Orthology and Paralogy Encyclopedia Article

Orthology and Paralogy

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

Orthology and Paralogy Encyclopedia Article.....1

Contents.....2

Orthology and Paralogy.....3

Orthology and Paralogy

Orthology and paralogy refer to comparisons between sequences of **deoxyribonucleic acid**. The sequences considered in both orthology and paralogy are identical to one another; also described as being homologous sequences.

The term orthology was coined in 1970 to describe an observed relationship between **gene** sequences. Orthologous genes are homologous genes present in organisms from two different **species** that originated from a common ancestor. In other words the genes are inherited through speciation. Despite this common origin, the genes need not necessarily have the same function.

Orthologous molecules provide useful information in taxonomic classification studies of organisms. The pattern of genetic divergence can be used to trace the relatedness of organisms. Two organisms that are very closely related can display very similar gene sequences. Conversely, an organism that is further removed evolutionarily from another organism can display a greater variation in the sequence of the gene in question.

Paralogous genes are homologous genes that occur in two organisms of the same species. But in one of the organisms the gene has been duplicated, so that there are two copies of the gene in one organism. Paralogous molecules provide useful information on the way genomes evolved. The **duplication** of genes and genomes have emerged s the important pathway to molecular innovation, including the **evolution** of developmental pathways.

The use of the terms orthology and paralogy has become somewhat controversial, as the terms have been misapplied. Orthology has also been used to signify genes that have the same function in different species, regardless of whether their sequences are identical, or even similar.