan Prasar, an autonomous Institute of the Department of Science & Technology, aired on 5th August 2017. https://www.youtube.com/watch?v=SPnSDrVqACc
2. **"Hindustan Times"**https://www.hindustantimes.com/cities/fish-bacteria-can-resist-drugs-used-to-treat-tb-malaria-reveals-mumbai-university-study/story-RKEezTi65fzchtZA2YQieN.html published on 23rd April 2018.
3. **"The Hindu"** http://www.thehindu.com/todays-paper/tp- national/tp-other states/mumbai- study-shows-drug-resistant-bacteria-in-chicken-moong-beans/article19213505.ece published on 5th July, 2017.
4. **"Outlook"**https://www.outlookindia.com/website/story/scientists-discover-antibiotic-resistant-bugs-in-raw-chicken-sprouts/299659 published on 20th July, 2017.
5. **"Biotech Times"**https://biotechtimes.org/2017/07/20/study-finds-antibiotics-bugs-chicken-sprouts/ published on 20th July, 2017.
6. **"Indian Science Journal"** http://www.indiansciencejournal.in/health-news/raw-chicken-and-sprouted-beans-in-mumbai-unhealthy-206806 published on 20th July, 2017.
7. **"India Science Wire"** http://vigyanprasar.gov.in/isw/antibiotic_sea_fishes_story.html published on 20th December, 2017.
8. **"India Water Portal"** http://hindi.indiawaterportal.org/node/66772 published on 20th December, 2017.
9. **"Mongabay"**https://india.mongabay.com/2018/01/11/mumbai-fish-harbour-high-levels-of-antibiotic-resistant-bacteria/ published on 11th January, 2018.

Recent Invited/ Oral Talks *(partial list)*

1. **Metagenomics in Clinical Microbiology** - PG Assembly (Western Region) of IAMM at Seth G.S. Medical College & K.E.M. Hospital, Mumbai – 29th July 2019.
2. **A study on antibiotic resistant *Escherichia coli* isolated from retail food in Mumbai, India** - World Congress on Infectious Diseases and Antibiotics, Bangalore – 28th November 2018.
3. **Food Associated Antibiotic Resistance and Its Implications to Human Health** - International Conference (IAETS- 2018), Chhatrapati Shivaji Maharaj University, Panvel, Mumbai (India) – 17th November 2018.

Conferences/ Events organized *(partial list)*

1. National Seminar-cum-Event on Biotechnology Entrepreneurship (**NSBTE**) in India: Recent Trends and Challenges held on 26th March 2018.
2. **BIOINNOVA** National Conference in collaboration with Thakur College, Kandivali held on 10th February 2018.
3. **National Science Day** held on 28th February 2017 & 2018.

Gene Bank Submissions

There are a total of **177** submissions from our lab till date.

1. Gene sequences of Antibiotic Resistant microorganism isolated from food samples:

Sr. No.	Food source	No. of isolates	Accession Numbers	Publication date on NCBI
1	Chicken	50	KX355642 – KX355691	26-JUNE-2016
2	Mung sprout	50	KX355692 – KX355741	26-JUNE-2016
3	Marine fish	50	KX300038 – KX300086 KY432753	26-JUNE-2016 14-JULY-2017

2. Antibiotic Resistant gene sequences amplified from metagenomic DNA:

No. of genes	Accession Numbers	Publication date on NCBI
13	KY798891-KY798897 KU573047-KU573052	09-MAY-2017 09-FEB-2017

3. Antibiotic Resistant gene sequences amplified from transconjugants:

No. of genes	Accession Numbers	Publication date on NCBI
3	KY924468-KY924470	12-JUN-2017

4. Antibiotic Resistant gene sequences amplified from isolates:

No. of genes	Accession Numbers	Publication date on NCBI
11	KY867437-KY867447	19-APR-2017