Enhancing Chemotherapeutic Efficacy through Amorphous Solid Dispersions

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非晶質固体分散体による
化学療法効果の
向上について

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ABSTRACT: The oral route remains the preferred method of drug administration due to its convenience and patient compliance. However, a significant challenge in modern pharmaceutical development, particularly for chemotherapeutic agents, is the low aqueous solubility of many drug candidates. The Biopharmaceutical Classification System (BCS) reveals that approximately 90% of pipeline drugs fall into low-solubility classes II and IV, compared to just 36% of marketed drugs. This discrepancy highlights the potential efficacy issues and financial risks associated with drug development, particularly in oncology where treatment failure rates are high.

Amorphous Solid Dispersions (ASD) offer a promising solution for improving the solubility and bioavailability of chemotherapeutic agents, which often face significant challenges in achieving therapeutic efficacy due to poor aqueous solubility. Through a comprehensive integration of quantum mechanical calculations, molecular dynamics simulations, and dielectric studies, we aim to optimize drug-polymer interactions and enhance drug loading capacity. This approach will ensure higher concentrations of active pharmaceutical ingredients, leading to more effective drug delivery and potentially improved therapeutic outcomes.

The successful application of this formulation strategy may extend beyond cancer treatment to address solubility and bioavailability challenges in a wide range of diseases, where many medications face similar limitations. This research could have a transformative impact, enhancing treatment options across diverse therapeutic areas and improving patient outcomes.

第78回MNTC講演会

Wed. December 25, 2024
13:30～15:00

会場：東海大学湘南キャンパス
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