

Basic Medical Microbiology

1-Microbial Taxonomy:
*Plays role in diagnostic microbiology and
infectious diseases*

It contains from:

- classification
- nomenclature
- identification

CLASSIFICATION: Classification is the organization of microorganisms that share similar **morphologic, physiologic, and genetic** traits into specific groups



Basic Medical Microbiology

1-Microbial Taxonomy:

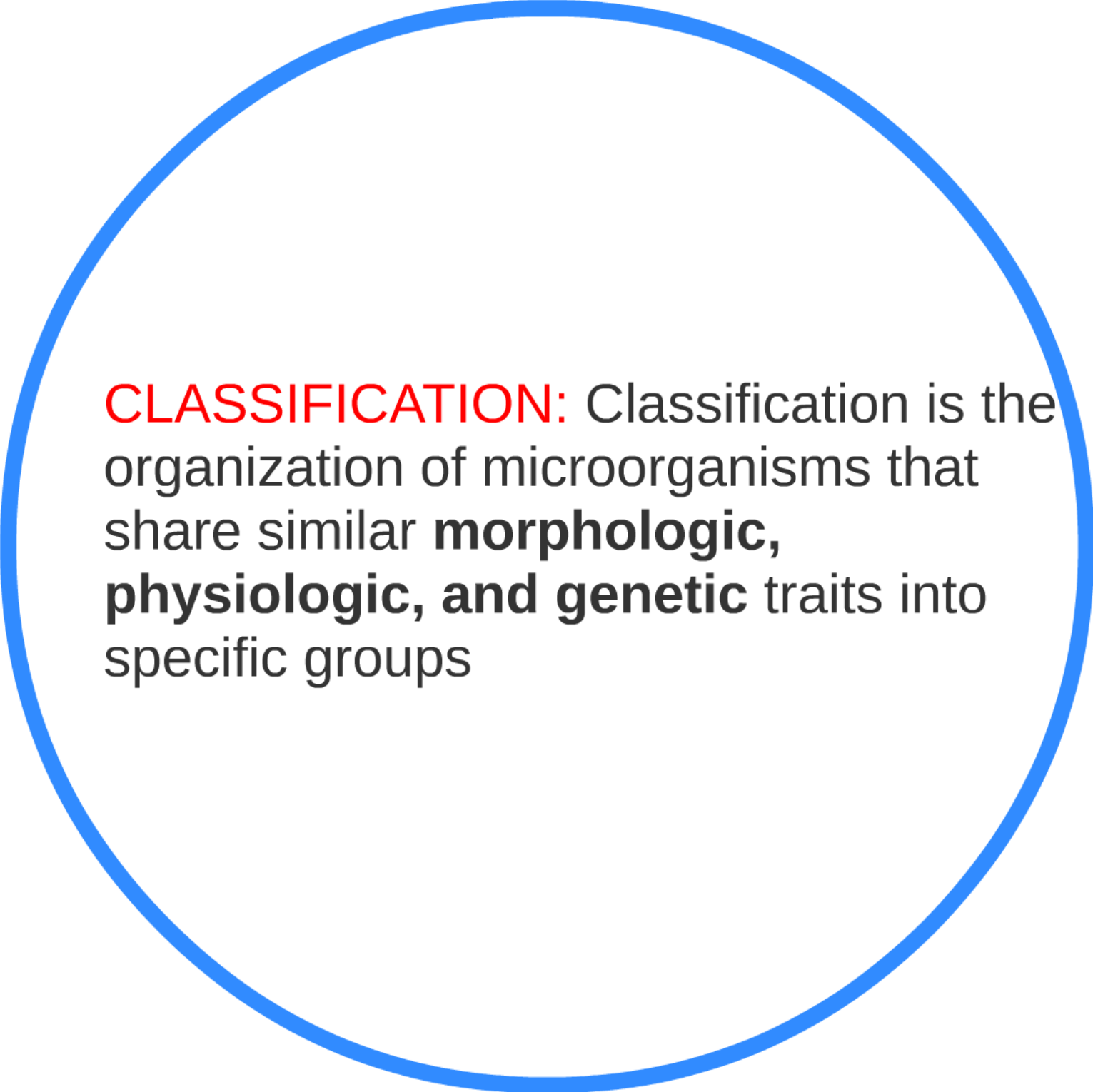
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It contains from:

classification

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CLASSIFICATION: Classification is the organization of microorganisms that share similar **morphologic, physiologic, and genetic** traits into specific groups

NOMENCLATURE (Naming):

Genus
species

ex: Staphylococcus aureus

or

Staphylococcus aureus

IDENTIFICATION:

The process by which a microorganism's key features are delineated

IDENTIFICATION METHODS:

1-Phenotypic characteristics

2-Genotypic characteristics

Phenotypic characteristics:

- 1-Macroscopic morphology
- 2-Microscopic morphology
- 3-Staining characteristics
- 4-Environmental requirements
- 5-Nutritional requirements
- 6-Resistance profiles
- 7-Antigenic properties
- 8-Subcellular properties

Genotypic characteristics:

