

Department of Biochemistry
College of Science
King Saud University
BCH 361 (3+1)

| Lecture No. | Topics | Book Page No. |
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| 1 | Introduction to Molecular Biology; brief history and noble prize winning discoveries; the era of genomics and proteomics | Slides |
| 2-4 | Early evidence of DNA as the carrier of genetic information- [Griffith; Avery & Macleod; Hershey & Chase; TMV experiments] | Book 2 P2-7 (photocopy) |
| 5-6 | The genome of prokaryotes and eukaryotes- nuclear and extranuclear genetic organization | Book 2 P29-33 (photocopy) |
| 7-8 | Chromosomes and chromatin; description of events during cell division [meiosis and mitosis] with emphasis on structure of chromosomes and chromatin. | Book 1 P962-968 Book 2 P115-128 P226-232 (photocopy) |
| 9-11 | Structure of DNA: primary, secondary and tertiary structure including: DNA topology; DNA packing; histones & histone modifications; transcriptionally active and inactive chromatin | Book 1 P271-281; 963-965 P1136-1138 |
| 12-14 | Functional types of DNA in the human genome: genes and gene-related sequences, multigenic families, pseudogenes; extragenic DNA (satellite, minisatellite; microsatellite; interspersed repeats- SINE and LINE; telomeric) and DNA transposition | Book 2 P237-239 (photocopy) |
| 15-16 | RNA structure (primary, secondary and tertiary); classes of RNA (mRNA, rRNA, tRNA, and HnRNA) and RNA-technology (miRNA, siRNA); RNA's as enzymes | Book 1 P271-278; 283-286 P1034; 1045-1049 P1145-1146 |
| 17 | Physical and chemical properties of DNA and RNA. | Book 1 P287-292 |
| 18-22 | DNA Replication: the semi-conservative nature of DNA replication; the enzymes involved; the replicating fork; specialization of DNA polymerases; the replicon model of replication | Book 1 P977-992 |

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| | initiation; replicator sequences and initiator proteins; replication elongation and termination; mechanism of replication; Okazaki fragments; DNA ligases; telomerases and telomere-binding proteins; differences between eukaryotic and prokaryotic replication | |
| 23-26 | The mutability and repair of DNA; replication errors and their repair; DNA damage; DNA recombinations and transpositions | Book 1 P993-1016 |
| 27-28 | Gene structure: promoters; coding, enhancers; silencers, interrupted genes; importance of exon-intron and intron-exon junctions; | Book 3 P105-124 (photocopy) |
| 29-33 | Transcription & expression; mechanism of transcription; RNA polymerases; General and gene-specific Transcription factors: eukaryotic and prokaryotic transcription cycle; post-transcriptional modifications: Capping, polyadenylation, RNA splicing- alternative splicing, and RNA editing; exon shuffling mRNA transport; control of transcription; antibiotic inhibitors of transcription | Book 1 P1022-1045 |
| 34-36 | The genetic code; degeneracy; Wobble; difference in nuclear and mitochondrial genetic code | Book 1 P1065-1074 |
| 37-40 | Translation; Role of RNA's; the ribosome; translation initiation, elongation and termination; factors involved; regulation of translation; antibiotic inhibitors of translation | Book 1 1075-1099 |
| 41-42 | Post-translation modification; protein Storage; distribution | Book 1 1100-1109 |

Text Books:

Book 1:

Nelson, DL; Cox, ML. Lehninger: Principles of Biochemistry. 5th Ed. W.H.Freeman and Company; New York. 2008

Book 2:

Hartl DL and Jones EW. Genetics-Analysis of genes and genomes. 7th Ed. Jones and Bartlett Publishers, London. 2009

Book 3:

Watson JD, Myers RM, Caudy AA, Witkowski JA. Recombinant DNA: Genes and Genomes- A Short Course. 3rd Ed. W.H.Freeman and Company; New York. 2007

Note: For Book 2 and Book 3, the students will be given photocopy of the pages.