7.016: Introductory Biology
Barbara Imperiali, Massachusetts Institution of Technology, Fall 2018

1 Section 1

1.1 Introduction

1.2 Chemical bonding and molecular interactions; Lipids and membranes

1.3 Structures of amino acids, peptides and proteins

1.4 Enzymes and metabolism

1.5 Carbohydrates and glycoproteins

1.6 Nucleic Acids

1.7 Replication

1.8 Transcription

1.9 Chromatin remodeling and splicing

1.10 Translation

1.11 Cells, the simplest functional units

2 Section 2

2.1 Genetics 1—Cell division and segregating genetic material

2.2 Genetics 2—Rules of inheritance

2.3 Genetics 3—Linkage, crossing over

2.4 Genetics 4—The power of model organisms in biological discovery

2.5 Recombinant DNA, cloning, and editing

2.6 Genomes and DNA sequencing

2.7 SNPs and human genetics

3 Section 3

3.1 Cell trafficking and protein localization

3.2 Cell signaling 1—Overview

3.3 Cell signaling 2—Examples

3.4 Neurons, action potential, and optogenetics

3.5 Cell cycle and checkpoints

3.6 Stem cells, apoptosis, and tissue homeostasis

3.7 Cancer 1

3.8 Cancer 2

4 Section 4

4.1 Visualizing life—Dyes and stains

4.2 Visualizing life—Fluorescent proteins

4.3 Cell imaging techniques

4.4 Immunology 1—Diversity, specificity, and B cells

4.5 Immunology 2—Memory, T cells, and autoimmunity

4.6 Infectious disease, viruses, and bacteria

4.7 Bacteria and antibiotic resistance

4.8 Viruses and anti-viral resistance

4.9 Reproductive cloning and embryonic stem cells