PURDUE INNOVATES | Office of Technology Commercialization

Novel class of HIV-1 protease inhibitors with potent activity and improved pharmacological properties

A novel class of oral HIV-1 protease inhibitors offers superior drug resistance and pharmacological profiles compared to current treatments for long-term disease management.

Currently, the best strategy for treatment of human immunodeficiency virus 1 (HIV-1)/AIDS is through therapeutic inhibition of HIV-1 protease. Previous development of inhibitor drugs relied on protein X-ray structure-based design, which proved to be a major achievement in medicinal chemistry, and has led to a decline in mortality rates of patients with HIV/AIDS. However, there are still issues such as the evolution of drug-resistant viral strains, high pill burden, and drug side effects for long-term management of HIV/AIDS. Current protease inhibitor design strategy aims to maximize hydrogen bonding interactions with the protease active site. Darunavir is a good example of the latest FDA-approved drug developed using this strategy, but already there are viral variants developing drug resistance. Thus, there is a need for new classes of HIV-1 protease inhibitors. Researchers at Purdue University have developed a novel class of HIV-1 protease inhibitors based on a tricyclic 5:5:5-fused ring hetero cyclic backbone with potent inhibitor activity and can be orally administered.

Technology Validation:

-Tested protease inhibitor activity with previously reported procedure (Toth et al., Int. J. Pept. Protein Res. 1990, 36, 544-550.) and identified 6 compounds with inhibitory constants, Ki 10 nM

-Antiviral studies are ongoing but expected to show potent activity

Advantages

-Novel class of HIV-1 protease inhibitors

-Improved pharmacological properties and drug resistance properties compared to darunavir

Technology ID
2026-GHOS-71462

Category
Pharmaceuticals/Drug Delivery & Formulations
Pharmaceuticals/Other

Authors
Arun K Ghosh
Hiroaki Mitsuya
Ashish Sharma

View online

Applications

-Therapeutic treatment of HIV-1

Related Publications (if none, delete this section)

Ghosh et al. Org. Biomol. Chem., 2024, 22, 7354-7372 DOI: 10.1039/

TRL: 3

Intellectual Property:

Provisional-Gov. Funding, 2025-12-17, United States