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10-23-2020

D04. Department of Pharmaceutics and Drug Delivery

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Recommended Citation

Repka, Michael A.; Chambliss, Walt G.; Majumdar, Soumyajit; Murthy, S. N.; Jo, Seong Bong; Tan, Chalet; Chougule, Mahavir; and Ashour, Eman, "D04. Department of Pharmaceutics and Drug Delivery" (2020). *Annual Poster Session 2020*. 27.

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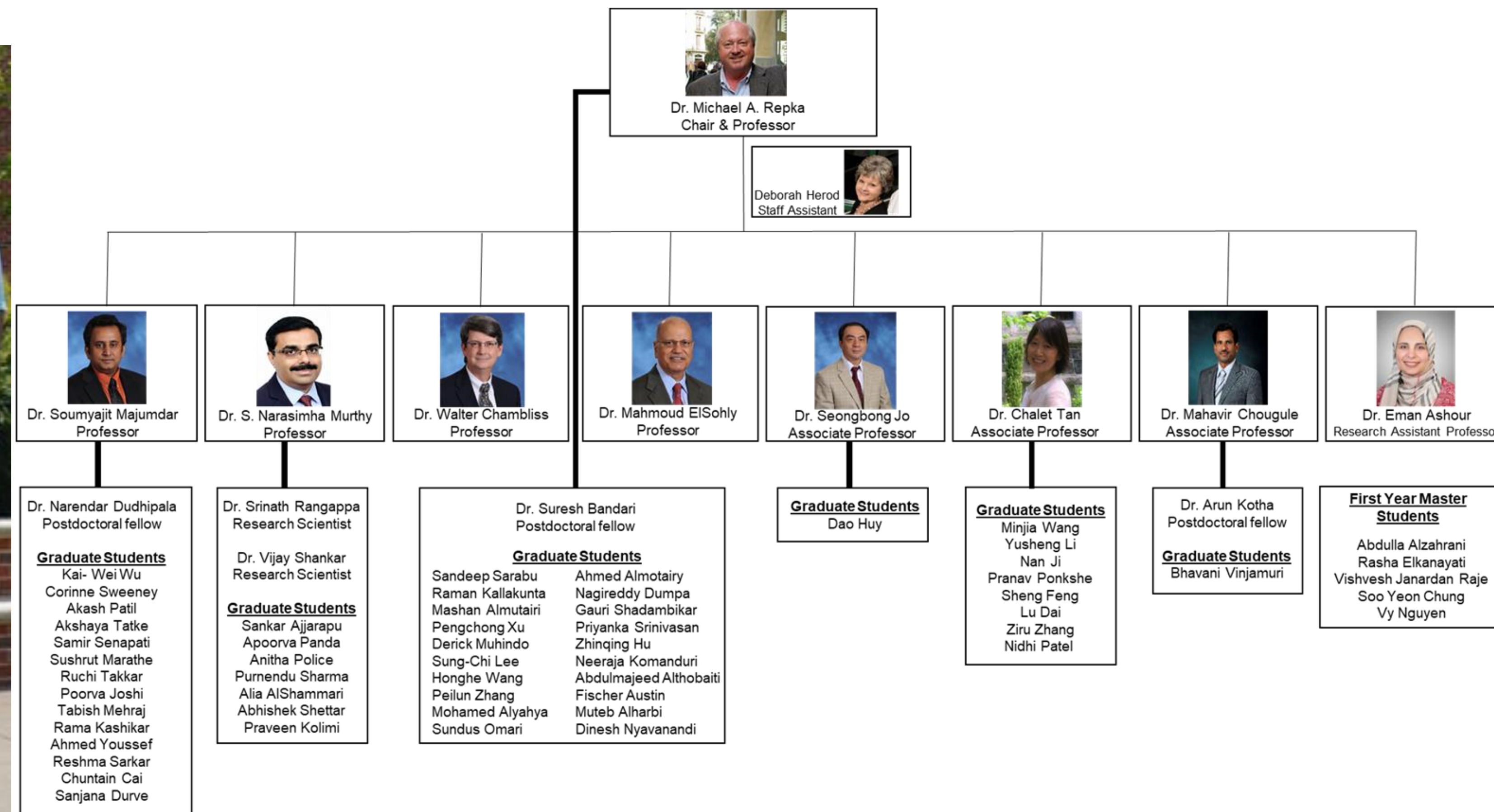
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Authors

