Opinion
Volume 12:2, 2023

Pharmaceutical Regulatory Affairs: Open Access

ISSN: 2167-7689 **Open Access**

The Physicochemical Properties of Pharmaceutical Cocrystals

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Introduction

The crystal engineering field has seen a steady rise in the number of publications detailing developments in cocrystal characterization, growing methods, and design strategies over the past two decades. Cocrystals, on the other hand, have only recently begun to make their way into pharmaceuticals. This is primarily due to the fact that they are able to alter physicochemical properties without jeopardizing the structural integrity of the active pharmaceutical ingredient (API) or its bioactivity. In the hope of bringing crystal engineering and pharmaceutical sciences closer together, this review article will highlight and discuss the 10 years' worth of progress in pharmaceutical cocrystalline materials' ability to improve chemical and physical properties [1].

Description

It is estimated that over half of the medicines on the market are administered as salts, and salt formation is currently one of the primary solid-state strategies utilized to modify the physical properties of APIs. However, the requirement that the API have a suitable ionizable site either acidic or basic is a major drawback of this strategy. Cocrystals, on the other hand, are multicomponent assemblies that are held together by freely reversible, noncovalent interactions. Cocrystallization of any API, regardless of whether it contains acidic, basic, or ionizable groups, is possible with cocrystals. By reintroducing molecules with limited pharmaceutical profiles due to their nonionizable functional groups, this aspect adds to the methods already in use. Additionally, a large number of nontoxic coformers, or cocrystal formers, can be incorporated into a cocrystalline reaction.

The development of novel preclinical discoveries into meaningful changes in patient care depends on clinical pharmaceutical research. Researchers with the special abilities to coordinate fundamental pharmacology and the clinical pathogenesis of illness are profoundly looked for in scholarly community and the drug business. Clinical pharmacologists' capacity to incorporate preclinical and clinical proof as it connects with drug reaction is a key component important to diminish both the hour of medication improvement and the probability of late-stage drug failures.1 Similarly as with the drug business, interpretation of preclinical examination revelations into significant restorative intercessions has been a significant drive inside scholastic settings. The National Institutes of Health (NIH) Clinical and Translational Science Awards (CTSA) have helped establish an infrastructure for clinical research within academic institutions, which has increased the demand for highly skilled researchers in the clinical pharmaceutical sciences [2].

There aren't enough researchers graduating from colleges and schools of pharmacy and medicine with expertise in clinical pharmaceutical sciences and clinical pharmacology, despite the demand from academia and the pharmaceutical industry. There is a lack of pharmaceutical scientists with expertise in clinical pharmacotherapeutics, pharmacogenetics, pharmacometric modeling and simulation, and pharmaceutics. The number of colleges and schools of pharmacy that provide fellowship training, master's degrees, and PhD degrees in the clinical pharmaceutical sciences has significantly increased in response to this demand. PharmD/PhD training programs were offered or planned by more than 40% of colleges and universities in 2006 in the pharmaceutical sciences. Additionally, efforts have been made to meet the demand for more clinical researchers through fellowship training programs. There has been a lot of discussion about the best way to train people in the pharmaceutical sciences to conduct clinical and translational research. In any case, the generally modest number of students created by all preparing programs isn't addressing the necessities of the exploration local area.

Cocrystals will need to be looked at in addition to polymorphism and scale-up in development. Different approaches, like those based on ternary solubility phase diagrams, will likely be required for processes that produce cocrystals on a large scale. As they progress through the development process, crystals will present additional challenges as well as additional IP, regulatory, and lifecycle management options for both new and existing drugs [3-5].

Conclusion

In conclusion, Although there is no doubt that cocrystals are present in pharmaceutical drug pipelines, it is only a matter of time before this imagination becomes a reality. At this time, no cocrystalline drug products appear to be on the market.

Acknowledgement

None.

Conflict of Interest

There are no conflicts of interest by author.

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Received: 28 January, 2023, Manuscript No. pbt-23-94650; **Editor assigned:** 30 January, 2023, PreQC No. P-94650; **Reviewed:** 11 February, 2023, QC No. Q-94650; **Revised:** 17 February, 2023, Manuscript No. R-94650; **Published:** 25 February, 2023, DOI: 10.37421/2167-7689.2023.12.356

How to cite this article: Bloom, Timothy. "The Physicochemical Properties of Pharmaceutical Cocrystals." *Pharmaceut Reg Affairs* 12 (2023): 356.