Protease and Protease Inhibitors Encyclopedia Article

Protease and Protease Inhibitors

The following sections of this BookRags Literature Study Guide is offprint from Gale's For Students Series: Presenting Analysis, Context, and Criticism on Commonly Studied Works: Introduction, Author Biography, Plot Summary, Characters, Themes, Style, Historical Context, Critical Overview, Criticism and Critical Essays, Media Adaptations, Topics for Further Study, Compare & Contrast, What Do I Read Next?, For Further Study, and Sources.

(c)1998-2002; (c)2002 by Gale. Gale is an imprint of The Gale Group, Inc., a division of Thomson Learning, Inc. Gale and Design and Thomson Learning are trademarks used herein under license.

The following sections, if they exist, are offprint from Beacham's Encyclopedia of Popular Fiction: "Social Concerns", "Thematic Overview", "Techniques", "Literary Precedents", "Key Questions", "Related Titles", "Adaptations", "Related Web Sites". (c)1994-2005, by Walton Beacham.

The following sections, if they exist, are offprint from Beacham's Guide to Literature for Young Adults: "About the Author", "Overview", "Setting", "Literary Qualities", "Social Sensitivity", "Topics for Discussion", "Ideas for Reports and Papers". (c)1994-2005, by Walton Beacham.

All other sections in this Literature Study Guide are owned and copyrighted by BookRags, Inc.



Contents

Protease and Protease Inhibitors Encyclopedia Article.....1

Contents.....2

Protease and Protease Inhibitors.....3

Protease and Protease Inhibitors

A protease is an enzyme that specifically recognizes and breaks apart a given protein or similar proteins. The destruction of the protein is accomplished by the ability of the protease to break the peptide bonds that link the constituent parts of the protein--the amino acids--together.

Proteases are present in every living **cell** of every living organism. As soon as the cells are disrupted, the proteases are released and can quickly degrade any given protein of interest. In experimental work this behavior is highly undesirable, as the protease destruction of other proteins greatly reduces the yield of the target protein in isolation experiments.

Fortunately, chemical substances called protease inhibitors can prevent protease activity. A protease inhibitor is any substance that partially or completely blocks functioning of the protease. This can be accomplished by the binding of the inhibitor to the **active site** within the protease at which the breakage of the peptide bonds occurs. Other protease inhibitors exert their influence by binding to some other place on the protease's structure that prevents, through a conformational (shape) change in the protein, the active site from functioning properly. Because of the binding specificity, a given inhibitor will be active against only one or a certain number of types of protease.

Protease inhibitors have become important clinically because of their promise as a treatment for AIDS--acquired immunodeficiency syndrome. They work by blocking the activity of a protease associated with the **AIDS virus**, the human immunodeficiency virus (HIV). HIV protease clips a long viral protein into several differently sized smaller proteins. These smaller proteins are necessary for proper HIV assembly and for the ability of these newly-made virus particles to infect other cells once they are released from the infected cell. It is the processing of the long viral protein into the infection-critical smaller proteins that is blocked by protease inhibitors. The spread of the virus to new cells is subsequently halted.

To combat HIV, protease inhibitors are usually administered as a cocktail with other agents that block the **transcription** of the viral **RNA** into **DNA**. This treatment is costly and monitoring of the body's response is important, as resistance to protease inhibitors can develop.