Al-Mustaqbal University

College of Sciences

Medical Biotechnology Department

جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم

قسم التقنيات الاحيائية الطبية

Molecular Biology

Lec. 1
Introduction to Molecular Biology

by

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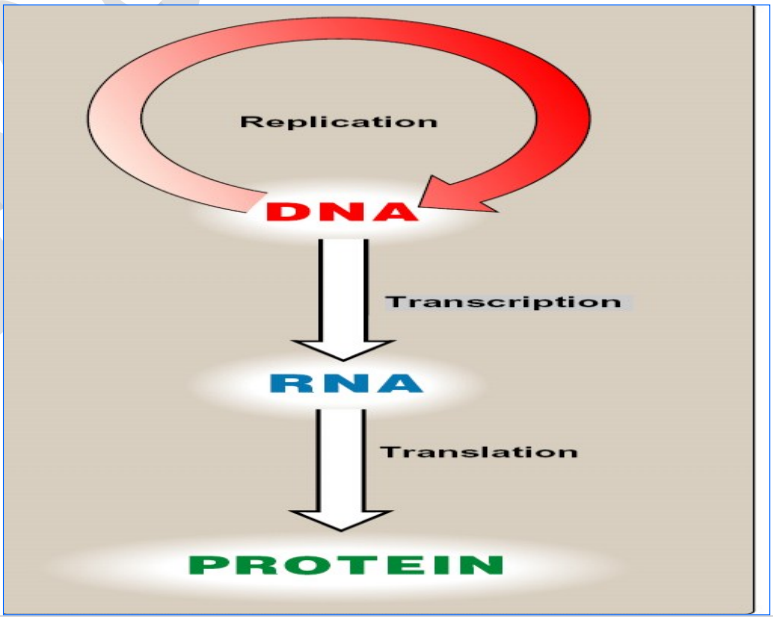
Week	Topic covered
١ _ ٢	Introduction in Molecular Biology Structure of DNA & RNA DNA as the vehicle of inheritance
٣ _ ٥	DNA replication and transcription
٦ _ ٧	Gene expression and regulation
٨	Post transcriptional modification
٩ _ ١٠	Translation and protein synthesis
١١ _ ١٣	Post translation modifications. Inhibitors of translation
١٤ - ١٥	Repair of DNA – types of damages, repair
١٦ - ١٨	Gene mutation and chromosomal aberrations. Cause of mutation-chemical and physical agents.
١٩ _ ٢٣	Recombinant- DNA technology, Role of restriction endonucleases, plasmid and cosmid cloning vectors
٢٤ _ ٢٧	Brief outline of molecular cloning.Applications or recombinant DNA technology.
٢٨ _ ٣٠	Disorders of Cell growth & carcinogenesis

Molecular Biology central dogma



The nucleic acid consists of:

1- Nucleotides
2- DNA
3- RNA

1. Nucleotides: structure and importance

Nucleotides = nitrogenous base + sugar + phosphate group

Nucleoside = nitrogenous base + sugar

Nitrogenous base = Purine OR Pyrimidine

Purine = Adenine OR Guanine

Pyrimidine = Thymine, Cytosine OR Uracil

- **DNA contains** Adenine & Guanine (purines)
  Cytosine & Thymine (pyrimidines)

- **RNA contains** Adenine & Guanine (purines)
  Cytosine & Uracil (pyrimidines)

Sugar = Ribose OR Deoxyribose

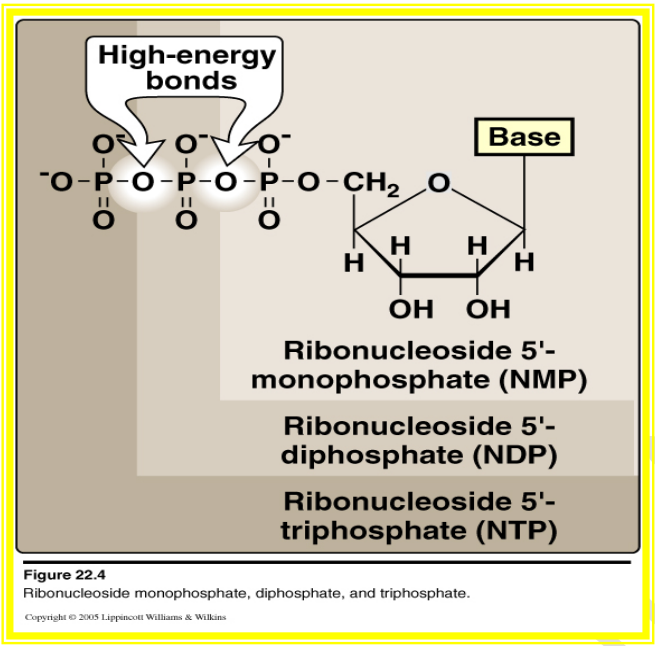
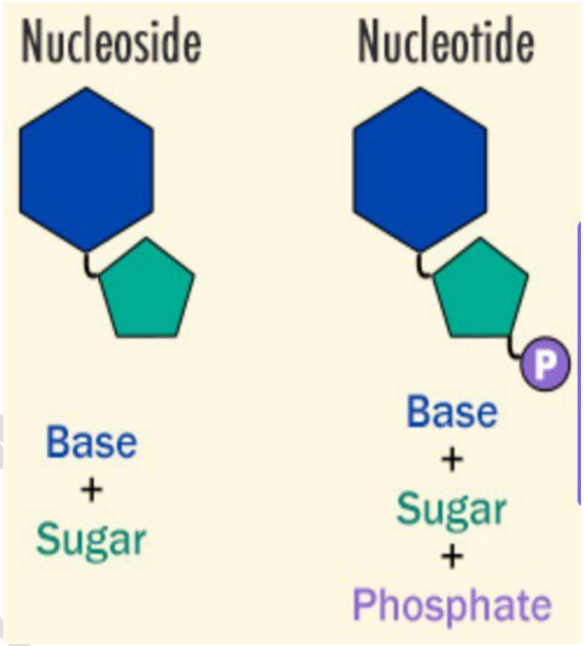


