We invite you to

Take a Closer Look...

The GRE® Biochemistry, Cell and Molecular Biology Test

Does your graduate department require or recommend that graduate applicants take the Biochemistry, Cell and Molecular Biology Subject Test offered by the GRE® Program?

This Subject Test can be very useful in distinguishing among candidates whose credentials are otherwise similar. The test measures undergraduate achievement and provides a common yardstick for comparing the qualifications of students from a variety of colleges and universities with different standards. Consider these factors:

**Predictive validity**
Subject Test scores are a valid predictor of graduate school performance, as confirmed by a meta-analysis performed by independent researchers who analyzed over 1,700 studies containing validity data for GRE tests.* This study showed that GRE Subject Tests are reliable predictors of a range of outcome measures, including first-year graduate grade-point average, cumulative graduate grade-point average, comprehensive examination scores, publication citation counts, and faculty ratings. For more information about the predictive validity of the GRE tests, visit [www.ets.org/gre/validity](http://www.ets.org/gre/validity).

**Content that reflects today’s curricula**
The test contains about 175 multiple-choice questions covering topics representing three major areas: biochemistry, cell biology, and molecular biology and genetics. Along with the total score, you receive a subscore in each of these areas to aid in guidance and placement. A detailed list of test content areas can be found on the back of this sheet. Many questions require problem-solving skills and analysis based on descriptions of laboratory situations, diagrams, or experimental results. Additional information about the test and a full-length practice test are provided FREE with test registration and can be downloaded at [www.ets.org/gre/subject/prepare](http://www.ets.org/gre/subject/prepare).

**Developed by leading educators in the field**
The content and scope of each edition of the test are specified and reviewed by a distinguished team of undergraduate and graduate faculty representing colleges and universities across the country.


For more information about this GRE® Subject Test, contact the GRE Program:
Phone: 1-609-683-2002
Email: gretests@ets.org
Fax: 1-609-683-2040

Educational Testing Service
Rosedale Road
Princeton, NJ 08541

www.ets.org/gre
Test Content

I. BIOCHEMISTRY (36%)

A. Chemical and Physical Foundations
   - Thermodynamics and kinetics
   - Redox states
   - Water, pH, acid-base reactions and buffers
   - Solutions and equilibria
   - Solute-solvent interactions
   - Chemical interactions and bonding
   - Chemical reaction mechanisms

B. Structural Biology: Structure, Assembly, Organization, and Dynamics
   - Small molecules
   - Macromolecules
   - Supramolecular complexes

C. Catalysis and Binding
   - Enzyme reaction mechanisms and kinetics
   - Ligand-protein interaction

D. Major Metabolic Pathways
   - Carbon, nitrogen, and sulfur assimilation
   - Anabolism
   - Catabolism
   - Synthesis and degradation of macromolecules

E. Bioenergetics
   - Energy transformations at the substrate level
   - Electron transport
   - Proton and chemical gradients
   - Energy coupling

F. Regulation and Integration of Metabolism
   - Covalent modification of enzymes
   - Allosteric regulation
   - Compartmentation
   - Hormones

G. Methods
   - Spectroscopy
   - Isotopes
   - Separation techniques
   - Immunotechniques

II. CELL BIOLOGY (28%)

A. Cellular Compartments of Prokaryotes and Eukaryotes: Organization, Dynamics and Functions
   - Cellular membrane systems
   - Nucleus
   - Mitochondria and chloroplasts

B. Cell Surface and Communication
   - Extracellular matrix
   - Cell adhesion and junctions
   - Signal transduction
   - Receptor function
   - Excitable membrane systems

C. Cytoskeleton, Motility, and Shape
   - Regulation of assembly and disassembly of filament systems
   - Motor function, regulation and diversity

D. Protein, Processing, Targeting, and Turnover
   - Translocation across membranes
   - Posttranslational modification
   - Intracellular trafficking
   - Secretion and endocytosis
   - Protein turnover

E. Cell Division, Differentiation and Development
   - Cell cycle, mitosis, and cytokinesis
   - Meiosis and gametogenesis
   - Fertilization and early embryonic development

III. MOLECULAR BIOLOGY AND GENETICS (36%)

A. Genetic Foundations
   - Mendelian and non-Mendelian inheritance
   - Transformation, transduction, and conjugation
   - Recombination and complementation
   - Mutational analysis

B. Chromatin and Chromosomes
   - Karyotypes
   - Translocations, inversions, deletions and duplications
   - Aneuploidy and polyploidy

C. Genomics
   - Genome structure
   - Physical mapping
   - Repeated DNA and gene families

D. Genome Maintenance
   - DNA replication
   - DNA damage and repair
   - DNA modification
   - DNA recombination and gene conversion

E. Gene Expression
   - The genetic code
   - Transcription/transcriptional profiling
   - RNA processing
   - Translation

F. Gene Regulation
   - Positive and negative control of the operon
   - Promoter recognition by RNA polymerases
   - Attenuation and anti-termination
   - Trans-acting regulatory factors
   - Gene rearrangements and amplifications
   - Small non-coding RNAs

G. Viruses
   - Genome replication and regulation
   - Virus assembly
   - Virus-host interactions

H. Methods
   - Restriction maps and PCR
   - Nucleic acid blotting and hybridization
   - DNA cloning in prokaryotes and eukaryotes
   - Sequencing and analysis
   - Protein-nucleic acid interaction
   - Transgenic organisms
   - Microarrays