DR. ARADHANA MOHANTY, Ph.D.

Dedicated and enthusiastic professional with a progressive experience of 5+ years in Research in Biotechnology and 1+ years in Teaching.

Personal Details:

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Address: Plot No- 252/2, Lane-12, Jagannath Vihar, Baramunda, Bhubaneswar-751003, Odisha, India

Research Experience:

Jul 2019 – May 2025

Junior & Senior Research Fellow
National Institute of Animal Biotechnology (NIAB), Hyderabad, India

Teaching Experience:

1. Assistant Professor in Biotechnology at Centurion University, Bhubaneswar — **Aug 2025 – Feb 2026**
2. Guest Lecturer in Zoology at Ekamra College, Bhubaneswar — **Aug 2018 – Apr 2019**

Educational qualifications:

Jul 2019- May 2025

PhD. Animal Biotechnology

Research Area: **Oocyte attrition and Ovarian aging**

National Institute of Animal Biotechnology, Hyderabad, India

Title of Thesis: Delineating apoptosis independent pathways in postnatal oocyte attrition to delay ovarian aging

MSc. Zoology

Aug 2016-May 2018

Specialization: **Developmental Biology**
PG Department of Zoology, Utkal University, Bhubaneswar, 751004

BSc. Zoology
Ramadevi Women's' Autonomous College, Bhubaneswar, 751002 **July 2013-April 2016**

Publications:

1. **Mohanty, A.,** Kumari, A., Kumar S, L., Kumar, A., Birajdar, P., Beniwal, R., Athar, M., Kumar P, K., & Rao, H. B. D. P. (2025). Cathepsin B Regulates Ovarian Reserve Quality and Quantity via Mitophagy by Modulating IGF1R Turnover. **Aging Cell.** **https://doi.org/10.1111/acel.70066. (IF- 8.0)**
2. **Mohanty, A.**, Singh, A.K., Kumar, S.L., Kumari, Beniwal, R., Kumar, A., Birajdar. P., Athar. M., & Prasada Rao, H.B.D. (2024). NAD+ levels and activation of retrotransposons promote postovulatory aged oocyte (POAO) death. **Cell Death Discovery**. 2024 Feb 28;10(1):104. A.K., **Mohanty, A.,** & Kumar, S.L. **contributed equally,** https://doi.org/10.1038/s41420-024-01876-w. **(IF-6.1)**
3. Kumar, P. K., Kumar, S. L., Silambarasan, V., Athar, M., Kumar, E. A., **Mohanty, A.**, Kumari, A., Birajdar, P., Kumar, A., Sabnam, S., Abhilasha, S., Sharma, G.T., ... & Rao, H.B.D.P. (2025). α-tocopherol deficiency in follicular ovarian cyst (FOCs) follicular fluid (FF) elevates oxidative stress and impairs oocyte maturation. **Free radical biology & medicine**. 2025 Mar 1:229:415-426, **https://doi.org/10.1016/j.freeradbiomed.2025.01.049. (IF-7.1)**
4. Lava Kumar, S., Kushawaha, B., **Mohanty, A.,** Kumari, A., Kumar, A., Beniwal, R., Kiran Kumar, P., Athar, M., Krishna Rao, D., & Rao, H. B. D. P. (2024). Glutathione peroxidase (GPX1) - Selenocysteine metabolism preserves the follicular fluid's (FF) redox homeostasis via IGF-1- NMD cascade in follicular ovarian cysts (FOCs). Biochimica et biophysica acta. Molecular basis of disease, 1870(6), 167235. **https://doi.org/10.1016/j.bbadis.2024.167235. (IF-6.6)**
5. Kumar, S. L., **Mohanty, A.**, Kumari, A., Etikuppam, A. K., Kumar S, R., Athar, M., Kumar P, K., Beniwal, R., Potula, M. M., Gandham, R. K., & Rao, H. B. D. P. (2024). Balanced spatiotemporal arrangements of histone H3 and H4 posttranslational modifications are necessary for meiotic prophase I chromosome organization. **Journal of Cell Physiology**. 2024 Jan 29; *239*(4), e31201, **https://doi.org/10.1002/jcp.31201. (IF-4.5)**
6. Singh, A. K., Kumar, S. L., Beniwal, R., **Mohanty, A.**, Kushwaha, B., & Rao, H. P. (2021). Local DNA synthesis is critical for DNA repair during oocyte maturation. **Journal of Cell Science**. 2021 Oct 1;134(19): jcs257774, **https://doi.org/10.1242/jcs.257774. (IF-4.6)**