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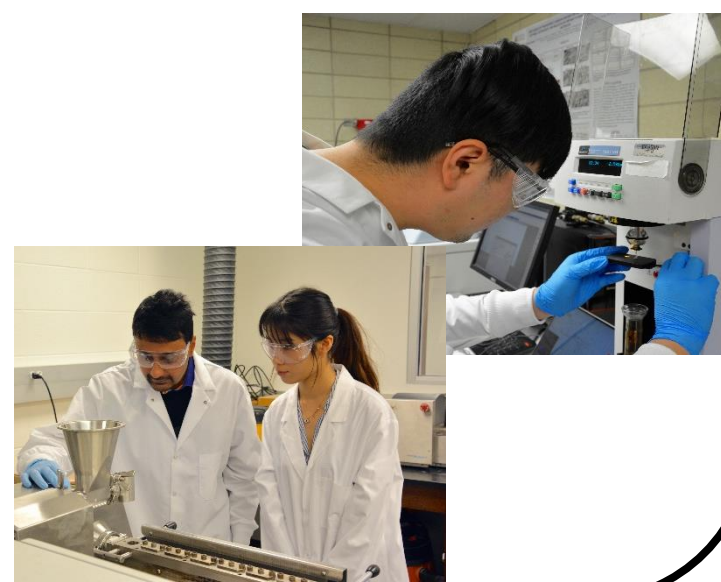
PHARMACEUTICS is the discipline of pharmacy that deals with the science of dosage form design and embraces all facets of the process of turning a new chemical entity (NCE) or an existing generic compound into a medication that can be safely and effectively used by patients in the community. There are many chemicals with known pharmacological properties but a raw chemical cannot be administered, as such, to the patient. Pharmaceutics deals with the formulation of a pure drug substance, which may include generic drugs, into dosage forms such as tablets, capsules, creams, gels, ointments, transdermal and transmucosal patches, solutions, sprays, eye and ear drops, injectable and many others. Successful formulations by pharmaceutical scientists translate to commercialized over-the-counter or prescription products.



Research Interests

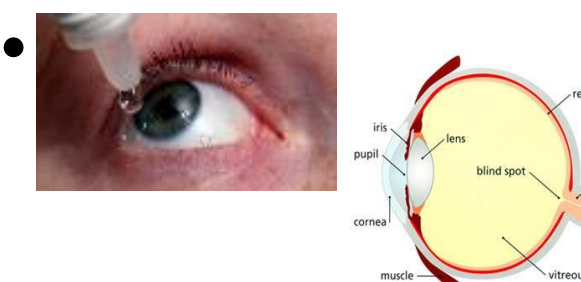
Dr. Repka's Lab.

- Hot-Melt Extrusion Processing related to pharmaceutical products
- Novel Drug Delivery Systems, including 'Trans' systems
- Polymeric Drug Delivery Design and Stabilization of DDS



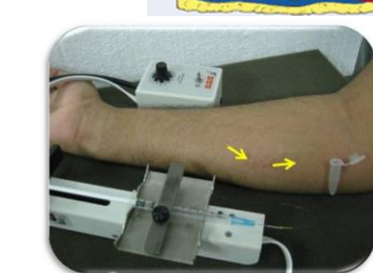
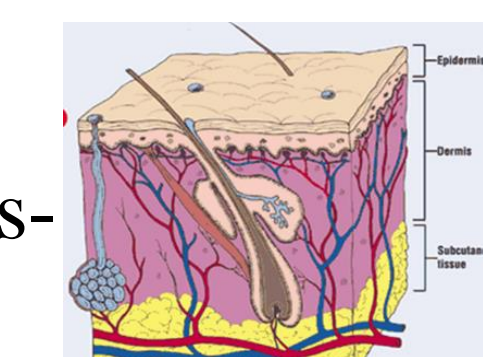
Dr. Majumdar's Lab.

