

Dr. Dipika Ramdas Kalambhe, Ph.D.

Molecular & Cellular Biology · Murine In Vivo Models · Gene and Protein Expression Analysis

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RESEARCH PROFILE

Experimental biologist (Ph.D.) with eight years of wet-lab research at the Shanghai Institute of Materia Medica, Chinese Academy of Sciences, spanning molecular biology, cell biology and in vivo work in murine models — with a doctoral project carried independently from hypothesis to published mechanism.

Mechanistic work centred on how gene and protein expression changes drive cell behaviour: established that a combination therapy induced apoptosis while suppressing both epithelial–mesenchymal transition and vasculogenic mimicry, using Western blot, RT-qPCR, ELISA, flow cytometry, immunofluorescence and immunohistochemistry to build the evidence. Published as joint first author in *Acta Pharmacologica Sinica*.

Ran the complete in vivo programme unaided — study design and animal ethics approval, dosing and route selection, longitudinal monitoring, biodistribution, terminal tissue collection, histopathology and organ-toxicity assessment — across multi-arm studies in orthotopic and metastatic murine models.

Seven peer-reviewed papers — three as first or joint first author — attracting 324 citations (h-index 3, Google Scholar, July 2026), and one filed Indian patent. Funded throughout the doctorate by two competitive international fellowships.

LABORATORY TECHNIQUES & CORE COMPETENCIES

Molecular biology & immunoassay Western blot · RT-qPCR · ELISA · Flow cytometry · Immunohistochemistry · Immunofluorescence · Protein expression analysis · Gene expression analysis

Cell biology & in vitro assays Mammalian & primary cell culture · Macrophage culture & polarisation · Cell viability / MTT & CCK-8 · Colony formation · Wound healing · Transwell migration & invasion · Apoptosis assays · Cellular uptake studies

In vivo / preclinical Murine tumour models (orthotopic & metastatic) · Study design & animal ethics protocols · Dosing & route selection · Tumour growth monitoring · Biodistribution studies · Tissue harvest & processing · Histopathology · Organ toxicity evaluation

Analytical & imaging Dynamic light scattering (DLS) · Zeta potential · TEM · SEM · Confocal laser scanning microscopy · Fluorescence microscopy · HPLC · UV–Visible spectroscopy · Fluorescence spectroscopy

Cancer & tumour biology Triple-negative breast cancer · Tumour immune microenvironment · Epithelial–mesenchymal transition (EMT) · Vasculogenic mimicry · Metastasis & invasion · Apoptosis · Cell signalling pathways · Immune modulation · Therapeutic resistance

Cancer nanomedicine & drug delivery Nanoparticle design & formulation · Nanocarrier optimisation · Mesoporous polydopamine carriers · Pickering emulsions · Co-delivery / combination therapeutics · Drug loading & encapsulation efficiency · Controlled & sustained release · Colloidal stability assessment · Ligand-mediated active targeting · Thermosensitive hydrogels · Transdermal delivery systems · Lipid-based nanocarriers · Liposomes

Professional & research practice Experimental design · Scientific writing & manuscript preparation · Systematic literature & prior-art review · Statistical analysis · Data interpretation · Research documentation & record integrity · Patent drafting support · Peer review support · Project management · Cross-functional collaboration · Mentoring & training

RESEARCH EXPERIENCE

Doctoral Research Scholar — Pharmaceuticals & Cancer Nanomedicine

Sept 2017 – 2025

Shanghai Institute of Materia Medica, Chinese Academy of Sciences — Shanghai, China

Doctoral project: *Co-delivery system of shikonin and JQ1 for experimental treatment of triple-negative breast cancer*

- Interrogated the molecular mechanism of a combination therapy across four independent axes — apoptosis, epithelial–mesenchymal transition, vasculogenic mimicry and tumour immune microenvironment remodelling — using Western blot, RT-qPCR, ELISA, flow cytometry, immunofluorescence and immunohistochemistry.
- Established that the treatment suppressed primary tumour growth and lung metastasis in triple-negative breast cancer models, and traced the effect to specific changes in protein and gene expression rather than to cytotoxicity alone.
- Designed and executed the full in vivo programme independently: study design and animal ethics approval, dosing and route selection, tumour growth and body-weight monitoring, biodistribution, terminal tissue collection, histopathology and organ-toxicity evaluation.

- Maintained mammalian and primary cell culture, including macrophage culture and polarisation, and ran viability, colony formation, wound healing, transwell migration and invasion, apoptosis and cellular uptake assays.
- Applied confocal laser scanning and fluorescence microscopy to localise labelled material within cells and tissue sections, and prepared and stained tissue for histological reading.
- Designed the nanoscale delivery system that made the study possible — a mesoporous polydopamine Pickering emulsion co-loading two agents with incompatible solubility — and characterised it by DLS, zeta potential, TEM, SEM, HPLC and UV–Vis.
- Published seven peer-reviewed papers over the doctoral period (324 citations, h-index 3) and presented at five national scientific meetings.
- Mentored Master's and undergraduate students in experimental design, cell-based assay technique and data analysis, and collaborated across a multidisciplinary institute with molecular biologists, oncologists, immunologists and pharmaceutical scientists.

EDUCATION

Ph.D. in Pharmaceutics (Integrated M.S.–Ph.D. programme)

Sept 2017 – 2025

Shanghai Institute of Materia Medica, Chinese Academy of Sciences, Shanghai, China

- CGPA 3.92 / 4.00
 - Thesis: “Co-delivery system of shikonin and JQ1 for experimental treatment of triple-negative breast cancer”
 - Supervisor: Prof. Yongzhuo Huang
- Fully funded by the Belt and Road Government Fellowship (China Scholarship Council) and the ANSO Young Talent Fellowship.

