

DOCTORAL SCHOOL OF EXACT AND NATURAL SCIENCES
PHD PROGRAMME IN CHEMISTRY
TOPICS FOR QUALIFYING INTERVIEW, BIOCHEMISTRY

1. Subjects of biochemistry research. The rise and evolution of life on Earth.
2. Structural elements: amino acids, peptides, proteins, sugars, lipids, nucleosides and nucleotides, chemical structure, structure, properties.
3. The most important strategies for acquire energy by living organisms
4. Absorption and conversion of light energy (photosynthetic processes)
 - 4.1. mitochondrial respiratory chain
 - 4.2. Krebs cycle
 - 4.3. glycolysis
5. Biochemical strategies for the activation of compounds and catalytic strategies
6. Enzymes - structure, mechanisms of catalysis, kinetics and regulation of activity, allostery, inhibitors of enzymatic reactions, cofactors of enzymatic reactions.
7. Basic pathways of biosynthesis: gluconeogenesis, polysaccharide synthesis, biosynthesis of fatty acids, phospholipids and isoprenoids.
8. Storage and processing of genetic information.
 - 8.1. structure and properties of DNA and RNA
 - 8.2. catalytic properties of RNA
 - 8.3. genetic information encoding and decoding, gene structure
 - 8.4. protein biosynthesis and regulation of gene expression