BRITISH COUNCIL

RESEARCHER LINKS

Newton Fund

Research Profile

Name: **David Berry**

Position: **Lecturer in Pharmaceutics**

Institute/division: **Durham University/ Pharmacy**

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SUMMARY OF MY RELEVANT RESEARCH AREAS:

Brief summary of your research areas, in English *just a short paragraph please*

I am a pharmacist by training and my research interests are in drug discovery, delivery and pharmacokinetics. Much of my work is associated with the modification of the solid state of drug molecules through the application of controlled physical form changes (e.g. the use of co-crystals) to improve delivery to a patient but also robust manufacture.

Brief summary of your research areas, in Chinese *we will translate this for non-Chinese speaking UK participants*

Primary Research interests: *A fuller description of your main research areas.*

- Pharmaceutical co-crystals: I currently have on-going work on the determination of structure property relationships between the parent and co-former molecule within co-crystalline materials. This work aims to improve the development properties of pharmaceutical materials through structural knowledge. This has included the application of design of experiments approaches to the screening of drug molecules to determine new functional phases.
- Co-amorphous materials: These are an emergent type of functional material, which can lead to the modification of drug solubility and other materials properties. Preliminary work within my group has suggested the predictable nature of the bonding within these phases, although significant further work is required to realise this potential.
- Pharmacokinetics: I have a number of drug projects where the *in silico* prediction of PK has been able to answer broader questions, along with novel small molecule prediction. How do you treat anorexics with SSRI therapy? Is it legal to drive with prescribed morphine? Etc.
- Drug discovery and Delivery: I have an active project developing peptide prodrugs for treatment of glioma.

Topics in which you would like to develop collaborative research:

Please indicate here research areas for which you would like to find partners to undertake joint research.

- Developing useful co-amorphous materials for drug delivery and broader applications.
- Determining structure property relationships in co-crystals for novel applications, implant coatings etc.
- Predicting pharmacokinetics of small molecule release in standard preparations and from novel drug delivery platforms and mechanical implants. E.g. Can plasticiser release from novel implant materials be predicted to ensure within safe levels?

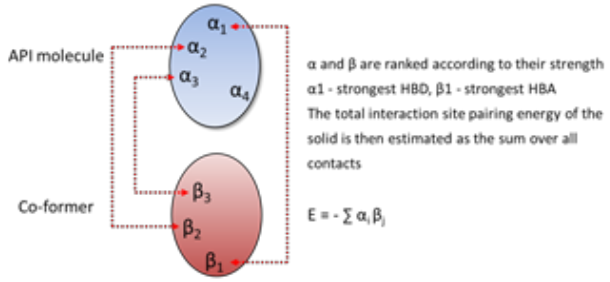
Relevant existing collaborations (academic) inside or outside China.

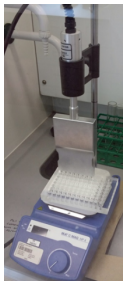
UK pharmaceutical industry: AstraZeneca 3 funded PhD students. Chair of the Association of Pharmaceutical Sciences materials science group.

Durham University: Chemistry department Professor Jon Steed, control of crystal growth through supramolecular gels. Pharmacology- Dr Jason Gill, design of peptide prodrugs for treatment of glioma.

University of York: Dr Jason Boland, prediction of the pharmacokinetics of pain killers for legal driving.

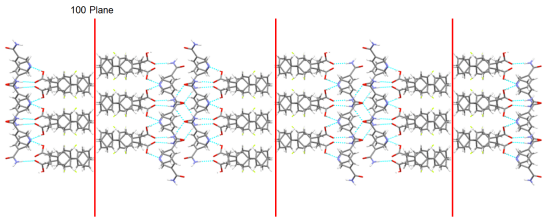
Relevant graphics, figures, pictures:



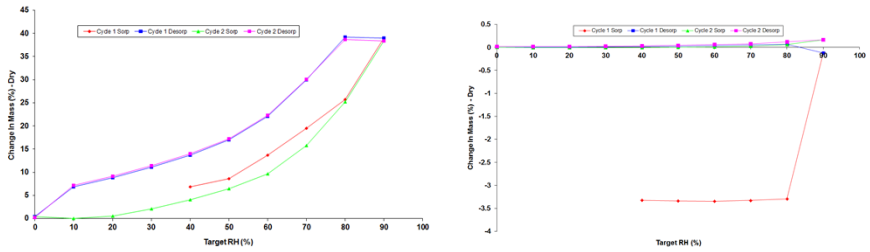


Linking computational prediction with physical form screening using gas phase predictions and well plate approaches

Fig. 1. Computational and physical screening for new physical forms for drug development



Better tabletting properties due to slip planes in the crystal structure



Better physical stability, due to reduced hygroscopicity

Fig. 2. Linking the structure of new materials to their function

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

Please give references to your key recent research publications

• Stabilisation of an amorphous form of ROY through a predicted co-former interaction, ChemComm, 2016, 52, 6537
• Tuning the spontaneous formation kinetics of caffeine:malonic acid co-crystals, CrystEngComm, 2016, 18, 2617 – 2620.
• Pharmaceutical Co-crystals- Are we there yet? CrystEngComm, 2014, 16: 5753-5761.
• Applying hot-stage microscopy to co-crystal screening: a study of nicotinamide with seven active pharmaceutical ingredients – Crystal Growth and Design, 2008, 8, 1697-1712.
• Current directions in co-crystal growth – New Journal of Chemistry, 2008, 32, 1659–1672.