- Drug delivery design strategies for ocular delivery
- Enhancing delivery via transporter targeted prodrugs (oral, ocular and trans-mucosal)
- Novel ocular drug delivery platforms



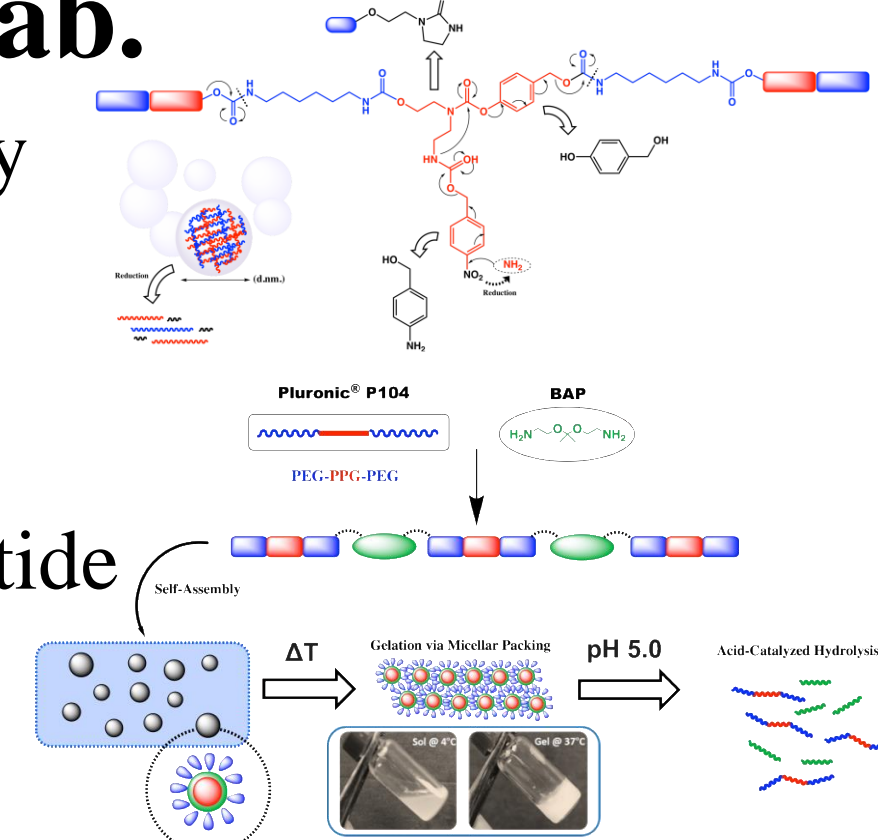
Dr. Murthy's Lab.

- Electrically mediated transdermal and trans-ungula drug delivery, Electroporation and transcutaneous sampling (ETS) of drugs
- Intranasal delivery for targeting to brain
- Study of Dermatokinetics of drugs
- Nano-structured systems in Transdermal Drug Delivery



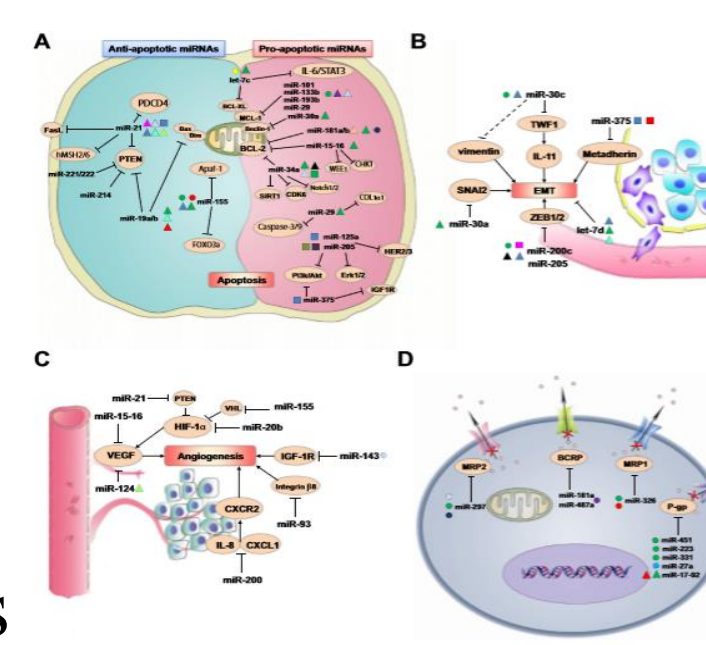
Dr. Jo's Lab.

