

Science Bridges China Research Profile

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SUMMARY OF MY RELEVANT RESEARCH AREAS:

Computational Pharmaceutics: Due to the rapid acquisition, high intensity and micro-scale spatial resolution, Synchrotron Radiation Micro Computed Tomography (SR- μ CT) is a powerful tool for the quantitative elucidation of the intrinsic release mechanisms of the Drug Delivery System (DDS). Combining the SR- μ CT with image processing, 3D reconstruction, 3D modeling and complex structures quantization, he has applied the noninvasive technique to visualize the internal three dimensional structures of dosage forms quantitatively. Correlating the quantitative characterization of spatial structure and its change with the release kinetics of DDS, the key 3D parameters have been selected to explain the 3D release kinetics. **Software Design:** With good understanding and working knowledge of computer sciences, he is familiar with program design and coding with C, Visual Basic, Java and Database languages. He has developed several software include DDS pharmacokinetics simulation and evaluation software, Traditional Chinese Medicines (TCM) poly release kinetics evaluation software, image enhancement software and fractal dimension computing software. **Data Mining, Simulation and Modelling:** He applies kinds of classification and regression, clustering and segmentation, correlation and dependency and similarity computation algorithm to massive data mining, model construction and simulation to analyze metabolomics data and pharmaceuticals experimental data. He has also introduced visualization techniques into pharmaceuticals research to gain a better understanding of complex multidimensional vision of DDS.

计算药剂学:

SR- μ CT 技术具有成像速度快、强度高、空间分辨率高等特点，为给药系统的内部释放动力学定量研究提供了有力的工具，通过与图像处理、三维重构、三维建模以及复杂不规则立体结构定量技术相结合，建立了给药系统内部三维立体结构的无损定量可视化方法。将定量表征的立体结构特征及其变化过程与释放动力学相关联，可以甄别影响药物释放的关键三维立体因素、解释制剂的释放机理、评价剂型三维立体释放动力学。 **软件设计与程序编写:** 基于较好计算机基础和丰富程序设计经验，采用 C、Visual Basic、Java 以及数据库语言编写代码，已经完成药物释放系统药动力学模拟评价、中药传统剂型与释药系统物质组释放溶出动力学评价、图像降噪与优化、三维立体结构的分形维数计算等软件的设计与编码 **数据挖掘与仿真建模:** 采用一系列分类与回归、聚类与分割，相关性、依赖性、相似性评价的数据挖掘算法，用于针对代谢组学数据以及药剂学实验数据的海量数据挖掘、仿真模型构建。同时通过引入新的数据可视化方法实现对多维、超维复杂数据更加全面、深入的理解。

Primary Research interests:

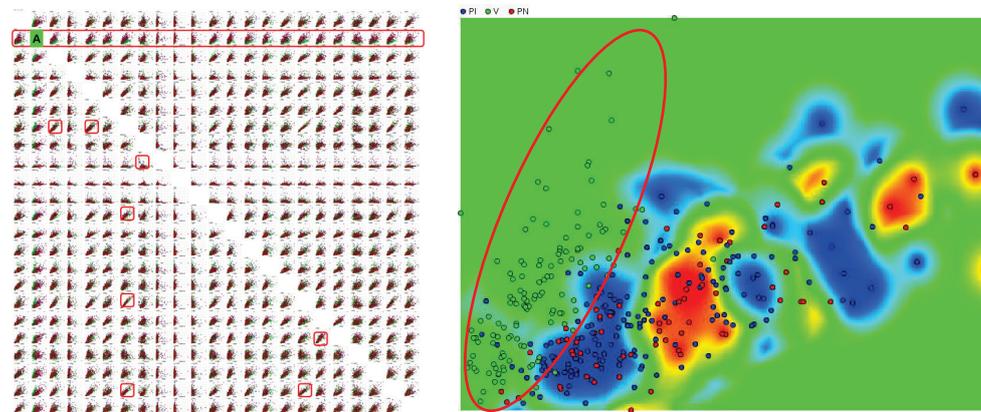
My research interests are mainly focused on the pharmacokinetics of the drug delivery systems (DDS), including new theories and methods for the pharmacokinetics of the sustained/controlled release dosage forms and computational pharmaceutics.