Master of Pharmacy (M.Pharm), Pharmaceutics

2014 – 2016

Guru Nanak College of Pharmacy, RTM Nagpur University, Nagpur, India

- Thesis: “Formulation and evaluation of a transdermal patch of flavonoid-rich extract from *Curcuma longa*”
- Supervisor: Dr. Amar Deshpande

Bachelor of Pharmacy (B.Pharm)

2010 – 2013

Dadasaheb Balpande College of Pharmacy, RTM Nagpur University, Nagpur, India

Diploma in Pharmacy (D.Pharm)

2008 – 2010

K. D. Pawar College of Pharmacy, Maharashtra State Board of Technical Education, Maharashtra, India

PUBLICATIONS

7 peer-reviewed publications · 3 as first or joint first author · 324 citations · h-index 3 (Google Scholar, July 2026)

1. Xu, X.-Y., Kalambhe, D. R. **, Yu, Y., Yu, L.-X., Gu, Z.-W., Jin, X.-Y., Wang, H.-Y., & Huang, Y.-Z. (2025). Co-delivery of shikonin and JQ1 inhibits triple-negative breast tumor progression and lung metastasis through inhibition of epithelial–mesenchymal transition and vasculogenic mimicry. *Acta Pharmacologica Sinica*, 46(12), 3314–3326.
Research Article · Joint first author (equal contribution) · 3 citations · doi:10.1038/s41401-025-01605-8
2. Kalambhe, D. R., Asrorov, A. M., Mukhammedov, N., Huang, Y., Wu, A., & Zhao, P. (2026). Nanotechnology-based shikonin delivery strategies for modulating the tumor immune microenvironment efficacy. *Drug Delivery and Translational Research*, 16(1), 1–16.
Review · First author · 1 citations · doi:10.1007/s13346-025-01943-4
3. Kalambhe, D. R., Shelke, O. S., Deshpande, A. H., & Huang, Y. (2026). In-vitro efficacy and in-vivo safety study of a transdermal formulation containing flavonoid-rich extract from *Curcuma longa* L.. *Journal of Pharmaceutical Innovation*, 21(1), Art. 44.
Research Article · First author · 1 citations · doi:10.1007/s12247-025-10169-3
4. Zhao, Y., Yang, Y., Zhang, J., Wang, R., Cheng, B., Kalambhe, D., Wang, Y., Gu, Z., Chen, D., Wang, B., & Huang, Y. (2020). Lactoferrin-mediated macrophage targeting delivery and patchouli alcohol-based therapeutic strategy for inflammatory bowel diseases. *Acta Pharmaceutica Sinica B*, 10(10), 1966–1976.
Research Article · 110 citations · doi:10.1016/j.apsb.2020.07.019
5. Zhang, J., Zhao, Y., Hou, T., Zeng, H., Kalambhe, D., Wang, B., Shen, X., & Huang, Y. (2020). Macrophage-based nanotherapeutic strategies in ulcerative colitis. *Journal of Controlled Release*, 320, 363–380.
Review · 171 citations · doi:10.1016/j.jconrel.2020.01.047
6. Rahman, M. H., Liza, N. Y., Hossain, K. R., Kalambhe, D. R., Shyeed, M. A., & Noor, D. H. (2024). Additive manufacturing in nano drug delivery systems. *Pharmaceutical Science Advances*, 2, Art. 100036.
Review · 37 citations · doi:10.1016/j.pscia.2024.100036
7. Hossain, K. R., Kalambhe, D. R., Jalil, M. A., & Farah, N. T. (2025). Research progress of 3D printing technology in the field of oral materials. *Pharmaceutical Science Advances*, 3, Art. 100093.
Review · 2 citations · doi:10.1016/j.pscia.2025.100093

RESEARCH INTERESTS

- Nano-enabled combination therapeutics for aggressive and treatment-resistant solid tumours
- Remodelling the tumour immune microenvironment through targeted delivery
- Post-surgical and adjuvant nanotherapeutics to prevent recurrence and metastasis
- Overcoming delivery barriers for poorly soluble natural products and epigenetic inhibitors
- Translationally scalable nanocarrier platforms and their manufacturability
- Macrophage-targeted delivery for immune-mediated disease

PATENT

Single-use transdermal delivery of turmeric flavonoid fraction for acne treatment

Indian Patent Application No. 202421042057 · Filed 2024

FELLOWSHIPS & AWARDS

ANSO Young Talent Fellowship

Alliance of International Science Organizations

2020 – 2025

Belt and Road Government Fellowship

China Scholarship Council

2017 – 2020

CONFERENCE PRESENTATIONS

Poster presentation — MSME National Conference, Mumbai

2014

Poster presentation — ETHNOPHARMA, Nagpur

2015

Oral presentation — JIGYASA National Research Convention

2016

Poster presentation — ETHNOPHARMA, Raipur

2016

Poster presentation — IFDA Conference, Nagpur

2016

TEACHING, MENTORING & PROFESSIONAL SERVICE

- Scholar Council Member — Eterno Press
- Peer reviewer support and manuscript appraisal within doctoral research group
- Mentor to Master's and undergraduate research students, Shanghai Institute of Materia Medica

CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

- Executive Certificate in Global Academic Writing & Research Services
- Remote Freelancing and Profile Building Programme
- Scholar Council Member — Eterno Press

LANGUAGES

English — Full professional proficiency — eight years of research, publication and presentation in English

Hindi — Native / bilingual proficiency

Marathi — Native proficiency

Mandarin Chinese — Conversational — eight years resident in Shanghai

REFEREES

Prof. Yongzhuo Huang (doctoral supervisor, Shanghai Institute of Materia Medica, CAS) and Dr. Amar Deshpande (M.Pharm supervisor, RTM Nagpur University). Full contact details and reference letters available on request.