

Dr. Dipika Ramdas Kalambhe, Ph.D.

Formulation Development · Nanoparticle Drug Delivery · Preclinical Drug Product Development

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PROFILE

Formulation and drug delivery scientist (Ph.D. Pharmaceuticals) specialising in nanoparticle and colloidal drug products — mesoporous carriers, Pickering emulsions, thermosensitive hydrogels and transdermal systems — with eight years' hands-on development experience at the Shanghai Institute of Materia Medica, Chinese Academy of Sciences.

Developed a mesoporous polydopamine-based Pickering emulsion co-encapsulating two chemically dissimilar actives, optimising drug loading, encapsulation efficiency, particle size distribution, colloidal stability and controlled-release profile — then carried the lead formulation through full in vivo efficacy, biodistribution and organ-toxicity evaluation and into a thermosensitive hydrogel dosage form.

Owns the complete analytical toolkit for nanoparticulate drug products: DLS and zeta potential, TEM and SEM, HPLC and UV–Vis assay and release testing, fluorescence spectroscopy and confocal imaging. Comfortable moving between formulation bench, analytical characterisation and in vivo study execution.

Named inventor on a filed Indian patent for a single-use transdermal delivery system, and lead author on seven peer-reviewed papers. Earlier hospital pharmacy practice gives working familiarity with how a product is actually dispensed, stored and used at the point of care.

TECHNICAL SKILLS & 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

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

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

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

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 & DEVELOPMENT 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*

- Developed nanoparticle and colloidal formulations — a mesoporous polydopamine Pickering emulsion and a thermosensitive hydrogel — co-encapsulating two chemically dissimilar actives, systematically optimising carrier composition, drug ratio, drug loading, encapsulation efficiency and process parameters.
- Characterised every formulation batch against a defined specification set — particle size and polydispersity by DLS, surface charge by zeta potential, morphology by TEM and SEM, assay and in vitro release by HPLC and UV–Vis spectroscopy.
- Established colloidal and chemical stability profiles across storage conditions and screened controlled-release behaviour in physiologically relevant media to support formulation selection.
- Carried the lead candidate through the full preclinical package: in vitro potency across breast cancer cell lines, in vivo efficacy in murine tumour models, biodistribution, and organ-toxicity and histopathology assessment.
- Built the mechanistic data package supporting the product rationale using Western blot, RT-qPCR, ELISA, flow cytometry and confocal imaging.

- Filed an Indian patent application on a single-use transdermal delivery system, taking the formulation from concept through in vitro efficacy and in vivo safety evidence to filing.
- Authored and co-authored seven peer-reviewed papers, including reviews on additive manufacturing in nano drug delivery and 3D printing for oral dosage materials.
- Trained and supervised junior researchers in formulation and characterisation technique, and maintained experimental documentation to a standard supporting external publication and patent filing.

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.
- Counselling 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.

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

PATENT

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

Indian Patent Application No. 202421042057 · Filed 2024

- Sole/lead inventor contribution: formulation design, in vitro efficacy and in vivo safety evidence, prior-art review and technical drafting support.

SELECTED PUBLICATIONS

7 of 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.**, 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
3. **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
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. 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
6. 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
7. 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

FELLOWSHIPS & AWARDS

ANSO Young Talent Fellowship

2020 – 2025

Alliance of International Science Organizations

Belt and Road Government Fellowship

2017 – 2020

China Scholarship Council

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.