

GENERAL GENETICS Syllabus 2020-21 – 0455-2526

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Textbook: "Introduction to Genetic Analysis" by Griffith et al., Freeman and co., New-York. 11th edition textbooks are available in the library. All editions, starting from the 8th, are OK. Edition 8th can be downloaded legally and for free (but lacks some content from Edition 11th). Below: All "Reading" and "Targilim" given are from the 11th Edition.

Lesson 1: Oct. 18,21. Martin

The Genetics Revolution; Single-Gene Inheritance. Independent Assortment of Genes. Dominance/recessiveness

Reading: Ch. 1 + Ch. 2.

Tirgul 1: Week of Oct. 25. NOTE THAT THERE IS NO TIRGUL THE FIRST WEEK.

In 11th edition: Ch. 2: 32, 33, 35, 25, 41, 43-49, 58. **Ch3.28.**

Lesson 2: Oct.25, 28. Martin

Family trees. Dominance/recessiveness. Sex determination. Gene interactions: haploinsufficiency, co-dominance, epistasis, ABO blood types.

Reading: Ch. 2: Pages 87-104. **Ch. 6:** 215-241

Tirgul 2: Week of Nov. 1

Ch.2: 50-57, 59, 60, 61, 63, 65, 75, 76, 77, 78 **Ch.6:** 21,22, 24, 25, 35-38, 40, 42-47, 64, 65. **Ch. 3:** 30, 31.

Lesson 3: Nov. 1, 4. Martin

Mapping Eukaryote Chromosomes by Recombination; RFLPs and SNPs. Current trait mapping methods

Reading: Ch. 4: Pages **127-142, 144-148, 154**

Tirgul 3: Week of Nov 8

Ch4: 12-14, 17, 18, 20, 25, 29, 30, 56, 59, 63.

Lesson 4: Nov. 8,11. Tzachi

What is a gene? Genotype-to-Phenotype. How does the genotype determine phenotype? Biochemical pathways (Tatum and Beadle, one gene-one enzyme), co-linearity DNA-protein.

Reading: Ch.6: 223-242

Tirgul 4: Week of Nov 15

Ch.6: 30, 31, 32, 47, 60, 77

Ch. 9: 12, 18, 20, 21, 39, 40, 42, 44, 45

Lesson 5: Nov. 15,18. Martin

Benzer and the T4 phage: Gene fine structure, complementation, genetic mapping. Cracking the genetic code (genetic experiments).

Reading: Ch. 7: 259-272. **Ch. 9:** 324-335.

Tirgul 5: Week of Nov. 22.

Ch.7: 30, 31, 32, 47, 60, 77

Ch. 9: 12, 18, 20, 21, 39, 40, 42, 44, 45

Lesson 6: Nov. 22, 25. Martin

Gene regulation in Prokaryotes. How do mutants lead to models? The Operon and its implications. Positive and negative regulation.

Reading: Ch. 11: 397-407

Tirgul 8: Week of Nov.29.

Ch. 11: 1-22.

Lesson 7: Nov. 29, Dec. 2. Martin

Eukaryotic gene expression; transcription regulation; yeast as a model; Reverse Genetics and Library screens; yeast two hybrid;

Reading: Yeast model: 796-797; **Ch. 8:** 301-309; **Ch. 12:** 431-459, **Ch. 14:** 536-538.

Tirgul 9: Week of Dec.6.

Ch 12: 11, 12, 15, 17, 24, 36,

Ch 8: 17, 18, 22, 23, 28, 33

Ch 14 (yeast two hybrid): 21.

Note, some of topics in Chapter 12 will be discussed in more detail in lesson 11.

Lesson 8: Dec. 6, 9. Martin

Evolution, mutations and DNA repair. The origin of mutations, mechanisms of accurate and inaccurate DNA repair. Mutation and the environment.

Reading: Ch. 16: 583-608

Tirgul 7: Week of Dec 20.

Ch.16: 33, 34, 35

Dec. 13, 16: HANNUKA, no class or tirgulim.

Lesson 9: Dec 20, 23. Tzachi

Chromosomal rearrangements: aberrant ploidies, aneuploidy, deletions. How is a gene born?
Gene duplication and divergence.

Reading: Ch. 17: 617-623, 627-649.

Tirgul 6: Week of Dec. 27.

Ch. 17: 42, 43, 46, 61, 62

Lesson 10: Dec. 27, 30. Tzachi

SNPs, Population Genetics and the Inheritance of Complex Traits

Reading: Ch 18: 665-677; **Ch19:** 715-727; 743-755.

Tirgul 10: Week of Jan 3.

Ch. 18: 1,2. **Ch.19:** 1-24.

Lesson 11: Jan. 3, 6. Tzachi

Digital karyotypes, Histone modifications and epigenetics. Heterochromatin. Position effects, X-inactivation and reactivation

Reading: Ch. 1: 14-17; **Ch. 17:** 649-652; **Ch. 16:** 609-612

Tirgul 11: Week of Jan 10.

Ch17: 18, 19, 20. Extra Questions on Cancer: Look on Moodle

Lesson 12: Jan. 10, 13. Tzachi

Human genetics: Cancer, technologies from cytogenetics to arrays and sequencing; 23andMe, transgenic mice; Ethical issues

Reading: Ch1: 14-17, 23-37; **Ch10** pp 387-391; **Ch12:** 460-463; **Ch14:** 527-539

There is NO TIRGUL scheduled for lesson 12