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Course code:mcb 310

Level:300

Dept:micro biology

Assignment

.Nucleic Acid

**Nucleic acids** are the [biopolymers](/wiki/Biopolymer%22%20%5Co%20%22Biopolymer), or large [biomolecules](/wiki/Biomolecule%22%20%5Co%20%22Biomolecule), essential to all known forms of [life](/wiki/Life%22%20%5Co%20%22Life). The term *nucleic acid* is the overall name for DNA and RNA. They are composed of [nucleotides](/wiki/Nucleotide%22%20%5Co%20%22Nucleotide), which are the [monomers](/wiki/Monomer%22%20%5Co%20%22Monomer) made of three components: a [5-carbon sugar](/wiki/Pentose%22%20%5Co%20%22Pentose), a [phosphate](/wiki/Phosphate%22%20%5Co%20%22Phosphate) group and a [nitrogenous base](/wiki/Nitrogenous_base%22%20%5Co%20%22Nitrogenous%20base). If the [sugar](/wiki/Sugar%22%20%5Co%20%22Sugar) is a compound  [ribose](/wiki/Ribose%22%20%5Co%20%22Ribose), the [polymer](/wiki/Polymer%22%20%5Co%20%22Polymer) is [RNA](/wiki/RNA%22%20%5Co%20%22RNA) (ribonucleic acid); if the sugar is derived from ribose as [deoxyribose](/wiki/Deoxyribose%22%20%5Co%20%22Deoxyribose), the polymer is [DNA](/wiki/DNA%22%20%5Co%20%22DNA) (deoxyribonucleic acid).

[Nucleic](/wiki/Cell_nucleus%22%20%5Co%20%22Cell%20nucleus) acids are the most important of all biomolecules. These are found in abundance in all living things, where they function to create and encode and then store information of every living cell of every life-form [organism](/wiki/Organism%22%20%5Co%20%22Organism) on Earth. In turn, they function to transmit and express that information inside and outside the cell nucleus—to the interior operations of the cell and ultimately to the next generation of each living organism. The encoded information is contained and conveyed via the [nucleic acid sequence](/wiki/Nucleic_acid_sequence%22%20%5Co%20%22Nucleic%20acid%20sequence), which provides the 'ladder-step' ordering of nucleotides within the molecules of RNA and DNA.

Strings of nucleotides are bonded to form helical backbones—typically, one for RNA, two for DNA—and assembled into chains of base-pairs selected from the five [primary, or canonical, nucleobases](/wiki/Nucleobase%22%20%5Co%20%22Nucleobase), which are: adenine, cytosine, guanine, thymine, and uracil. Thymine occurs only in DNA and uracil only in RNA. Using amino acids and the process known as [protein synthesis](/wiki/Protein_synthesis%22%20%5Co%20%22Protein%20synthesis),[[1]](%22%20%5Cl%20%22cite_note-1) the specific sequencing in DNA of these [nucleobase-pairs](/wiki/Base_pair%22%20%5Co%20%22Base%20pair)enables storing and transmitting [coded](/wiki/Code%22%20%5Cl%20%22Genetic_code%22%20%5Co%20%22Code)instructions as [genes](/wiki/Gene%22%20%5Co%20%22Gene). In RNA, base-pair sequencing provides for manufacturing new proteins that determine the frames and parts and most chemical processes of all life forms.

.purine synthesis:

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Purine synthesis occurs in all tissues. The major site of purine synthesis is in the liver and, to a limited extent, in the brain.

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* ****Products:****GMP; AMP; glutamate; fumarate; H2O.

## ****Overview of the pathway****

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.conversion of nucleotides to deoxynucleotides

DNA, however, requires deoxyribose, which is missing the 2'-hydroxyl (-OH group) on the ribose. The reaction to remove this -OH is catalyzed by ribonucleotide reductase. This enzyme converts NDPs (nucleoside-diphosphate) to dNDPs (deoxynucleoside-diphosphate).

.Difference between bioreactor and fermentor

**Bioreactor and fermentor** are two words for basically the same thing. Scientists who cultivate bacteria, yeast, or fungi often use the term **fermentor**. The term **bioreactor** often relates to the cultivation of mammalian cells but is also generically used.

Broadly speaking, bioreactors and fermentors are culture systems to produce cells or organisms. They are used

in various applications, including basic research and development, and the manufacturing of biopharmaceuticals, food and food additives, chemicals, and other products. A broad range of cell types and organisms can be cultivated in bioreactors and fermentors, including cells (like mammalian cell lines, insect cells, and stem cells), microorganisms (like bacteria, yeasts, and fungi), as well as plant cells and algae.

Bioreactor and fermentor are two words for basically the same thing. Scientists who cultivate bacteria, yeast, or fungi often use the term fermentor. The term bioreactor often relates to the cultivation of mammalian cells but is also generically used. If we talk about bioreactors in this

white paper we usually mean systems for the cultivation of microbes or mammalian cells.

.Amino acid synthesis:

### Introduction

The pathways of [amino acid synthesis](/topics/immunology-and-microbiology/amino-acid-synthesis%22%20%5Co%20%22Learn%20more%20about%20Amino%20Acid%20Synthesis%20from%20ScienceDirect%27s%20AI-generated%20Topic%20Pages)comprise a significant fraction of a bacterium’s metabolic activity during its growth in a minimal medium. Two amino acids, glutamine and glutamate, are the immediate products of ammonia assimilation and essential nitrogen donors for the synthesis of other intermediates. Amino acids are not only protein precursors, but also precursors for numerous other crucial compounds, such as polyamines, S-adenosylmethionine, pantothenic acid, and nucleotides. Our knowledge of the pathways of [amino acid metabolism](/topics/immunology-and-microbiology/amino-acid-metabolism%22%20%5Co%20%22Learn%20more%20about%20Amino%20Acid%20Metabolism%20from%20ScienceDirect%27s%20AI-generated%20Topic%20Pages) and their regulation is most extensive in the model genetic organism Escherichia coli. The availability of genome sequences has the potential to alter our knowledge of amino acid pathways. Nonetheless, E. coli will always be used to initially evaluate new information from other organisms. This article focuses on amino acid metabolism in E. coli. It considers the functions of the amino acid other than as a protein precursor, the [biosynthetic pathways](/topics/immunology-and-microbiology/biosynthesis%22%20%5Co%20%22Learn%20more%20about%20Biosynthesis%20from%20ScienceDirect%27s%20AI-generated%20Topic%20Pages)and their regulation. Because catabolic pathways may contribute to regulating the availability of amino acids, amino acid degradation is also briefly considered.