

# DHWANI RANA

Ahmedabad, Gujarat, India | 7984146745

[LinkedIn Profile](#) | [dhwanirana73@gmail.com](mailto:dhwanirana73@gmail.com)

## SUMMARY

I attribute an insatiable desire to knowledge, aiming to extend the boundaries of my knowledge and be a part of the fast-growing scientific community by contributing to its development through employing my skills. My constant urge to learn, explore, and a desire to be a part of the pharmaceutical niche by contributing to its development have been instrumental in kindling an interest in me in the area of Pharmaceuticals. My objective lies in taking up a research-oriented career in the rapidly excelling field of Pharmaceutical Sciences.

## ACADEMIC DETAILS

**2021-Current**    PhD in Pharmaceutics from National Institute of Pharmaceutical Research (NIPER), Ahmedabad with **10 CGPA** in the course work

**2019-2021**        **M.S. (Pharm.)** in Pharmaceutics from National Institute of Pharmaceutical Research (NIPER), Ahmedabad with **9.7 CGPA**

I explored the art of formulation development and studied core subjects like Pharmaceutical Preformulation, Biopharmaceutics and Pharmacokinetics, Global Regulatory considerations for Pharmaceutical Product Development, Advanced Analytical Techniques in Pharmaceutical R&D, Biostatistics, Fundamentals of Intellectual Property Rights, Controlled Drug Delivery Systems, Targeted Drug Delivery Systems, Solid State Pharmaceutics, Models for Testing of Drug Delivery System, Pharmaceutical Product Development, Pharmacological Screening and Assays.

Apart from this, the journey throughout made me develop traits like perseverance, excellent communication and delivering skills, and leadership skills as a part of extracurricular activities.

**2015-2019**        **Bachelor of Pharmacy** from L. M. College of Pharmacy under Gujarat Technological University with **8.34 CGPA**

During my graduation studies, I was exposed to subjects like Pharmaceutics, Pharmaceutical Analysis, Pharmaceutical Chemistry, Medicinal Chemistry, Organic Chemistry, Dosage form Design, Pharmaceutical Technology, Pharmacology and Toxicology, Forensic Pharmacy, Pharmaceutical Jurisprudence, Physical Pharmacy, Inorganic Chemistry, Pharmacognosy, Clinical Pharmacy. Along with this, I also studied Basics of Computer Application and undertook Contributor Personality Development course. I have also imbibed myself with the current advances in Pharmacy and Novel Drug Delivery Systems. I was given strong foundation in core subjects that have

provided commendable groundwork for my advanced study and honed my laboratory skills in these areas.

**Year: 2014**      **Higher Secondary Education** (Grade: XII) from Little Flowers Higher Secondary School, Dahod under Gujarat Secondary and Higher Secondary Education Board with **82.85%**

**Year: 2012**      **Secondary Education** (Grade: X) from Little Flowers Secondary English Medium School, Dahod under Gujarat Secondary Education Board with **90%**

## CORE COMPETENCIES

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- Formulation Development- Systematic product development employing Quality by Design driven approach for quality risk management
- Excipient compatibility study, pre-formulation studies, reverse engineering
- Good hands-on experience in instrument handling such as High-Performance Liquid Chromatography (HPLC), Zeta sizer, Rotary Evaporator, UV- visible spectrophotometer Ultracentrifuge, FT-IR Spectrophotometer, High Pressure Homogenizer (HPH), Hot Melt Extrusion (HME), Rheometer
- Skilled in tissue culture techniques and animal handling

## SOFTWARE SKILLS

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- Proficient in Microsoft Office systems: Word, PowerPoint, Excel, Publisher, Outlook
- Statistical software: Design Expert, Chemdraw, GraphPad Prism, OriginPro, DDSolver
- Thorough understanding of software useful for literature survey and citations: SciFinder, Scopus, EndNote, Mendeley

## PROJECT EXPERIENCE

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- Currently exploring novel compositions for the development of ophthalmic inserts using hot melt extrusion (HME) and CaliCut technology.
- Worked on peptide delivery and developed Teriparatide loaded nanoliposomes employing QbD approach for the treatment of osteoporosis followed by *in-vitro* characterization of the developed formulation.
- Formulated an intranasal delivery system of almotriptan malate using the Quality-by-Design (QbD) approach followed by its pharmacokinetic evaluation for the treatment of migraine.
- Fabricated an implantable electrospun nanofiber composite for ocular delivery of levofloxacin using unique polymeric blend. Also, developed polymeric ocular of dexamethasone employing the same technique.
- Worked on the development of iron-sucrose complex, hydrophobic ion pairing of small and large molecules, lactose free milk powder using resin exchange and spray drying techniques.
- Developed microemulsion of dexamethasone and amorphous solid dispersion of budesonide.

