

Pharmacy and applied physical chemistry at the Institute of Pharmaceutics and Biopharmaceutics

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The Institute of Pharmaceutics and Biopharmaceutics has been established in 1977. It was then one of four institutes ensuring the education of pharmacists according to the German regulations for pharmacists. Today, it forms together with the Institute of Biology and Biotechnology, the Institute of Pharmaceutical and Medical Chemistry as well as the Institute of Clinical Pharmacy and Pharmacotherapy the so-called Scientific Unit Pharmacy which is part of the Faculty of Mathematics and Sciences.

To date there are three different research groups focussing mainly on the development and characterization of solid dosage forms. Main topics are the preparation of pellets by wet and melt extrusion as well as the manufacturing of granules by roller compaction. The development of solid dispersions aims to improve the dissolution rate and the solubility of poorly water soluble drugs. Furthermore, the coating of solid dosage forms by innovative techniques like dry coating as well as by conventional techniques is of major importance. Emphasis is put on the scale up of the coating process. Last but not least the development of dry powders intended for the drug delivery to the lungs has to be mentioned. Generally, characterization and validation of the preparation process as well as process analytical technologies (PAT) play an important role. Special interest is given to the development of drug delivery systems and formulations suitable for children, elderly and special patient subpopulations. Especially in this context pharmacokinetics and drug-interaction of excipients are investigated.

The characterization by well established and quite modern techniques is not limited to the final formulation but is also performed on drugs and excipients. Frequently applied techniques include particle size analysis by laser diffraction, sieving and different microscopic techniques, particle surface analysis by BET measurements, atomic force microscopy, contact angle measurements and inverse gas chromatography, determination of porosity by mercury porosimetry, investigations of the flowability by angle of repose and ring shear cell measurements, and investigations of interparticulate interactions by tensile strength measurements and atomic force microscopy. Furthermore moisture sorption, isothermal calorimetry, thermal analysis and X-ray diffraction are applied in order to investigate the physico-chemical properties of drugs, excipients and final formulations. Except for these experimental techniques, computer assisted calculations of molecular properties are part of the research activities.