Figure 22.4
Ribonucleoside monophosphate, diphosphate, and triphosphate.



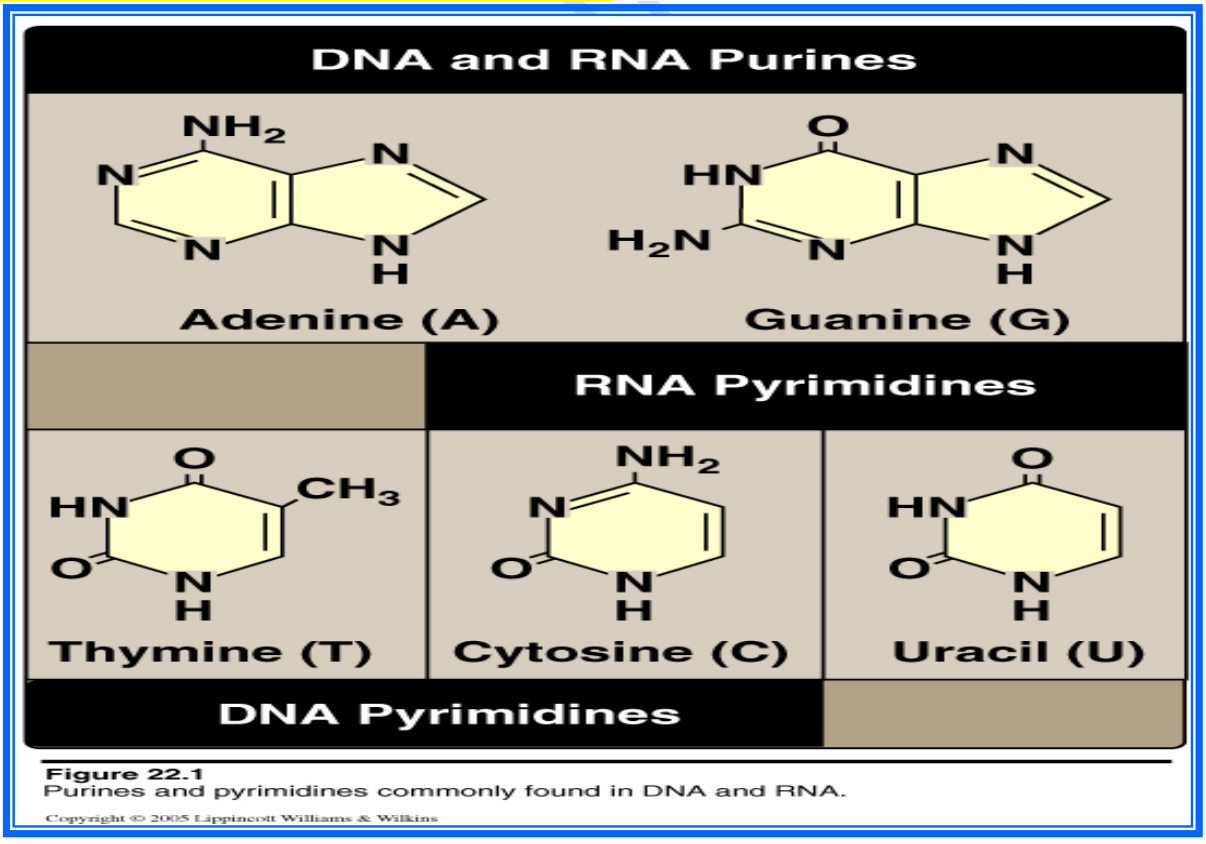


Figure 22.1
Purines and pyrimidines commonly found in DNA and RNA.

Importance of nucleotides

1- Building units for nucleic acids (DNA & RNA)

2- Other rules in metabolism & energy storage (e.g. ATP is a nucleotide)

Metabolism of nucleotides

1- Synthesis (anabolism)

i. sources of purine ring atoms

ii. sources of pyrimidine ring atoms

2- Degradation (catabolism)

i. end products of purine ring

ii. end product of pyrimidine ring

End products of purine ring degradation

In human cells purine nucleotides is finally degraded to **URIC ACID**

Uric acid is transported in blood to **kidneys**

Finally, Uric acid is excreted in **urine**

If uric acid is increased in blood, the case is called **HYPERURICEMIA**

Hyperuricemia may lead to **GOUT**

GOUT is a disease affects joints (**arthritis**) & kidneys (**kidney stones**) caused by deposition of uric acid in these tissues.