## ACHIEVEMENTS

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- **Khorana Scholar 2020**
- Honored with Khorana Scholar Award in March 2020 by Department of Biotechnology (DBT), Govt. of India, WINStep Forward, and the Indo-U.S. Science and Technology Forum (IUSSTF).

- Selected to work in the lab of Dr. Abu Serajuddin at St. John's University, NY, United States, focusing on solubility enhancement techniques aimed at Hot Melt Extrusion.
- Received **Dr. B. K. Bacchawat Award** for Third Prize for Pre-Clinical Poster Presentation at the 13<sup>th</sup> International Annual Conference of SAC-ACCP.
- Awarded the **Silver Medal** and cash prize of 21,000 INR at the Indian Pharmaceutical Congress (IPC)-2023 for Shri B.V. Patel Essay Competition-2023 on the subject "Increasing role and importance of advanced technologies like artificial intelligence, block chain technology, 3-D printing in drugs and pharmaceutical industries".

## KEY ATTRIBUTES

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- Language proficiency: English, Hindi, Gujarati
- Scientific writing
- Communication (written and verbal)
- Critical thinking and trouble shooting
- Team work and leadership
- Documentation, organizing, and ability to prioritize task
- Project planning, implementation, and reporting
- Focused and active listener
- Resilient, empathetic, adaptive, and perseverant

## DISTINCTIVE HIGHLIGHTS AND CERTIFICATION

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- Graduate Pharmacy Aptitude Test (GPAT)- All India Rank 210
- NIPER-JEE- All India Rank 120
- Lean Six Sigma White Belt by Management and Strategy Institute, Certification ID 52481718
- e-Tutorial on Using Patent Information (DL-177) by World Intellectual Property Organization- WIPO, Credential B1bf8gTs9n
- IP Intern at Excelon IP- Patent and Trademark Attorney (August 2020)
- Diploma in Psychology by Alison, Credential ID 1251-15511578
- Awarded first position in the event "Shastrath (Debate)" Program held at by L. M. College of Pharmacy during the academic year 2018-19. Secured second position in event "Race of hope: Problem Solving" organized by L. M. College of Pharmacy on 8<sup>th</sup> March, 2019
- Underwent training in "Brand Management" at Accurate Pharmaceuticals from 20 May to 20 June, 2019
- Volunteered in TEDx LM College of Pharmacy held on 25th April, 2018
- Attended several national and international conferences, workshops, seminars, webinars in the field of Pharmaceutical Science

## PUBLICATIONS

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### Research Articles

1. **Rana D**, Beladiya J, Sheth D, Salave S, Sharma A, Jindal AB, et al. Precise Fabrication of Ocular Inserts Using an Innovative Laser-Driven CaliCut Technology: In Vitro and In Vivo Evaluation. J Pharm Sci. 2023.

2. **Rana D**, Salave S, Jain S, Shah R, Benival D. Systematic Development and Optimization of Teriparatide Loaded Nanoliposomes Employing Quality by Design Approach for Osteoporosis. *Journal of Pharmaceutical Innovation*, 1-15.
3. S Longre, **D Rana**, S Rangra, AB Jindal, S Salave, J Vitore, D Benival. Quality-by-Design Based Development of Doxycycline Hyclate–Loaded Polymeric Microspheres for Prolonged Drug Release. *AAPS PharmSciTech* 25 (3), 49.
4. R Agarwal, **D Rana**, S Salave, D Benival. Dexamethasone Loaded Electrospun Nanocomposite Ocular Insert: In-vitro Drug Release and Mechanical Assessment. *Current Nanomedicine (Formerly: Recent Patents on Nanomedicine)* 12 (2), 150-158.
5. S Sangole, S Salave, **D Rana**, S Shah, TP Medhe, D Benival. Electrospun Nanofiber Composite for Levofloxacin in Ocular Drug Delivery. *Pharmaceutical Nanotechnology* 10 (5), 393-400.
6. S Gupta, A Perla, A Roy, JG Vitore, B K, S Salave, **D Rana**, A Sharma. In Vivo Evaluation of Almotriptan malate Formulation through Intranasal Route for the Treatment of Migraine: Systematic Development and Pharmacokinetic. *AAPS PharmSciTech* 24 (1), 32.
7. S Salave, **D Rana**, H Kumar, N Kommineni, D Benival. Anabolic Peptide-Enriched Stealth Nanoliposomes for Effective Anti-Osteoporotic Therapy *Pharmaceutics* 14 (11), 2417.
8. S Salave, SD Shinde, **D Rana**, B Sahu, H Kumar, R Patel, D Benival. Peptide Engraftment on PEGylated Nanoliposomes for Bone Specific Delivery of PTH (1-34) in Osteoporosis. *Pharmaceutics* 15 (2), 608.
9. S Salave, **D Rana**, D Benival. Encapsulation of anabolic peptide in lipid nano vesicles for osteoporosis. *Current Protein and Peptide Science* 23 (7), 495-503.
10. S Salave, **D Rana**, D Benival. Peptide functionalised nanocarriers for bone specific delivery of PTH (1-34) in osteoporosis. *Current Nanomedicine (Formerly: Recent Patents on Nanomedicine)* 11 (3), 142-148.
11. J Ajinkya, S Salave, **D Rana**, D Benival. Development and *In-vitro* Evaluation of Dexamethasone Enriched Nanoemulsion for Ophthalmic Indication. *Drug Delivery Letters*. 13 (3), 17.

