

Watson Molecular Biology Of Gene 7th Edition

Gene

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In biology, the word gene has two meanings. The Mendelian gene is a basic unit of heredity. The molecular gene is a sequence of nucleotides in DNA that is transcribed to produce a functional RNA. There are two types of molecular genes: protein-coding genes and non-coding genes. During gene expression (the synthesis of RNA or protein from a gene), DNA is first copied into RNA. RNA can be directly functional or be the intermediate template for the synthesis of a protein.

The transmission of genes to an organism's offspring, is the basis of the inheritance of phenotypic traits from one generation to the next. These genes make up different DNA sequences, together called a genotype, that is specific to every given individual, within the gene pool of the population of a given species. The genotype...

Bibliography of biology

list of works on molecular biology, the study of the molecular basis of biological activity. Crick, Francis; Watson, James D. (1953). "Molecular Structure

This bibliography of biology is a list of notable works, organized by subdiscipline, on the subject of biology.

Biology is a natural science concerned with the study of life and living organisms, including their structure, function, growth, origin, evolution, distribution, and taxonomy. Biology is a vast subject containing many subdivisions, topics, and disciplines. Subdisciplines of biology are recognized on the basis of the scale at which organisms are studied and the methods used to study them.

Recombinant DNA

(2008). Molecular Biology of the Cell (5th edition, Extended version). New York: Garland Science. ISBN 978-0-8153-4111-6.[page needed] Fourth edition is available

Recombinant DNA (rDNA) molecules are DNA molecules formed by laboratory methods of genetic recombination (such as molecular cloning) that bring together genetic material from multiple sources, creating sequences that would not otherwise be found in the genome.

Recombinant DNA is the general name for a piece of DNA that has been created by combining two or more fragments from different sources. Recombinant DNA is possible because DNA molecules from all organisms share the same chemical structure, differing only in the nucleotide sequence. Recombinant DNA molecules are sometimes called chimeric DNA because they can be made of material from two different species like the mythical chimera. rDNA technology uses palindromic sequences and leads to the production of sticky and blunt ends.

The DNA sequences...

Zoology

discovery of the structure of DNA by Francis Crick and James Watson in 1953, the realm of molecular biology opened up, leading to advances in cell biology, developmental

Zoology (zoh-OL-ə-jee, UK also zoo-) is the scientific study of animals. Its studies include the structure, embryology, classification, habits, and distribution of all animals, both living and extinct, and how they interact with their ecosystems. Zoology is one of the primary branches of biology. The term is derived from Ancient Greek ζῷον, zōion ('animal'), and λόγος, logos ('knowledge', 'study').

Although humans have always been interested in the natural history of the animals they saw around them, and used this knowledge to domesticate certain species, the formal study of zoology can be said to have originated with Aristotle. He viewed animals as living organisms, studied their structure and development, and considered their adaptations to their surroundings and the function of their parts...

Genetics

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friar working in the 19th century in Brno, was the first to study genetics scientifically. Mendel studied "trait inheritance", patterns in the way traits are handed down from parents to offspring over time. He observed that organisms (pea plants) inherit traits by way of discrete "units of inheritance". This term, still used today, is a somewhat ambiguous definition of what is referred to as a gene.

Trait inheritance and molecular inheritance mechanisms of genes are still primary principles of genetics in the 21st century, but modern genetics has expanded to study the function and behavior...

Transcription (biology)

Freeman. ISBN 0-7167-8724-5. Watson JD, Baker TA, Bell SP, Gann AA, Levine M, Losick RM (2013). Molecular Biology of the Gene (7th ed.). Pearson. ISBN 978-0-321-76243-6

Transcription is the process of copying a segment of DNA into RNA for the purpose of gene expression. Some segments of DNA are transcribed into RNA molecules that can encode proteins, called messenger RNA (mRNA). Other segments of DNA are transcribed into RNA molecules called non-coding RNAs (ncRNAs).

Both DNA and RNA are nucleic acids, composed of nucleotide sequences. During transcription, a DNA sequence is read by an RNA polymerase, which produces a complementary RNA strand called a primary transcript.

In virology, the term transcription is used when referring to mRNA synthesis from a viral RNA molecule. The genome of many RNA viruses is composed of negative-sense RNA which acts as a template for positive sense viral messenger RNA - a necessary step in the synthesis of viral proteins needed...

Macromolecule

Keith (2008). Molecular Biology of the Cell (5th edition, Extended version). New York: Garland Science. ISBN 978-0-8153-4111-6.. Fourth edition is available

A macromolecule is a "molecule of high relative molecular mass, the structure of which essentially comprises the multiple repetition of units derived, actually or conceptually, from molecules of low relative molecular mass." Polymers are physical examples of macromolecules. Common macromolecules are biopolymers (nucleic acids, proteins, and carbohydrates). and polyolefins (polyethylene) and polyamides (nylon).

RNA polymerase

1016/0968-0004(91)90164-Q. PMID 1776168. Watson JD, Baker TA, Bell SP, Gann AA, Levine M, Losick RM (2013). Molecular Biology of the Gene (7th ed.). Pearson. Revyakin

In molecular biology, RNA polymerase (abbreviated RNAP or RNAPol), or more specifically DNA-directed/dependent RNA polymerase (DdRP), is an enzyme that catalyzes the chemical reactions that synthesize RNA from a DNA template.

Using the enzyme helicase, RNAP locally opens the double-stranded DNA so that one strand of the exposed nucleotides can be used as a template for the synthesis of RNA, a process called transcription. A transcription factor and its associated transcription mediator complex must be attached to a DNA binding site called a promoter region before RNAP can initiate the DNA unwinding at that position. RNAP not only initiates RNA transcription, it also guides the nucleotides into position, facilitates attachment and elongation, has intrinsic proofreading and replacement capabilities...

Messenger RNA

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In molecular biology, messenger ribonucleic acid (mRNA) is a single-stranded molecule of RNA that corresponds to the genetic sequence of a gene, and is read by a ribosome in the process of synthesizing a protein.

mRNA is created during the process of transcription, where an enzyme (RNA polymerase) converts the gene into primary transcript mRNA (also known as pre-mRNA). This pre-mRNA usually still contains introns, regions that will not go on to code for the final amino acid sequence. These are removed in the process of RNA splicing, leaving only exons, regions that will encode the protein. This exon sequence constitutes mature mRNA. Mature mRNA is then read by the ribosome, and the ribosome creates the protein utilizing amino acids carried by transfer RNA (tRNA). This process is known as translation...

Neutral mutation

Levine, Michael; Losik, Richard; Harrison, Stephen C. (2013). Molecular biology of the gene (7th ed.). Benjamin-Cummings. pp. 573-6. ISBN 978-0321762436. Venetianer

Neutral mutations are changes in DNA sequence that are neither beneficial nor detrimental to the

ability of an organism to survive and reproduce. In population genetics, mutations in which natural selection does not affect the spread of the mutation in a species are termed neutral mutations. Neutral mutations that are inheritable and not linked to any genes under selection will be lost or will replace all other alleles of the gene. That loss or fixation of the gene proceeds based on random sampling known as genetic drift. A neutral mutation that is in linkage disequilibrium with other alleles that are under selection may proceed to loss or fixation via genetic hitchhiking and/or background selection.

While many mutations in a genome may decrease an organism's ability to survive and reproduce...

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