

## Biochemistry qualifier exam study guide

The biochemistry qualifier is the ACS exam in biochemistry. A broad review of an undergraduate course in biochemistry is appropriate. For this, any undergraduate textbook will be helpful, such as Lehninger's "Principles of Biochemistry" (David L. Nelson & Michael M. Cox, Worth Publishers), Stryer's "Biochemistry" (Lubert Stryer, W. H. Freeman & Co. Publishers), Zubay's "Biochemistry" (Geoffrey Zubay, Wm. C. Brown Publishers), or Voet & Voet "Biochemistry" (Donald Voet & Judith G. Voet, Wiley & Sons Publishers).

The most important topics to consider in your review are the following:

### Amino acids, peptides, proteins

- Chemical properties ( $pK_a$ s of amino acids)
- Spectroscopic properties
- Secondary structure elements
- Tertiary folding of proteins
- Purification – chromatography, electrophoresis

### Protein function

- Biological catalysis
- Enzyme kinetics
- Cofactors of enzymatic reactions
- Inhibitors of protein enzymes
- Proteins as cell receptors

### Nucleotides, nucleic acids

- Spectroscopic properties
- Electrophoresis
- Watson-Crick complementarity
- Structure of nucleic acids

### Lipids

- Fatty acids
- Triacylglycerols
- Biological membranes
  - Components of
  - Transport across
- Steroid hormones

### Metabolism – know the enzymes, substrates, & products where appropriate

- Energetics, thermodynamics
- Oxidation-reduction reactions
- Glycolysis
- Citric acid cycle

**Fatty acid oxidation**

**Urea cycle**

**Amino acid catabolism**

**Oxidative phosphorylation**

**Photosynthesis**

**Carbohydrate biosynthesis**

**Cellular information transfer**

**Replication**

**Transcription**

**Translation**