Dr. Dipika Ramdas Kalambhe, Ph.D.

Cancer Nanomedicine · Targeted Drug Delivery · Tumour Immune Microenvironment

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RESEARCH PROFILE

Pharmaceutical scientist with eight years of doctoral and postgraduate research in cancer nanomedicine, completed at the Shanghai Institute of Materia Medica, Chinese Academy of Sciences — China's leading drug discovery institute. Research centres on rationally designed nanocarriers that deliver two synergistic agents at once to remodel the tumour immune microenvironment and suppress metastasis.

Doctoral work produced a mesoporous polydopamine-based Pickering emulsion co-delivering shikonin and the BET bromodomain inhibitor JQ1, which suppressed primary tumour growth and lung metastasis in triple-negative breast cancer models by inducing apoptosis and blocking both epithelial–mesenchymal transition and vasculogenic mimicry. The formulation was further incorporated into a thermosensitive hydrogel placed at the resection site to limit post-surgical recurrence. Published as joint first author in Acta Pharmacologica Sinica.

Seven peer-reviewed papers — three as first or joint first author — in journals including Journal of Controlled Release, Acta Pharmaceutica Sinica B and Acta Pharmacologica Sinica, attracting 324 citations (h-index 3, Google Scholar, July 2026). One Indian patent filed on a transdermal botanical formulation. Independently funded throughout by two competitive international fellowships (ANSO Young Talent; Belt and Road Government Fellowship).

Full-stack experimental capability — formulation design and physicochemical characterisation, molecular and cell biology, and in vivo efficacy, biodistribution and toxicology in murine tumour models — allowing a project to be carried from formulation concept to preclinical proof of concept without handoff.

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

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

RESEARCH EXPERIENCE

Doctoral Research Scholar — Pharmaceutics & 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

- Designed and optimised a mesoporous polydopamine-based Pickering emulsion for simultaneous delivery of shikonin (a naphthoquinone natural product) and JQ1 (a BET bromodomain inhibitor), resolving the incompatible solubility and release requirements of the two agents in one carrier.
- Demonstrated that the co-delivery system suppressed primary tumour growth and lung metastasis in triple-negative breast cancer models, and established the mechanism as apoptosis induction combined with blockade of epithelial–mesenchymal transition and vasculogenic mimicry.
- Interrogated the mechanism across EMT, vasculogenic mimicry, apoptosis and tumour immune microenvironment remodelling using Western blot, RT-qPCR, ELISA, flow cytometry, immunofluorescence and immunohistochemistry.
- Ran the full in vivo programme independently — study design and animal ethics approval, dosing and administration, tumour growth and body-weight monitoring, biodistribution, terminal tissue collection, histopathology and organ-toxicity evaluation.
- Extended the platform to post-surgical use by incorporating the emulsion into a thermosensitive hydrogel intended to limit post-resection recurrence and metastatic outgrowth.
- Contributed to the group's macrophage-targeted nanomedicine programme, including lactoferrin-modified liposomes directed at LRP-1 on activated macrophages — work that has since accumulated over 280 citations.
- Published seven peer-reviewed papers over the doctoral period (324 citations, h-index 3) and presented findings at institute seminars, laboratory meetings and national conferences.
- Mentored Master's and undergraduate students in nanoparticle formulation, cell-based assay design, experimental planning and data analysis.
- Collaborated across a multidisciplinary institute with pharmaceutical scientists, molecular biologists, oncologists and immunologists, and co-authored review articles on macrophage-targeted nanotherapeutics and additive manufacturing in drug delivery.

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. 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

5. 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

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

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 2020 – 2025
Alliance of International Science Organizations
Competitive international fellowship supporting doctoral research at Chinese Academy of Sciences institutes.

Belt and Road Government Fellowship 2017 – 2020
China Scholarship Council
Full doctoral scholarship awarded to international scholars at CAS institutes.

CORE COMPETENCIES

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

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

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

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

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

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

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

PHARMACY PRACTICE & INDUSTRY EXPERIENCE

Hospital Pharmacist 2020 – 2022
Shravan Multispeciality Kidney Hospital, Nagpur, India
Undertaken in India during COVID-19 border closures, while doctoral thesis work continued remotely.

- Dispensed and reviewed prescriptions for nephrology, dialysis and general inpatients, including dose checks and interaction screening for renally cleared medicines.
- Counselled patients and carers on administration, adherence, storage and expected adverse effects.

Hospital Pharmacist 2013 – 2014

Shravan Multispeciality Kidney Hospital, Nagpur, India

- Delivered day-to-day inpatient and outpatient dispensing in a multispeciality nephrology hospital.
- Maintained dispensing records, controlled-drug registers and inventory documentation.

Industrial Trainee (Intern) 2013

Shree Baidyanath Ayurved Bhawan Pvt. Ltd., Nagpur, India

- Rotated through formulation, production and quality control in an established ayurvedic manufacturing facility.

CERTIFICATIONS & PROFESSIONAL DEVELOPMENT

- Executive Certificate in Global Academic Writing & Research Services
- Remote Freelancing and Profile Building Programme

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.