### **Book Chapters**

12. **D Rana**, R Gupta, K Bharathi, R Pardhe, NK Jain, S Salave, R Prasad, D Benival, N Kommineni. Porous Silica Nanoparticles for Targeted Bio-Imaging and Drug Delivery Applications. *Nanomaterials in Healthcare*, 133-153.
13. **D Rana**, S Salave, R Patel, D Khunt, M Misra, B Prajapati, G Patel, J Patel. Solid Lipid Nanoparticles in Tuberculosis. *Tubercular Drug Delivery Systems: Advances in Treatment of Infectious Diseases*, 99-121.
14. S Salave, **D Rana**, P Patel, R Gupta, D Benival, N Kommineni. Development of generic liposome products for drug delivery. *Liposomes in Drug Delivery*, 613-634.
15. S Salave, **D Rana**, A Bodar, D Khunt, B Prajapati, J Patel. Viral Infections: Current Treatment Options. *Viral Drug Delivery Systems: Advances in Treatment of Infectious Diseases*, 65-89.
16. S Salave, **D Rana**, D Benival, A Jain. Decoding Artificial Intelligence in Neuroscience: Applications Beyond Diagnosis. *Current Indian Science*.
17. **D Rana**, R Patel, A Sharma, S Salave, D Benival. Mixing and Filtration. *Pharmaceutical Process Engineering and Scale-up Principles*, 113-130.
18. R Patel, S Salve, **D Rana**, A Sharma, K Bharathi, S Salave, D Benival. Rapid Mixer Granulator. *Pharmaceutical Process Engineering and Scale-up Principles*, 41-54.

19. S Salave, **D Rana**, A Sharma, K Bharathi, R Gupta, S Khode, D Benival, N Kommineni. Polysaccharide based implantable drug delivery: Development strategies, regulatory requirements, and future perspectives. *Polysaccharides* 3 (3), 625-654.
20. N Desai, S Pande, AD Gholap, **D Rana**, S Salave, LK Vora. Regulatory processes involved in clinical trials and intellectual property rights around vaccine development. *Advanced Vaccination Technologies for Infectious and Chronic Diseases*, 279-309.
21. **D Rana**, S Salave, D Khunt, D Benival. Blood brain barrier and its significance in drug delivery to brain in Alzheimer disease. *Alzheimer's Disease and Advanced Drug Delivery Strategies*, 47-60.
22. D Khunt, S Salave, **D Rana**, D Benival, B Gayakvad, BG Prajapati. Nose to brain delivery for the treatment of Alzheimer's disease. *Alzheimer's Disease and Advanced Drug Delivery Strategies*, 61-71.
23. **D Rana**, S Salave, G Rawat, D Benival. Nanomedicines for the Treatment of Systemic Candidiasis. *Nanomedicines for the Prevention and Treatment of Infectious Diseases*, 95-124.
24. B Karunakaran, J Vitore, A Sharma, **D Rana**, D Benival. Nanocarriers for Delivery of Peptide Antibiotics. *Nanomedicines for the Prevention and Treatment of Infectious Diseases*, 1-34.

