RECAP AND GENERAL OVERVIEW

Ass. Prof. Dr. Jaafaru Sani Mohammed

Advance Clinical Biochemistry I (MA 407)

Summer Semester

Week one

11/08/2025

Outlines

- Topics to be covered for the semester.
- Recap on general biochemistry.
- Introduction Adv. Biochemistry.
- Familiarization with terminologies.

Objectives

- At the end of this lesson, you should be able to:
- To remember basis of general biochemistry.
- Understand the basic concept of clinical biochemistry.
- Familiarize terminologies used in the course.

Classroom policy

1. **Attendance:** Strongly encouraged to attend classes regularly and participate during lectures.

2. **Lateness:** Lateness to class is disruptive and prohibited

3. **Electronic devices:** Any form of device that could distract the class is not allowed to be used.

4. **Talking and improper movement: S**ide conversations and restlessness during lectures are distracting.


Expectations

From me

1. Knowledge and expertise
2. Effective communication
3. Accessibility and availability
4. Respect for diversity
5. Making the environment Scientific
6. Listening to new ideas
7. Quick response to inquiries
8. Assessment and feedback

From you

1. Active Participation in discussions
2. Response to ambiguous statements
3. Self-respect and respect for all.
4. Note-taking during lectures
5. Utilising the office hours effectively
6. Early preparations for quizzes and exams
7. Honesty and Transparency
8. And many more

Topics to be covered

- Recap on previous courses and general introduction
- Water and its biochemical importance
- Electrolytes in biosystem
- Acid base balance and disturbances
- Advance carbohydrates
- Digestion, absorption and assimilation of protein
- Digestion, absorption and assimilation of lipid
- Metabolism of carbohydrate and its related disorders
- Metabolism of proteins and its related disorders
- Metabolism of lipids and its related disorders

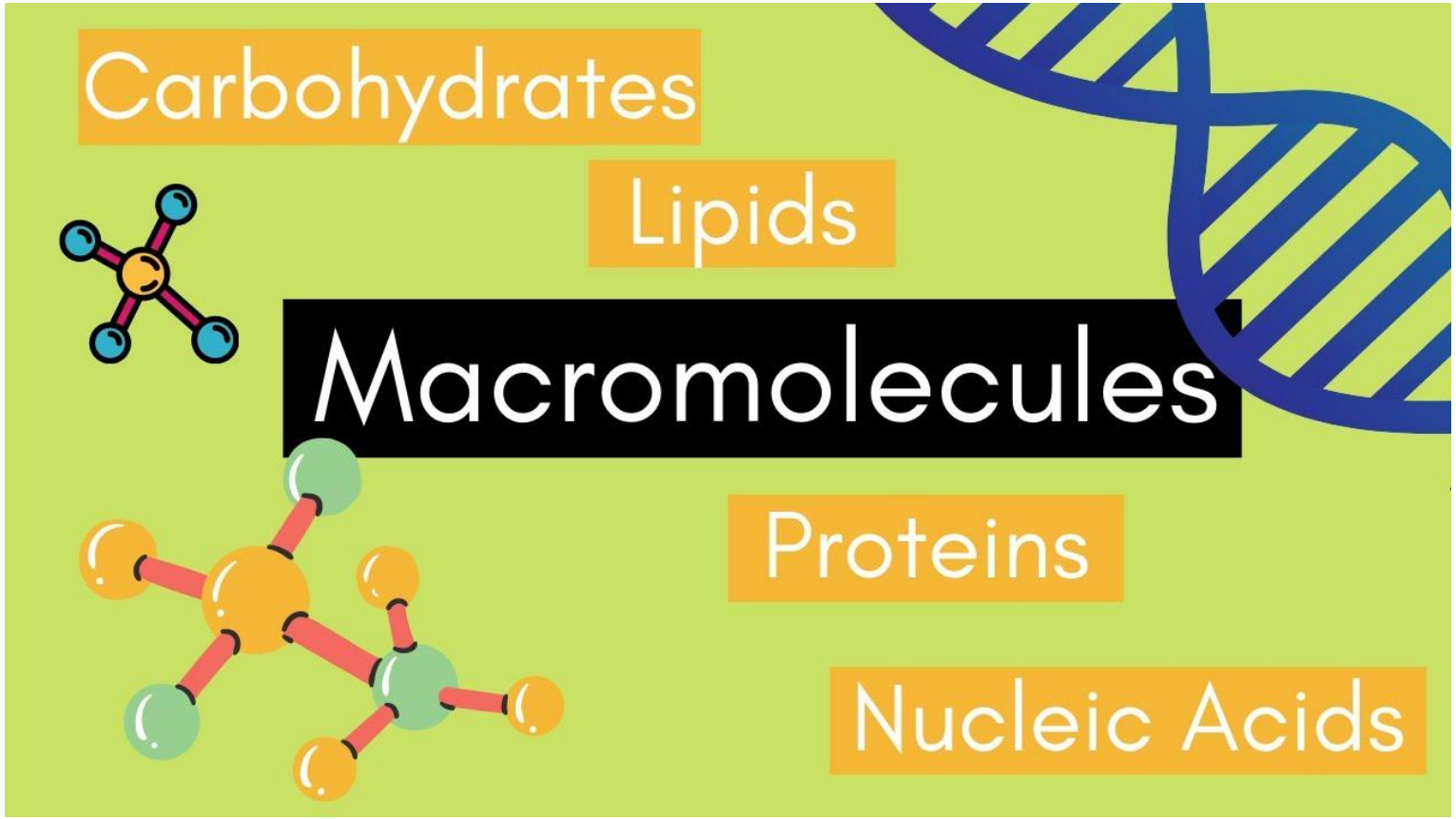
Recap

Biochemistry is the application of chemistry to the study of biological processes at the cellular and molecular level.