1-DNA base composition ratio

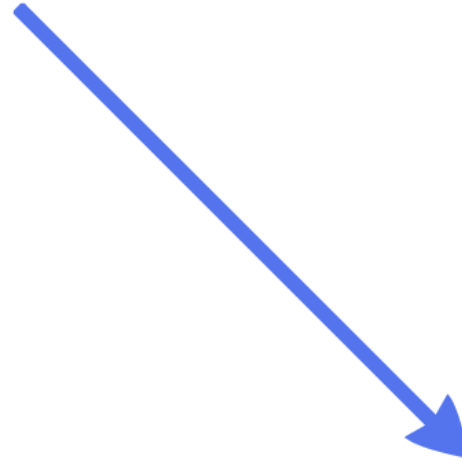
2-Nucleic acid (DNA and RNA) base sequence analysis

NUCLEIC ACID STRUCTURE AND ORGANIZATION:

nucleic acids



deoxyribonucleic acid (DNA)



ribonucleic acid (RNA)

Nucleotide Structure and Sequence:

deoxyribose sugars

phosphate

bases



nucleotide

The bases



```
graph TD; A[The bases] --> B["(purines)"]; A --> C["(pyrimidines)"]; B --> D["adenine (A)"]; B --> E["guanine (G)"]; C --> F["cytosine (C)"]; C --> G["thymine (T)"];
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(purines)

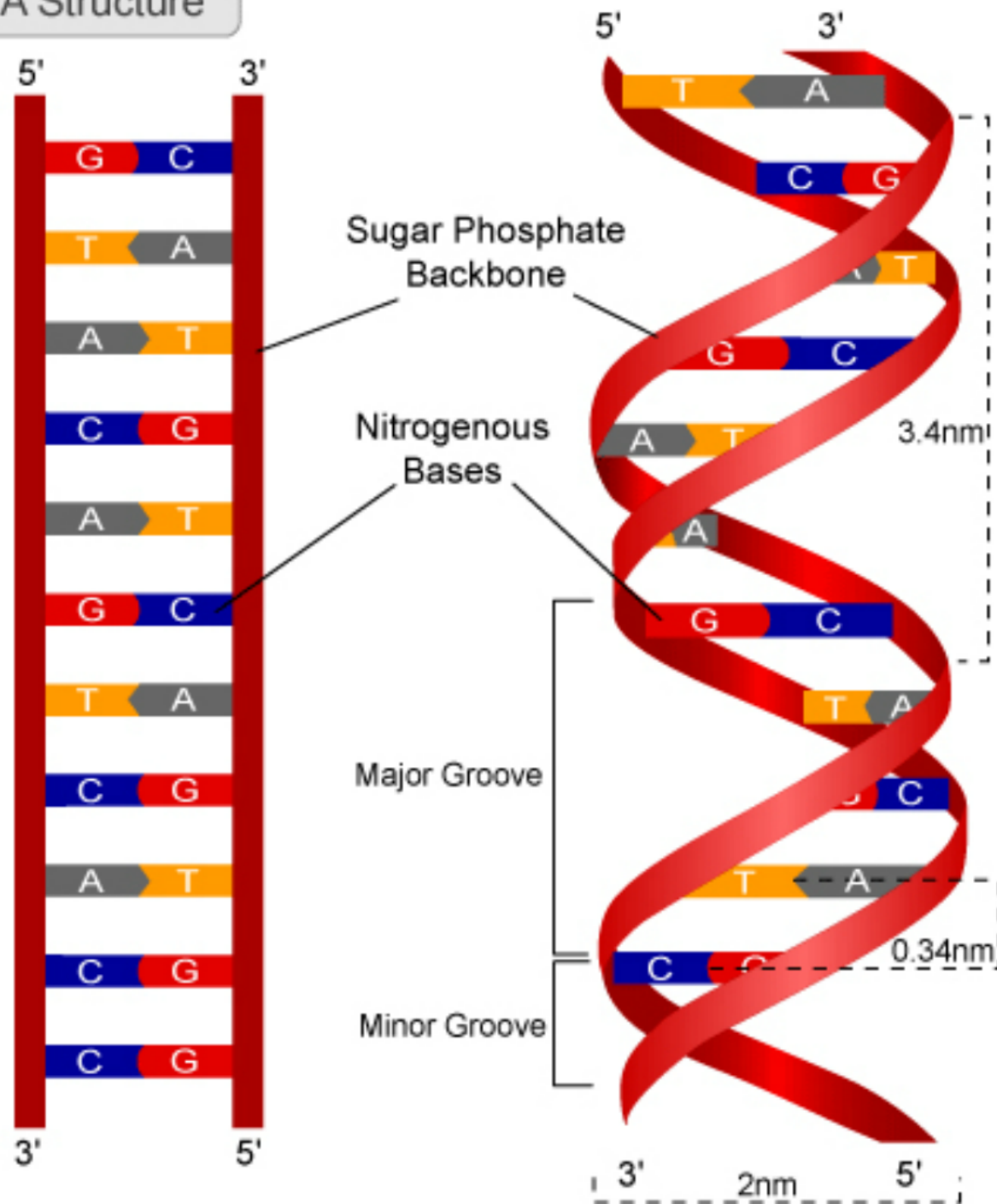
adenine (A)
guanine (G)

(pyrimidines)

cytosine (C)
thymine (T)

In RNA, uracil(U) replaces thymine

DNA Structure



*DNA and RNA are **nucleotide polymers**

* The order of bases along a DNA or RNA strand is known **as the base sequence**