Book Chapters:

1. Singh, A.K., Kumar, S.L., Beniwal, R., **Mohanty, A**., Kushwaha, B., & Prasada Rao, H.B.D. (2023). Influence of the Ovarian Reserve and Oocyte Quality on Livestock Fertility. Sustainable Agriculture Reviews 59. Animal Biotechnology for Livestock Production 3, 201-240. **Equal Contribution. https://doi.org/10.1007/978-3-031-21630-5_4**
2. Kushawaha, Bhawna & Beniwal, Rohit & **Mohanty, Aradhana** & Singh, Ajay & Yadav, Rajkumar & Garg, Satish. (2021). Effect of Heavy Metals on Tyrosine Kinases Signaling during Sperm Capacitation. **https://doi.org/10.5772/intechopen.99261.**

Manuscript under review:

1. **Aradhana Mohanty**, Rohit Beniwal, Anjali Kumari, S. Lava Kumar, Ajith Kumar, and H.B.D. Prasada Rao. Zoledronic acid impedes ovarian aging by limiting the TAp63α phosphorylation.

Aradhana Mohanty and Rohit Beniwal **contributed equally.**

2. Lava Kumar, Bhawna Kushawaha, Ranjith Kumar, **Aradhana Mohanty**, Anjali Kumari, Ajith Kumar E, Rohit Beniwal, Kiran Kumar. P, Mohd Athar, Yogendra Kalenahalli, Hemalatha Sanivarapu , and H.B.D. Prasada Rao. Gut dysbiosis-mediated elevated steroid biosynthesis promotes PCOS-like phenotype in postnatal androgen-treated goat models.
3. Anjali Kumari, Kiran Kumar. P, **Aradhana Mohanty,** Abhilasha S.**,** Lava Kumar S., Ajith Kumar E, Mohd Athar, Pravin Birajdar, Akshay Kumar, Silambarasan y, Sahina Sabnam and H.B.D. Prasada Rao. HIPK2 and IKKβ-Driven Phosphorylation Stabilize TAp63α to Preserve the Ovarian Reserve and Protect Against Genotoxic Stress.
4. Lava Kumar, Rohit Beniwal, **Aradhana Mohanty**, Gandham, R. K., and H.B.D. Prasada Rao. SUMO modulates meiotic crossover rates between and within vertebrate species.
5. Kumar Ajith, Lava Kumar S, **Mohanty Aradhana**, Kumari Anjali, Kumar Kiran, Athar Mohd, Birajdar Pravin, Kumar Akshay, S Abhilasha, Y Silambresan, Sabnam Sahina,, and Rao Hanumanthu Prasada. CDK1 promotes RAD51-mediated DNA repair to protect dictyate stage arrested oocytes from genotoxic stress.
6. Pravin Birajdar; Akshay Kumar; Anjali Kumari; **Aradhana Mohanty**; Mohd Athar; Ajith Kumar; Kiran Kumar. P; Abhilasha. S; sahina Sabnam; Silambresan Y; Ankita Verma; Rajendar M; PrasadaRao Hanumanthu. Lipid Droplet Remodeling Safeguards Redox Balance through the DGAT1–PANK2–NRF2 Axis in Mammalian Oocytes.

Awards, Honours, and Professional Recognitions:

1. Qualified Graduate Aptitude Test in Engineering (GATE) in Life Science-2018 **(AIR 245)**
2. Qualified Joint CSIR-UGC NET 2018 **(AIR 63)**
3. **Best Poster award** in "International conference on Chromosome Stability meeting -2022" at IISER, Thiruvananthapuram, India.
4. **Best Oral presentation** in "International Conference on Reproductive Biology, Comparative Endocrinology & Development (ICRBCED) and 39th Annual Meeting of SRBCE-2022" at CSIR-CCMB, Hyderabad, India. ST-39.
5. **2nd Best Oral presentation** in "PhD Mini Symposium – 2022" at National Institute of Animal Biotechnology (NIAB), Hyderabad, India.
6. **Best Oral presentation** in "International conference on Reproductive Health with Emphasis on "Innovations in Reproductive Sciences and Technologies: Hope, Risk and Responsibilities (ISSRF 2023)" at Ravenshaw University Convention Center, Cuttack, Odisha, India.
7. **Best Oral presentation** in "PhD Mini Symposium – 2023" at National Institute of Animal Biotechnology (NIAB), Hyderabad, India.

