Potent Protease Inhibitors Against HIV

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Acquired immune deficiency syndrome (AIDS), has been one of the most difficult to manage diseases despite the progress in medicine. Human immunodeficiency virus (HIV) causes AIDS, which is a complex disease that includes gradual destruction of the immune system and deterioration of the central and peripheral nervous system. Therapy that has been used to treat HIV is highly active antiretroviral therapy (HAART), HIV protease inhibitors (PI), and reverse transcriptase inhibitors (RTIs). However, these therapies have multiple side effects in patients, complexities in the treatment regimen, and development of multidrug resistance. In addition, many of the agents cannot reach residual HIV in the brain, and therefore, it is very important to develop medications that can pass into the brain.

In light of these evolving issues, researchers at Purdue University have developed a therapy to combat the HIV pandemic. They have found that nonpeptidyl compounds are strong inhibitors of HIV-1 protease enzymes. The unique structure, which includes urethanes with P2 ligand activity, make these inhibitors effective in attaching to the enzyme's active portion with strong hydrogen bonds and deterring the function of HIV and other multidrug resistant strains of the virus. Currently, these compounds have demonstrated less toxicity and higher potency, which may result in lower doses compared to traditional AIDS medications. These compounds could be used in combination with current therapies or alone to provide a therapeutically effective, safe treatment of AIDS.

Advantages:
-More potent, lower doses used
-Less toxicities and side effects
-Effective against resistant HIV strains

Potential Applications:
-AIDS prevention and treatment

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