*This sequence provides the information that specifies the proteins that will be synthesized by microbial cells (**i.e., the sequence is the genetic code**)

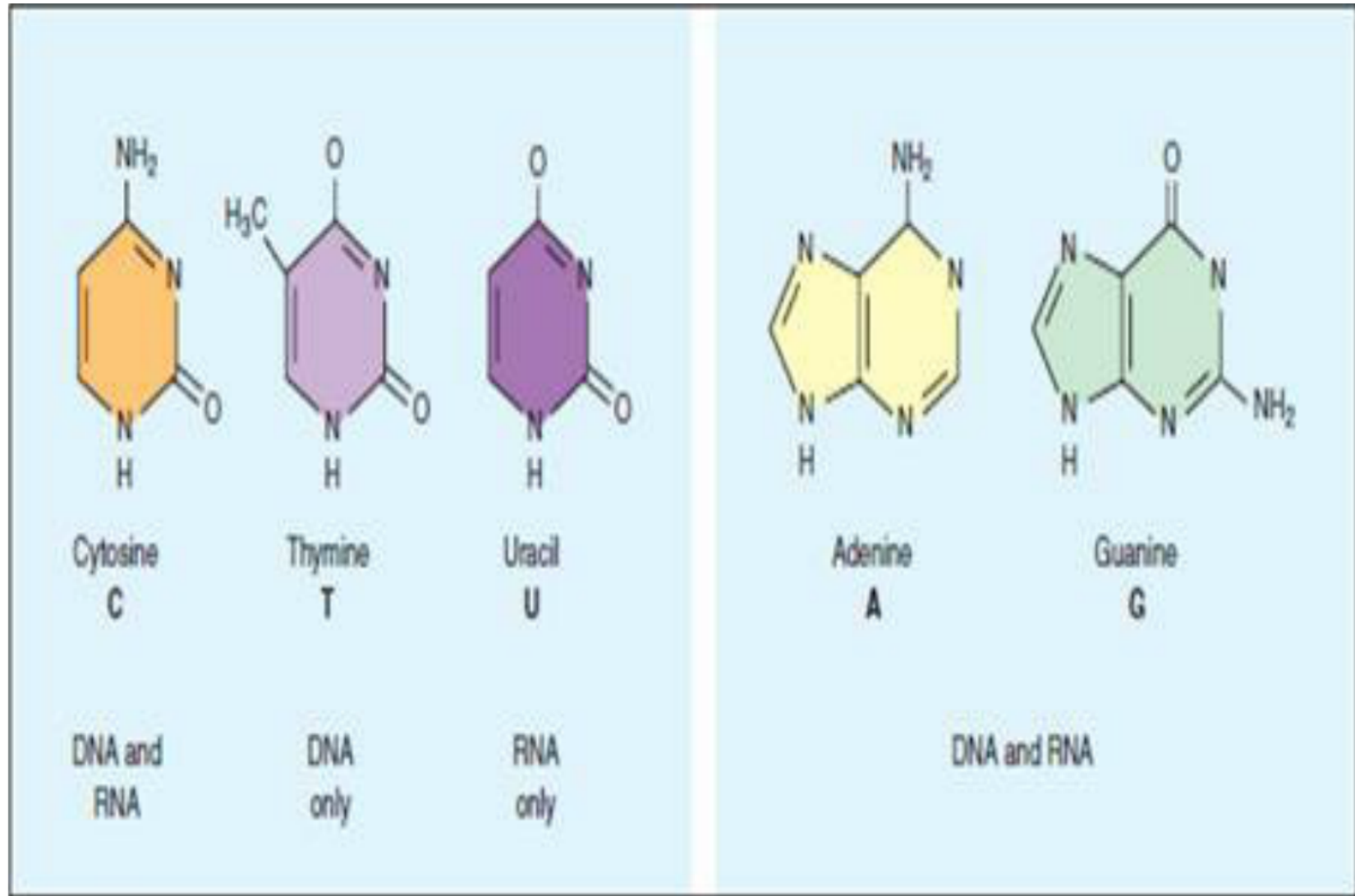


Figure 2-3 Molecular structure of nucleic acid bases. Pyrimidines: cytosine, thymine, and uracil. Purines: adenine and guanine.

**RNA rarely exists as a double-stranded molecule*

the three major types of RNA:

(messenger RNA [mRNA]

transfer RNA [tRNA]

ribosomal RNA [rRNA])

****Genes contain the codes for the production of specific proteins. The information contained within DNA is not directly converted to proteins, but must first be transcribed in a process called DNA transcription.***

****The size of a gene and an entire genome is usually expressed in the number of base pairs (bp) present (e.g., kilobases [10^3 bases], megabases [10^6 bases]).***

A genome is an organism's complete set of DNA, including all of its genes.