Hands on technique:

1. **Animal cell culture:** Maintaining and freezing of different cell lines, Cell transfection using Lipofectamine-2000/3000 for siRNA and Plasmid DNA, knockdown/overexpression.
2. **Proteomics:** Mass spectrometry of Mice and Goat tissue samples, Analysis using Proteome Discover, FunRich, ClustVis software.
3. **Microscopy:** Basic as well as high end microscopy, Confocal Microscopy, Image analysis using

ImageJ, ZEN, NIS ELEMENTS

4. **Experimental animal handling:** C57BL/6J mice, Balb/C, FVB, CD1 for generation of knock out mice, Intraperitoneal injection, Oral gavaging, Surgery (Vasectomy, Ovectomy), 3D culture of Goat ovary.
5. **Histology:** Paraffin block and slide preparation from in vivo and patient tissue samples, Analysis of different apoptotic proteins by immunohistochemistry, DNA, RNA and Protein isolation from animal tissue and further experimental analysis.
6. **Oocyte and Embryo handling:** Isolation of Oocytes, Embryos, In- Vitro maturation (IVM), In-Vitro Fertilization (IVF), Microinjection in embryos by micromanipulation.
7. **Cloning and Molecular biology:** Cloning, Gene Knock-in and knock out, CRISPR/Cas9 and gene editing, Nucleic acid isolation, purification and estimation, Agarose gel electrophoresis, Primer designing, PCR, RT-PCR.
8. **Mitophagy related assay:** Detection of mitophagy by confocal microscopy, western blotting.

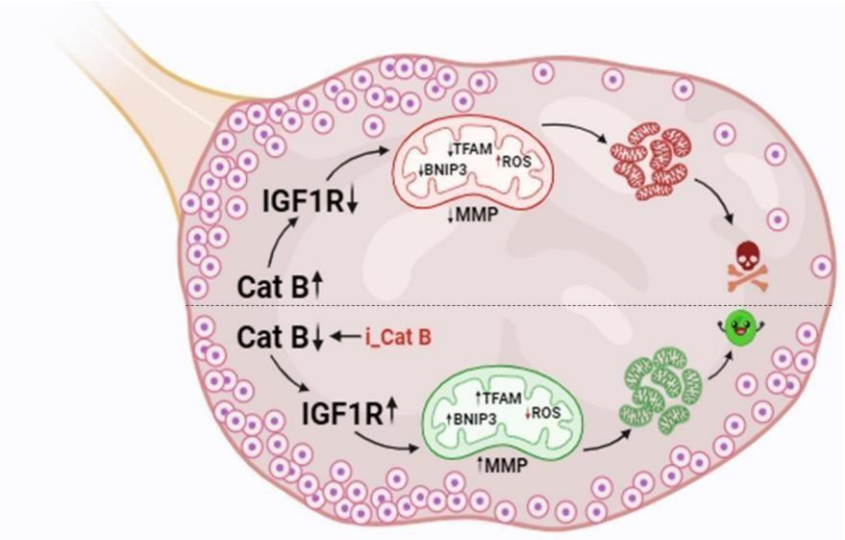
Professional Training/Workshops:

1. Trained the students of Osmania University, Hyderabad, India on oocyte culture, embryo isolation and culture, micromanipulation for genetic modifications.
2. Workshop training on Microsoft
3. Workshop training on IHC and ICC

Doctoral Research Summary:

India indeed relies heavily on agriculture, and livestock rearing is a significant component of the agricultural sector. Livestock contributes to the livelihoods of millions of people in rural areas and plays a crucial role in providing food, dairy, and other products for both domestic consumption and export. Despite having the world's largest livestock reserves, India faces challenges related to livestock fertility and productivity that result in the loss of millions of rupees annually. Infertility is one of the major reproductive problems in livestock where age dictates the fertility lifespan in female. One of the key factors contributing to infertility in animals is the decline of ovarian reserves. Ovarian reserve represents the number and quality of oocytes left in the ovaries at any moment that have the potential to be fertilized and lead to a successful pregnancy. This reduction in the number of oocytes is called oocyte atresia. Although three theories exist regarding the death of oocytes, apoptosis is the only death pathway recognized for its role in maintaining the ovarian reserve. However, the extent to which other cell death pathways are involved in this process remains unclear. Therefore, this study, tried to delineate the mechanisms of the apoptosis-independent pathways in oocyte death. Employing chemical genetics and proteomics, this study reveals the existence of apoptosis-independent oocyte death pathways in mice. Inhibition of apoptosis or autophagy pathways significantly increases follicle numbers, suggesting both pathways play crucial roles in oocyte attrition. Through proteomics analysis, weobserved a dynamic shift from apoptosis to autophagy throughout follicular development and Cathepsin B has been identified as a significant factor in orchestrating this transition. Further, we found that inhibiting Cathepsin B replenishes the oocyte reserves in a dose-response manner up to the late age of the animal. This inhibition of Cathepsin B protects ovarian reserve through the autophagy pathway by upregulating the IGF1R and AKT-mTOR pathways. Surprisingly, Cathepsin B inhibition leads to a notable increase in the IGF1R level and in vitro data suggest that IGF1R undergoes Cathepsin B dependent degradation. Additionally, the protective effects of Cathepsin B inhibition on oocyte reserves are partially compromised when IGF1R inhibition is introduced, indicating their interdependence. Furthermore, this elevated IGF1R level maintains

the ovarian reserve by modulating mitochondrial turnover. Finally, this Cathepsin B-dependent ovarian reserve maintenance mechanism is found to be conserved in higher-order vertebrates. Cumulatively, this study showed the importance of autophagy and Cathepsin B in maintaining ovarian reserve that will pave the way to delay ovarian aging in livestock species.



Teaching Statement:

I have had the privilege of teaching both theory and practical courses to higher secondary, undergraduate, and postgraduate students during my tenure as an Assistant Professor at Centurion University and as Guest Faculty in Zoology at Ekamra College. My teaching experience also extends throughout my PhD research period, where I was actively involved in mentoring and research training. I have delivered theory courses in Genetics, Molecular Biology, Biochemistry, Cell Biology, Developmental Biology, Animal Physiology, and Biotechnology. Alongside classroom teaching, I have consistently emphasized practical training to help students bridge conceptual understanding with experimental application. Mentoring postgraduate students during my PhD has been particularly rewarding, as I guided them in their academic development and early research endeavours. I worked closely with my PhD supervisor in planning lectures and organizing short-term research training programs. I actively contributed to these programs by providing both theoretical and hands-on training to postgraduate students from Osmania University during their annual visits to our institute. These sessions focused on advanced topics such as transgenic mouse generation, oocyte and embryo development using mouse models, and related experimental techniques. Additionally, I participated in SERB-sponsored workshops, contributing to sessions on microscopy, immunohistochemistry, and cytochemistry. As a faculty member, I aspire to contribute not only to high-quality research but also to a dynamic and inclusive teaching environment. I am deeply committed to mentoring undergraduate and graduate students, fostering intellectual curiosity, and integrating research-led teaching approaches to enhance learning outcomes. My enthusiasm for teaching stems from a profound passion for life sciences and a desire to inspire the next generation of biologists. I believe that effective science education extends beyond the classroom. It should encourage students to think critically, apply theoretical concepts to real-world challenges, and develop strong problem-solving skills. My teaching philosophy centres on experiential learning - promoting interactive discussions, hands-on laboratory experiences, and collaborative projects. Through personalized mentorship and constructive feedback, I aim to cultivate scientific reasoning, independence, and a sustained interest in research. To me, teaching is not merely a professional responsibility but a meaningful opportunity to shape thoughtful, innovative, and socially responsible scientists who can contribute significantly to both academia and society.