Topics in which you would like to develop collaborative research:

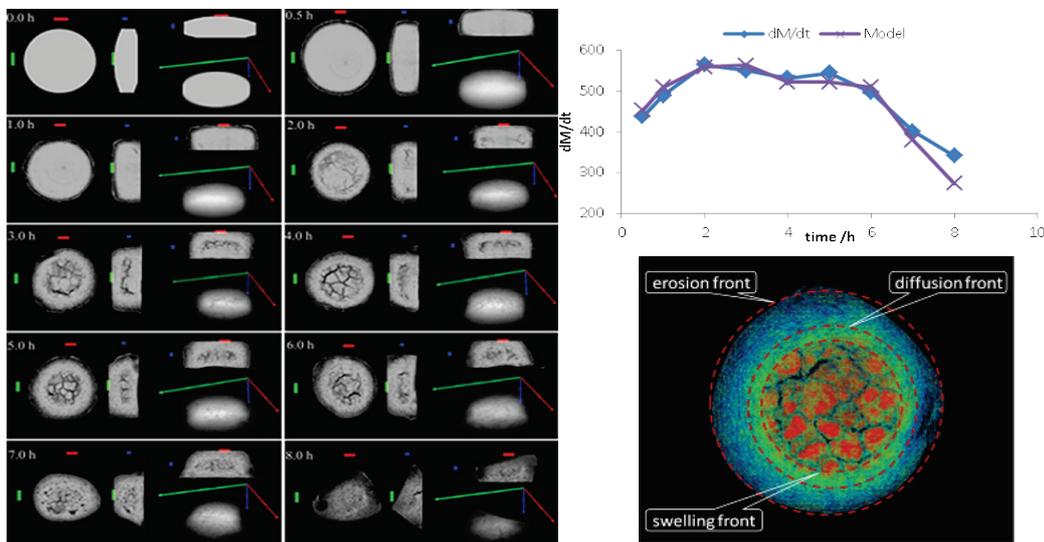
Smart drug delivery via advanced materials; Architecture of DDS and materials.

Relevant existing collaborations (academic/clinical/commercial) inside or outside China.

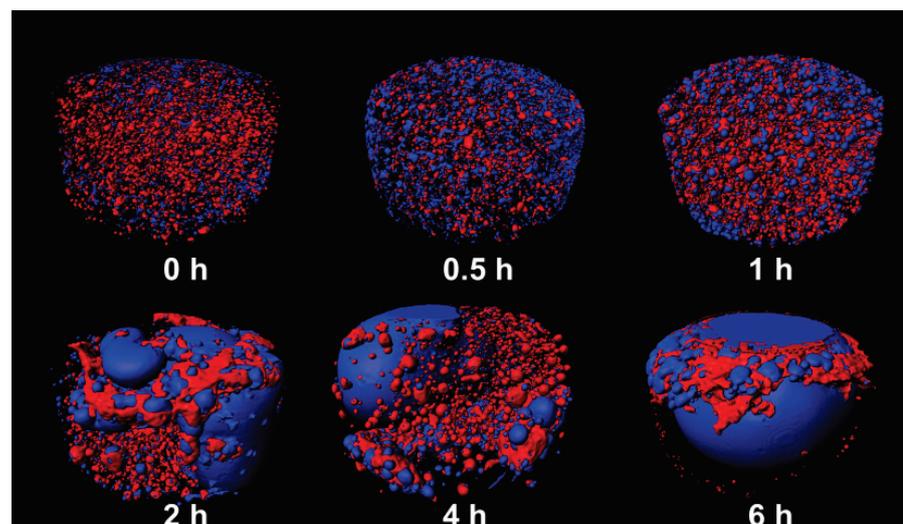
Relevant graphics, figures, pictures:



Data Mining Method and Visualization in metabolomics research



Hydration dynamics determines the release kinetics



The bubble size, shape and evolution determine the release kinetics

Publications and other outputs relevant to your interest in this programme (up to 5)

Microstructural Investigation to the Controlled Release Kinetics of Monolith Osmotic Pump tablets via Synchrotron Radiation X-ray Microtomography. *Int J Pharm*, 2012, 427(2): 270-275