- Stimuli responsive drug delivery platforms and NCEs
- Redox, thermal, pH sensitive polymers
- pH, ionic strength sensitive peptide based hydrogel
- Light, redox sensitive prodrug



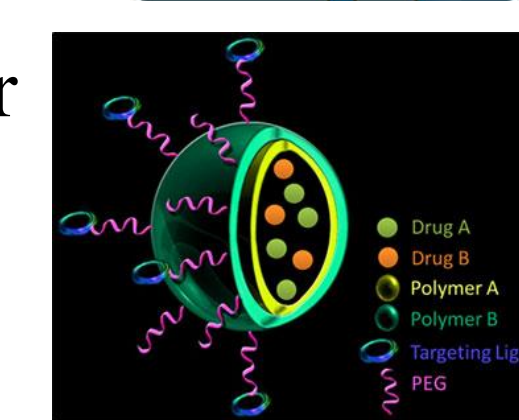
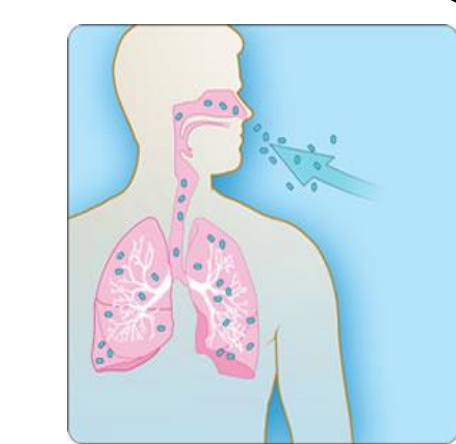
Dr. Tan's Lab.

- Nanodelivery / tissue-specific delivery
- Cancer immunotherapy
- Cancer biology
- Tumor metabolism
- Pharmacokinetics/Pharmacodynamics



Dr. Chougule's Lab.

- Targeted inhalation delivery of drugs and siRNA using bio-engineered polymeric or lipidic nanoparticles for asthma
- Co-delivery of chemo drug and siRNA for the treatment of lung cancer
- Delivery of immunomodulatory agents for inflammatory disorders



Hands-on Course in Tablet Technology

Post-graduate educational program that provides an extensive review of conventional and advanced manufacturing technologies, including hot-melt extrusion, that is used to develop a variety of novel delivery and continuous manufacturing systems. Experience 15 hours of lecture and 20 hours of actual laboratory hands-on training over 5 days that cover various pharmaceutical unit operations for manufacture of oral solid dosage forms. Attendees include domestic and international cross-functional representatives (e.g. R&D management/technical/regulatory, QC, manufacturing, sales and marketing) from the pharmaceutical, dietary supplement, animal health and food industries; regulatory agencies (e.g. FDA, Health Canada) and raw material/equipment suppliers.



Graduate Programs

Department of Pharmaceutics and Drug Delivery currently offers:

- Master of Pharmaceutical Sciences**
 - 1) Pharmaceutics
 - 2) Industrial Pharmacy
- Ph.D. in Pharmaceutical Sciences**
 - 1) Pharmaceutics



The existing graduate program has grown dramatically from 5 graduate students in 2000 to over 50 M.S./Ph.D. students in 2020. Over 80% of Ph.D. graduates work in industry as their first job post graduation. It is noteworthy that since 2001, 100% of all graduates are employed within 3 months in their field by industry, government or academia.

Diverse Funding of the Department of Pharmaceutics and Drug Delivery