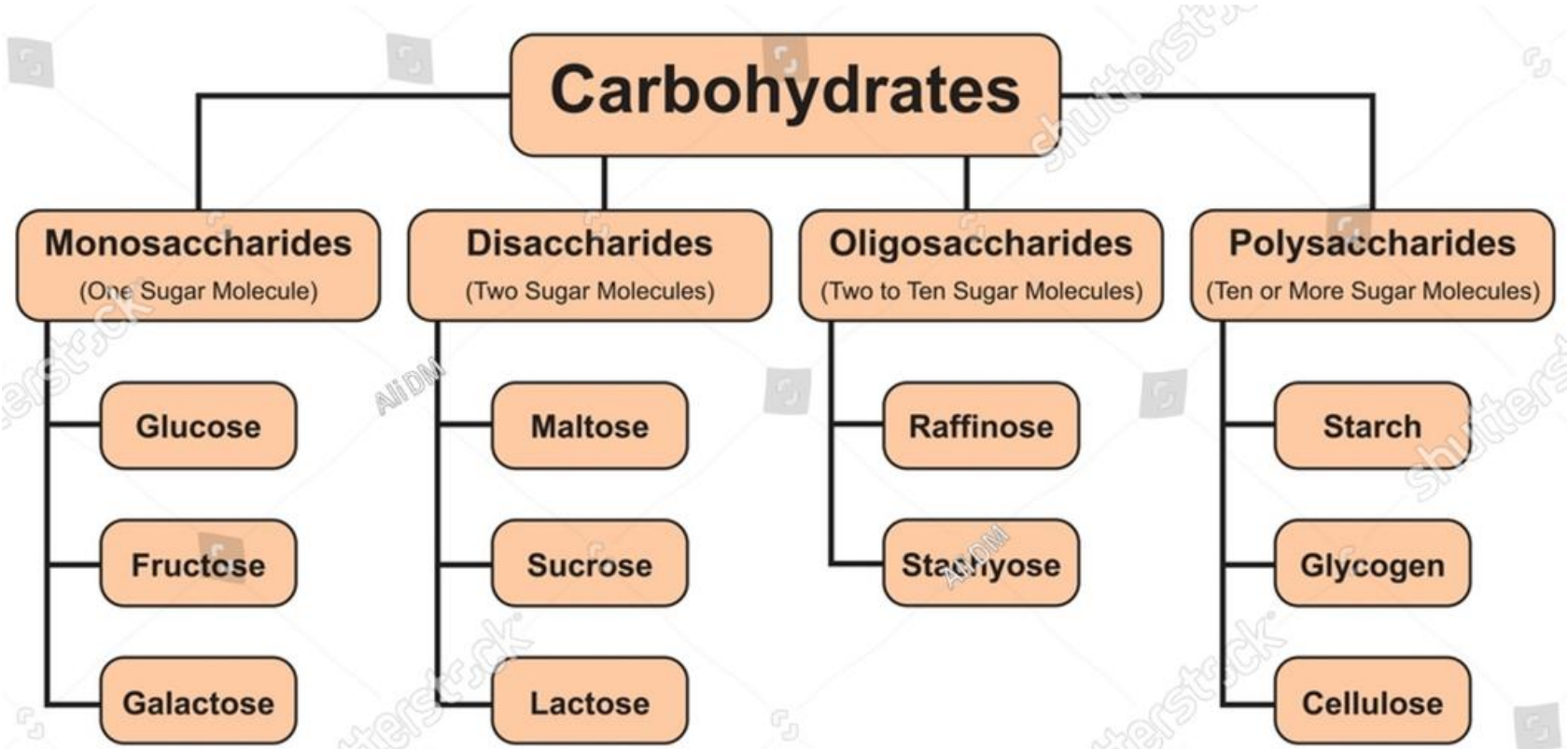
The discipline emerged as a unique one by combining chemistry, physiology, and biology to investigate the chemistry of living systems.

It is a laboratory-based science that explores chemical processes related to living organisms.

It involved studying the structure, composition, and chemical reactions of substances in living systems.