## **Review Articles**

25. AB Jindal, AR Bhide, S Salave, **D Rana**, D Benival. Long-acting Parenteral Drug Delivery Systems for the Treatment of Chronic Diseases. *Advanced Drug Delivery Reviews*, 114862.
26. **D Rana**, S Salave, D Benival, LK Vora, D Khunt. Peptide-based targeting: Novel concept for thrombosis diagnosis and treatment. *Journal of Drug Delivery Science and Technology* 95, 105612.
27. **D Rana**, N Desai, S Salave, B Karunakaran, J Giri, D Benival, S Gorantla, N Kommineni. Collagen-based hydrogels for the eye: A comprehensive review. *Gels* 9 (8), 643.
28. **Rana D**, Salave S, Perla A, Nadkarni A, Kohle S, Jindal AB, Benival D. Bugs as Drugs: Understanding the Linkage between Gut Microbiota and Cancer Treatment Microbiome in Cancer Therapy. *Current Drug Targets* 23 (9), 869-888.
29. **Rana D**, Salave S, Benival D. Emerging trends in Abuse-Deterrent Formulations: Technological insights and Regulatory considerations. *Current Drug Delivery* 19 (8), 846-859.
30. **Rana D**, Salave S, Rawat G, Benival D. Recent Trends in Drug Delivery and Emerging Biomedical Applications of Gelatin for Ophthalmic Indications. *Macromolecular Research* 30 (10), 687-702.
31. **D Rana**, N Desai, S Pande, S Salave, J Giri, D Benival, N Kommineni. "Bioinspired" Membrane-Coated Nanosystems in Cancer Theranostics: A Comprehensive Review. *Pharmaceutics* 15 (6), 1677.
32. **D Rana**, S Salave, S Longare, R Agarwal, K Kalia, D Benival. Nanotherapeutics in Tumour Microenvironment for Cancer Therapy. *Nanoscience & Nanotechnology-Asia* 12 (1), 32-47.
33. S Rangra, **D Rana**, A Prajapati, D Benival, P Dwivedi, A Mandoli. Nutritional and microbiota-based therapeutic intervention for alcohol-associated liver disease: Pathogenesis to therapeutic insights. *Life Sciences*, 122852.
34. N Desai, **D Rana**, S Salave, D Benival, D Khunt, BG Prajapati. Achieving Endo/Lysosomal Escape Using Smart Nanosystems for Efficient Cellular Delivery. *Molecules* 29 (13), 3131.
35. Salave S, **Rana D**, Benival D. Dual Targeting Anti-Osteoporotic Therapy through Potential Nanotherapeutic Approaches. *Pharmaceutical Nanotechnology* 10 (5), 384-392.

36. Salave S, **Rana D**, Pardhe R, Bule P, Benival D. Unravelling Micro and Nano vesicular System in Intranasal Drug Delivery for Epilepsy. *Pharmaceutical Nanotechnology* 10 (3), 182-193.
37. Salave S, Prayag K, **Rana D**, Pardhe R, Amate P, Jadhav A, Jindal A, Benival D. Recent Progress in Hot Melt Extrusion Technology in Pharmaceutical Dosage Form Design. *Recent Patents on Drug Delivery & Formulation*. 16 (3), 170-191.
38. Rawat G, Kolhe S, **Rana D**, Salave S, Vitore J, Benival D. Exploring the Therapeutic Potential of Cyclosporin for Ophthalmic Indications by virtue of Novel Carrier Systems. *Critical Reviews™ in Therapeutic Drug Carrier Systems* 40 (5).
39. D Bisht, S Salave, N Desai, P Gogoi, **D Rana**, P Biswal, et al. Genome editing and its role in vaccine, diagnosis, and therapeutic advancement. *International Journal of Biological Macromolecules*, 131802.
40. N Desai, **D Rana**, S Salave, R Gupta, P Patel, B Karunakaran, A Sharma, J Giri, D Benival, N Kommineni. Chitosan: A Potential Biopolymer in Drug Delivery and Biomedical Applications. *Pharmaceutics* 15 (4), 1313.
41. JG Vitore, K Bharathi, S Salave, **D Rana**, A Perla, S Gupta, S Shah, R Pardhe, P Chittremreddy, S Kashid, R Jadhav, A Sharma, R Patel, A Jindal, D Benival. Intranasal transmucosal drug delivery: An alternative approach to the parenteral route for medical emergencies. *Journal of Drug Delivery Science and Technology*, 104421.
42. R Gupta, S Salave, **D Rana**, B Karunakaran, A Butreddy, D Benival, N Kommineni. Versatility of Liposomes for Antisense Oligonucleotide Delivery: A Special Focus on Various Therapeutic Areas. *Pharmaceutics* 15 (5), 1435.
43. S Salave, P Patel, N Desai, **D Rana**, D Benival, D Khunt, K Thanawuth. BG Prajapati, P Sriamornsak. Recent advances in dosage form design for the elderly: a review. *Expert Opinion on Drug Delivery* 20 (11), 1553-1571.
44. A Prajapati, **D Rana**, S Rangra, AB Jindal, D Benival. Current Status of Therapeutic Peptides for the Management of Diabetes Mellitus. *International Journal of Peptide Research and Therapeutics* 30 (2), 13.

## REFERENCES

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- **Dr. Derajram Benival**  
Assistant Professor, NIPER Ahmedabad  
Email: [derajram@niperahm.res.in](mailto:derajram@niperahm.res.in)
- **Prof. Yamini Shah**  
Professor and Ex-HOD, Dept of Pharmaceutics and Pharmaceutical Technology, L.M. College of Pharmacy  
Email: [yaminidushyantshah@gmail.com](mailto:yaminidushyantshah@gmail.com)

## DECLARATIONS

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I hereby certify that all the information provided above is true to the best of my knowledge.

**Dhwani Rana**