Keynote Lecture

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Pharmaceutical Solids in Crystal Engineering

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The role of X-ray diffraction in identifying new leads by structure-based drug design and characterization of drug-receptor complexes is well known. In the past decade, X-ray crystallography and crystal engineering are playing a crucial role in pharmaceutical development. The emphasis in these studies has been to modify the physicochemical and pharmacokinetic properties of drugs as well as their crystalline forms for improved solubility and enhanced bioavailability. That the optimal crystal form of a particular drug, e.g. polymorph, salt, cocrystal, solvate, hydrate, eutectic, etc., is possible to derive by a combination of synthon-based design and high-throughput solid form screen has resulted in the improvement of oral formulation for drugs. The launch of Entresto (sacubuitril-valsartan) in 2015 for the treatment of heart failure is a case in point. Apart from solubility and bioavailability, other properties which can be tuned for pharmaceutical solids are permeability, half-life, color stability, cross reactivity, tableting, compaction, mechanical behavior, etc. The engineering of multi-component cocrystals (binary and ternary) offers the potential to arm multiple drug payloads in the same pharmaceutical composition.

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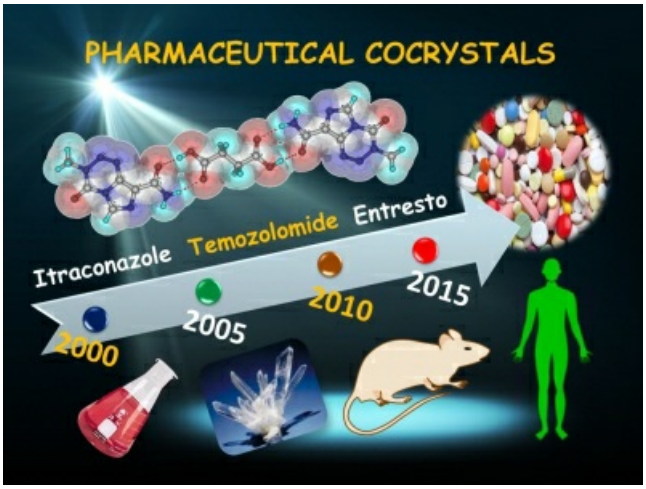
[2] Pharmaceutical Cocrystals: Walking the Talk. Chem. Comm. (2016) 52, 8342-8360.
[3] Crystal Engineering of a Zwitterionic Drug to Neutral Cocrystals: A General Solution for Floxacins. Chem. Commun. (2016) 52, 12610-12613.



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