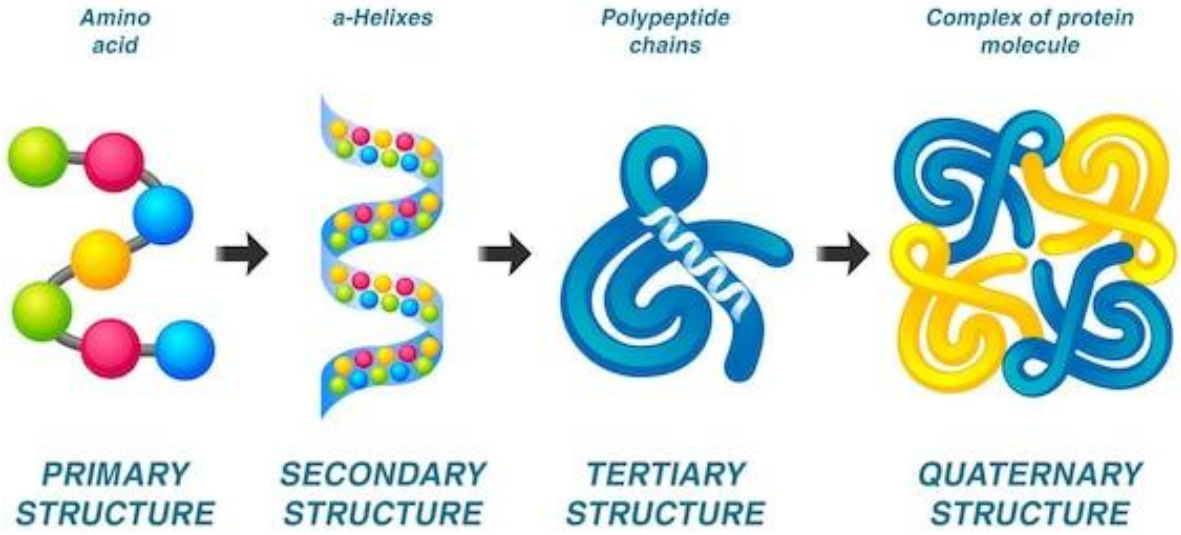


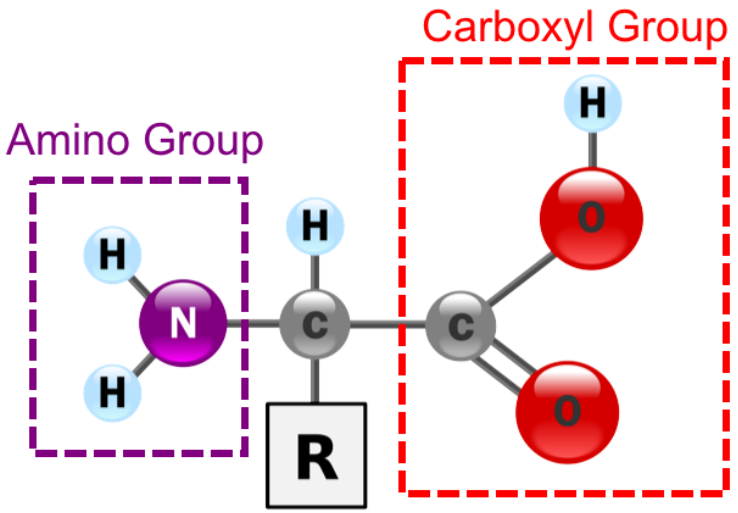
- The large molecules required for life.
- Built from smaller organic molecules.
- There are four major biological macromolecules.
- Together, these molecules form most of a cell's mass.



Carbohydrate

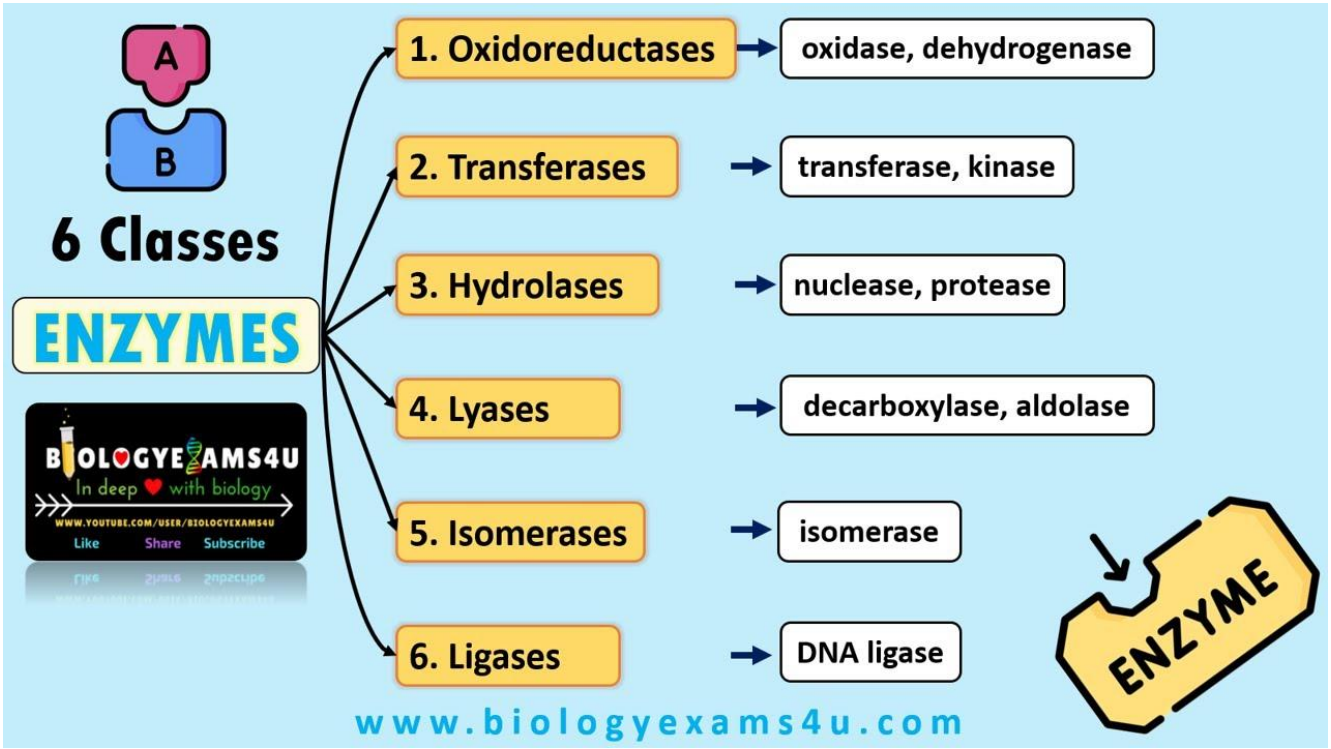
- Sources
- Types
- Classifications
- Uses
- Importance

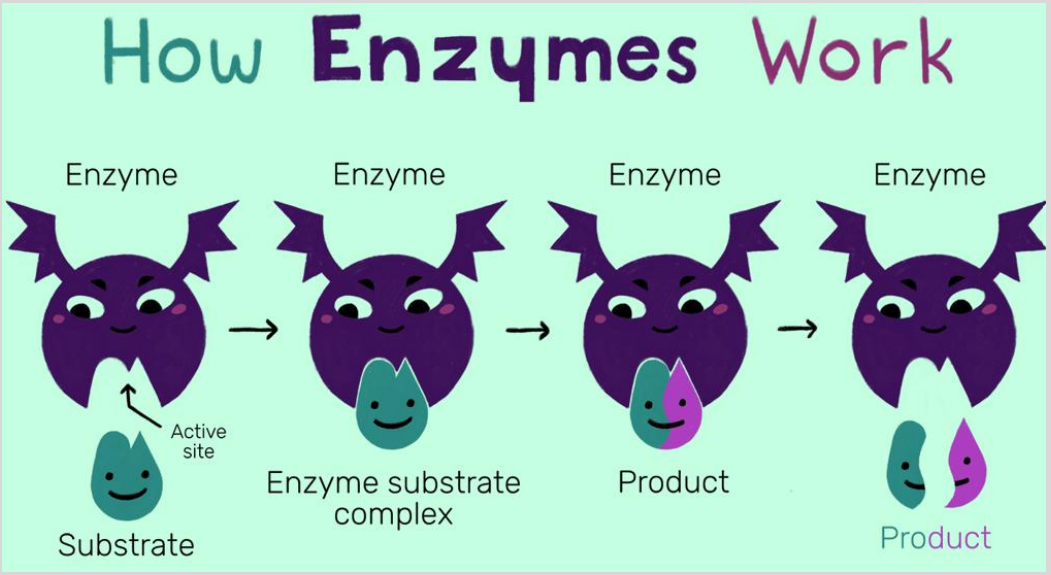




Protein

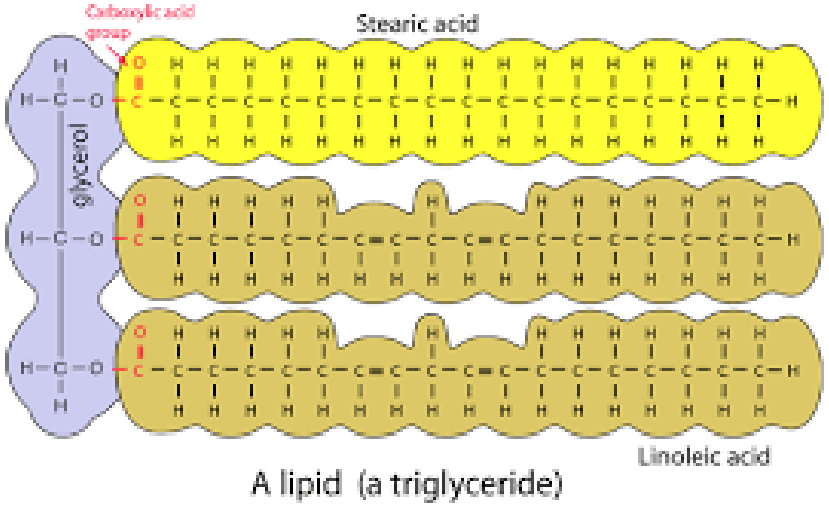
- Sources:
- Types:
- Classifications:
- Uses:
- Importance:



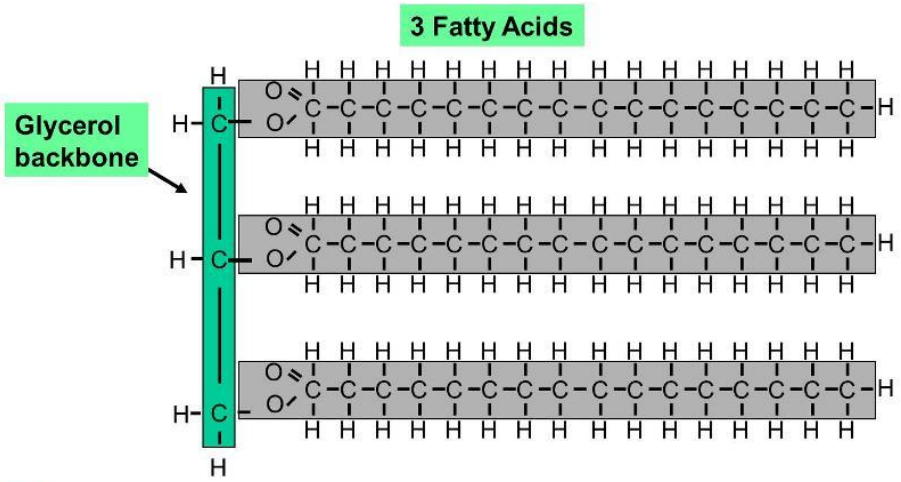


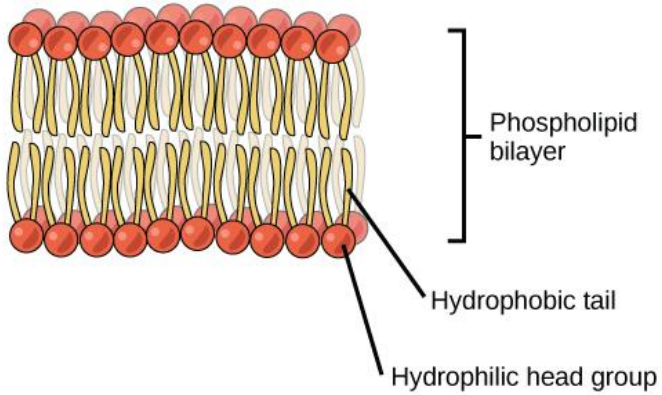
Enzymes

- Nature
- Classifications
- Functions
- Importance.



A lipid (a triglyceride)



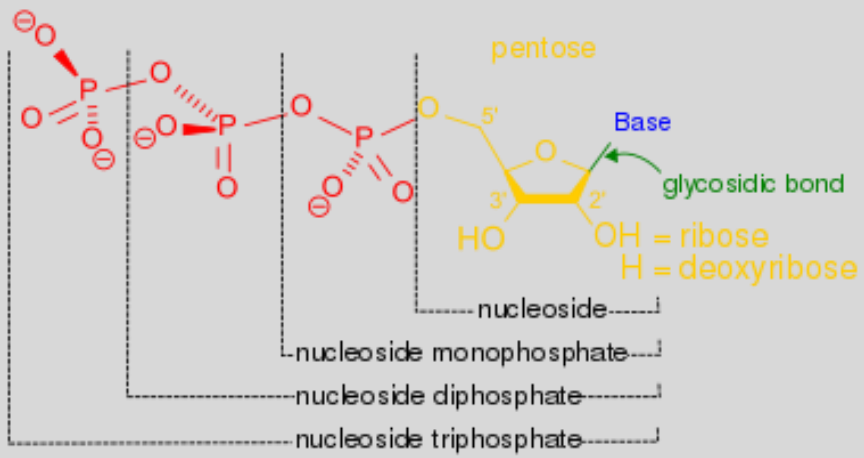


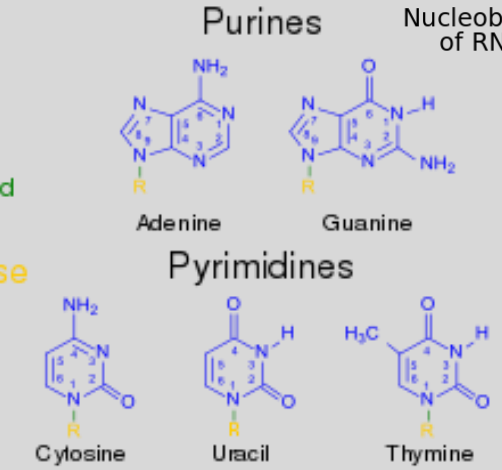
Lipids

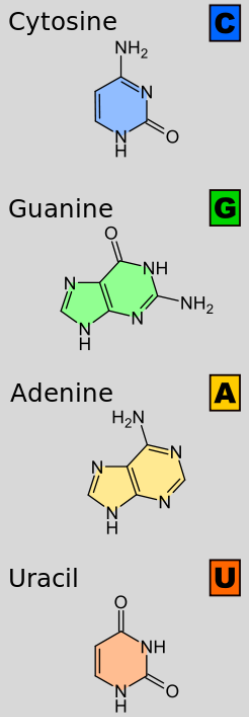
- Sources
- Types
- Classifications
- Uses
- Importance

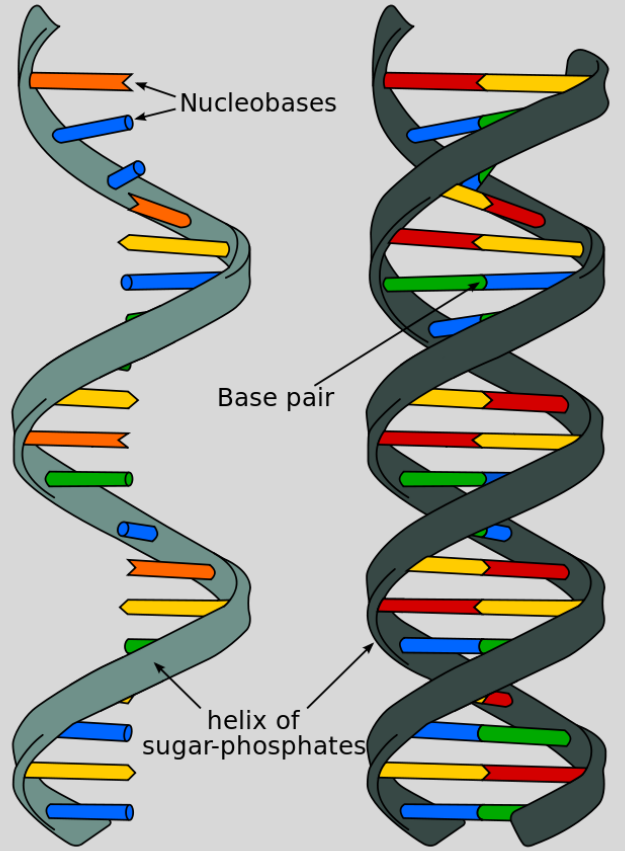
Nucleic Acid

- Sources:
- Types:
- Classifications:
- Uses:
- Importance:



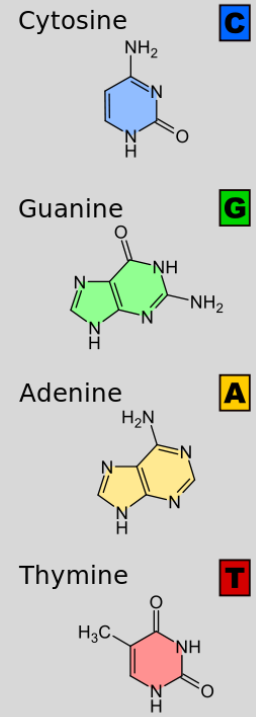






RNA
Ribonucleic acid

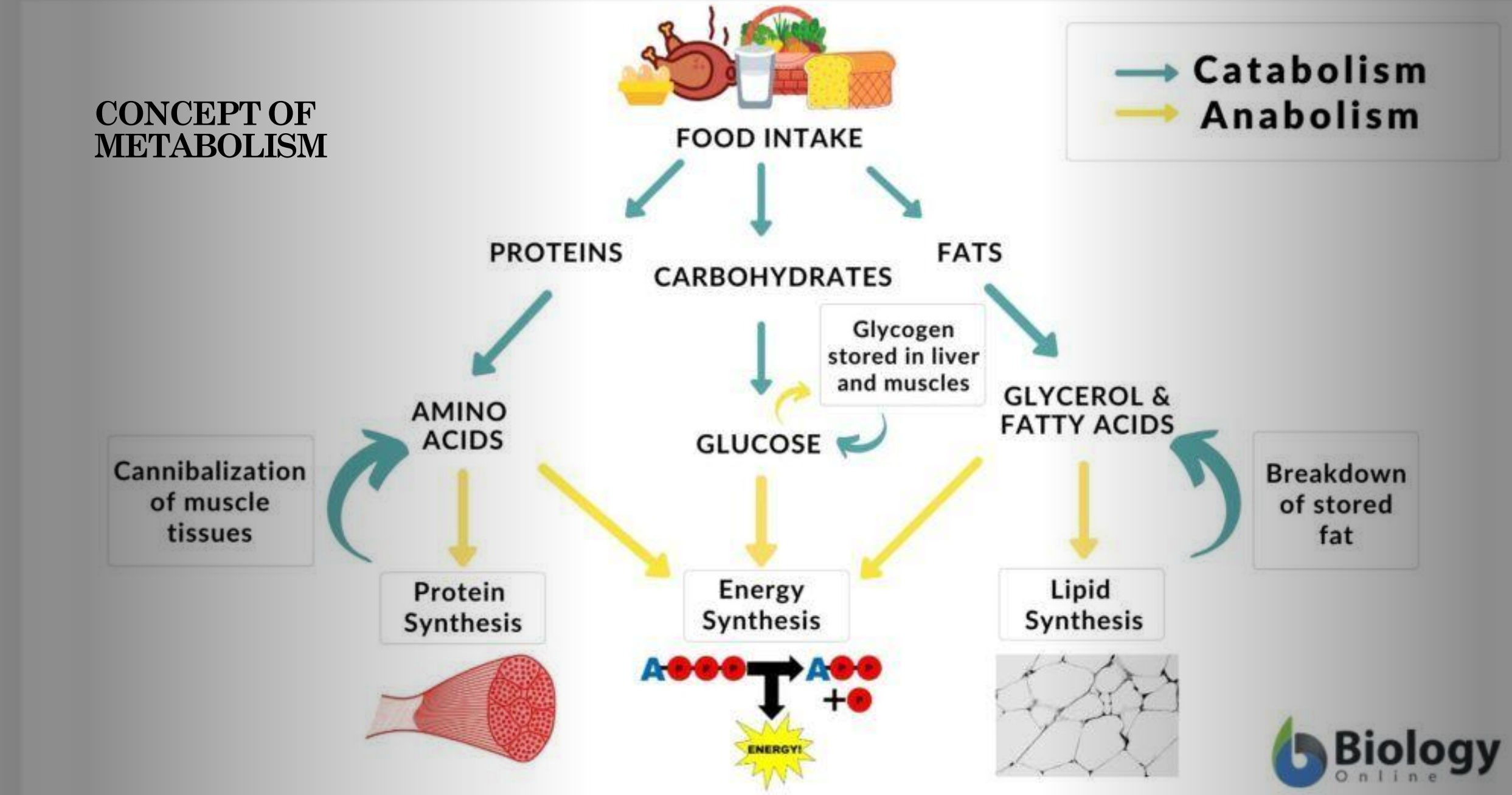
DNA
Deoxyribonucleic acid



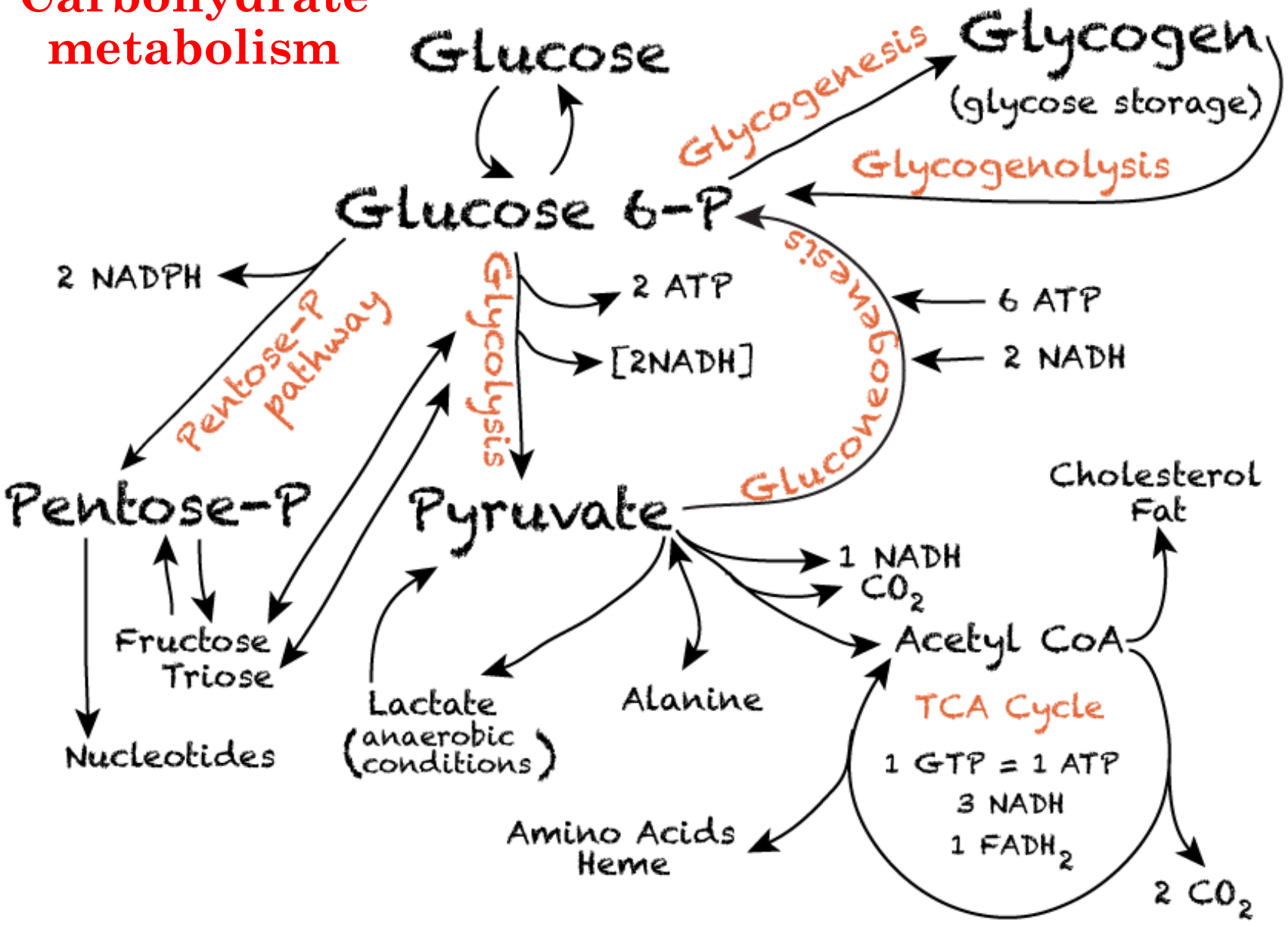
Clinical Biochemistry (molecular basis of diseases)

Metabolism

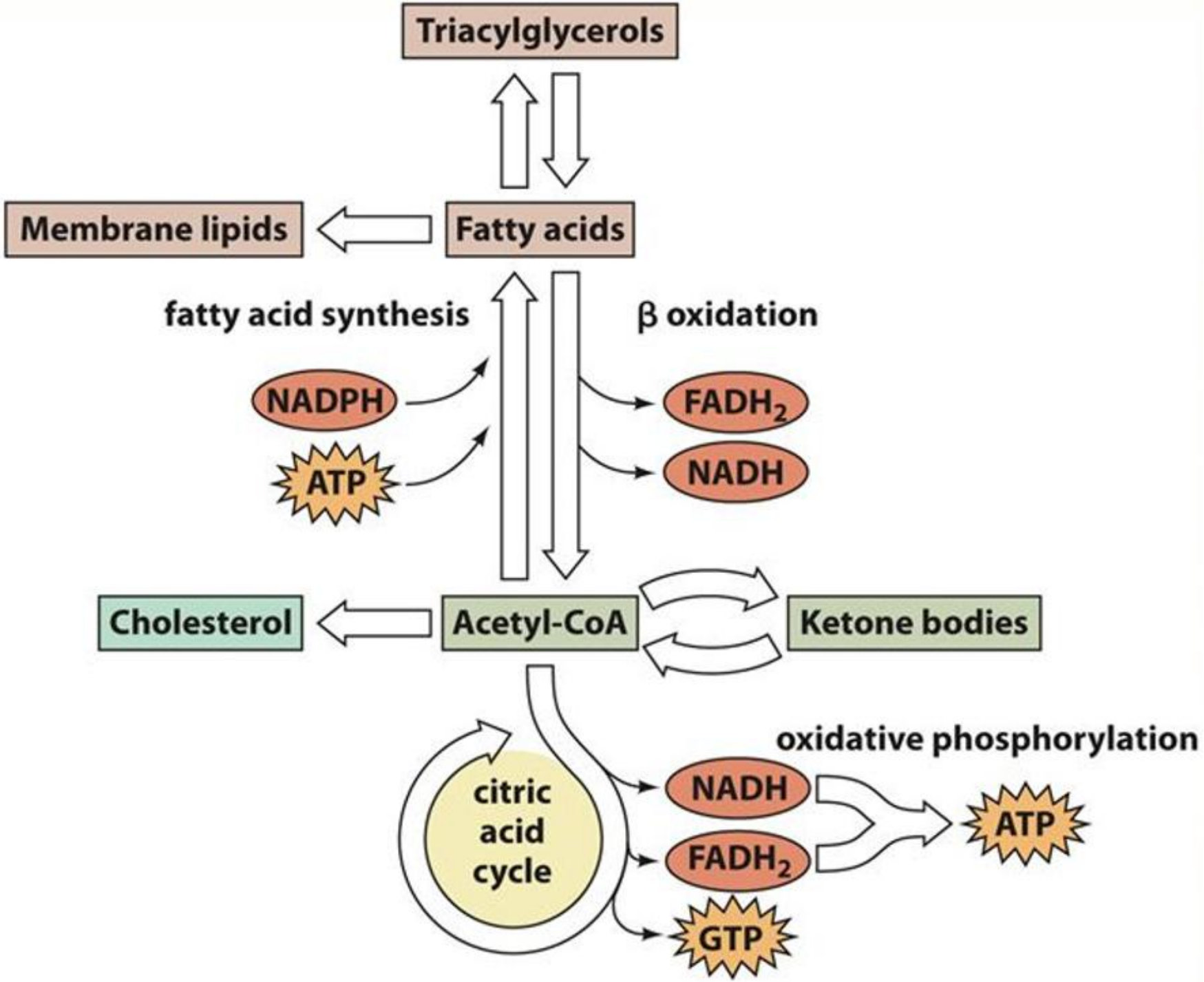
CONCEPT OF METABOLISM



Carbohydrate metabolism

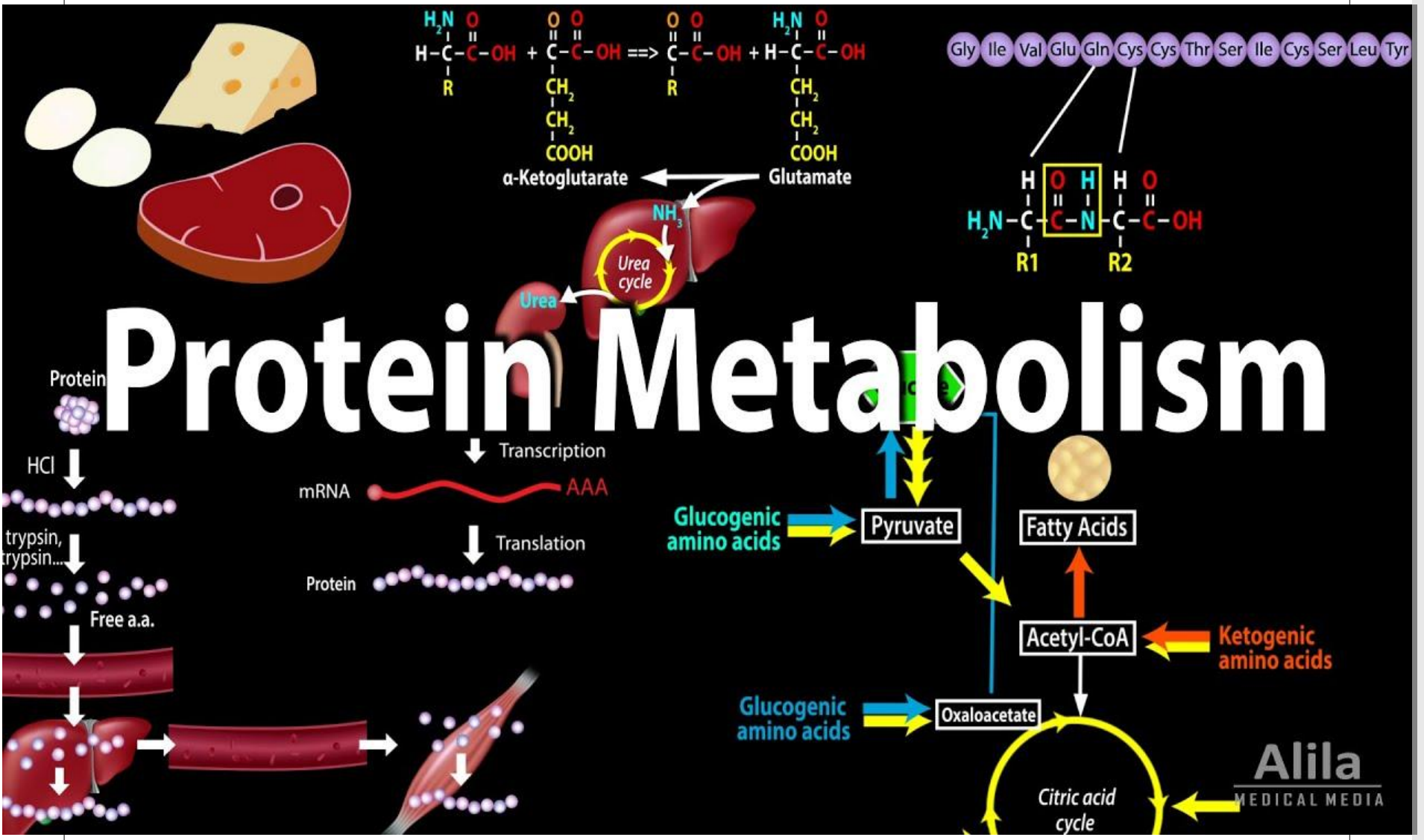


- A fundamental biochemical process that ensures a constant supply of energy to living cells.
- The most important carbohydrate is glucose.
- It is oxidized via glycolysis, TCA cycle, and oxidative phosphorylation to generate ATP.



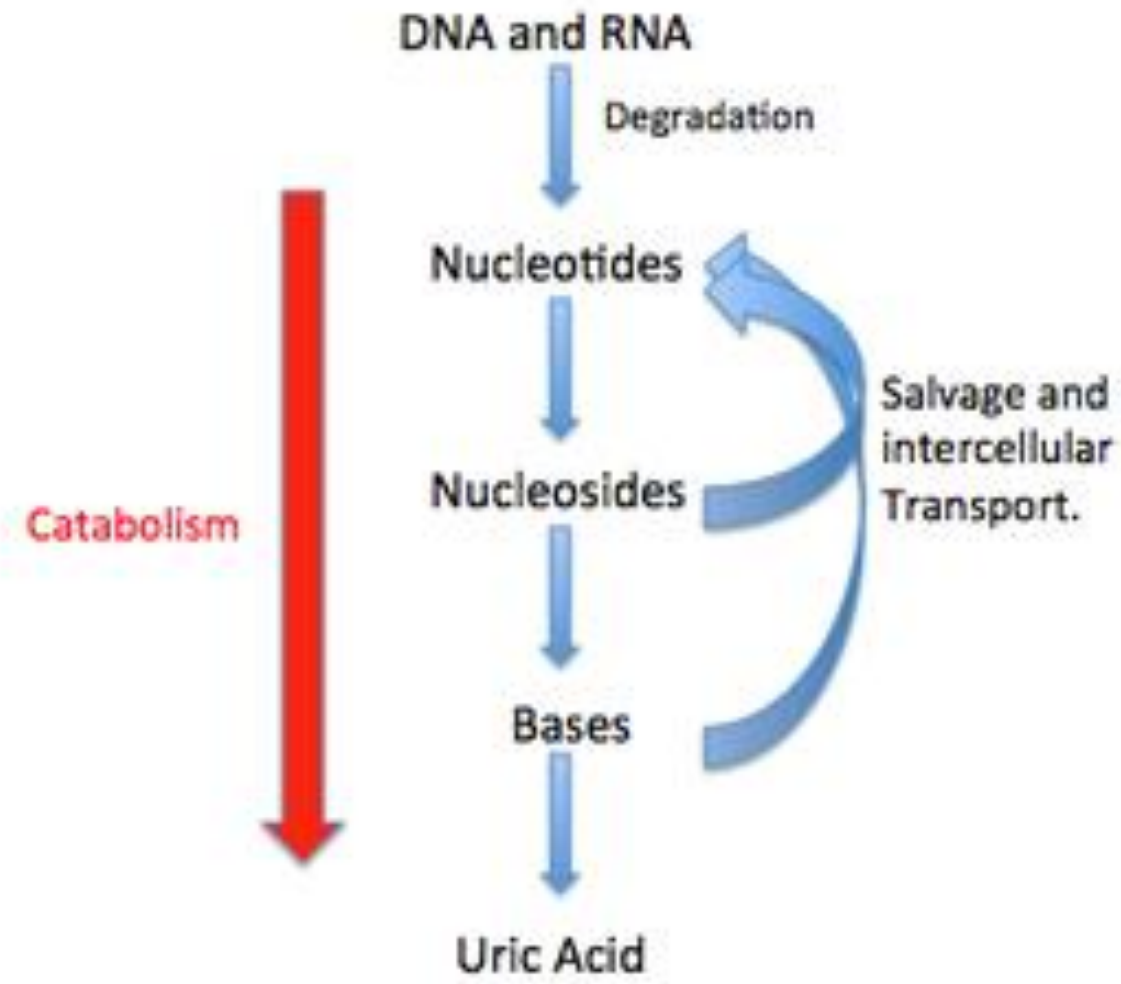
Lipid metabolism

- Involves the synthesis of lipids (phospho, glyco, sphingo, cholesterol) that are characteristic of individual tissues.
- Degradation of lipids to satisfy the metabolic needs of the body (e.g., energy production)



Protein metabolism

- It signifies the various biochemical processes responsible for the synthesis of proteins and amino acids.
- The breakdown of proteins by catabolism.



Nucleic Acid Metabolism

- It encompasses the formation and polymerization of nucleotides into DNA and RNA.
- Further modification of these macromolecules and their catabolism and excretion

References

- Pigman, W. (Ed.). (2012). *The carbohydrates: chemistry and biochemistry*. Elsevier.It is recommended that you use current textbooks and up-to-date materials.
- Rodwell, V. W., Bender, D., & Botham, K. M. (2018). *Harper's illustrated biochemistry*. McGraw-Hill.
- Kenelly, P. J., Botham, K. M., McGuinness, O. P., Rodwell, V. W., & Weil, P. A. (2018). *Illustrated Biochemistry* (Vol. 118). Mc Graw Hill (31st ed.). https://doi. org/10.1161/CIRCRESAHA.


Questions
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