

GENOMICS, DEVELOPMENT and MEDICINE

BIO SCI D145, Course Code: 05570

Quarter: Winter Quarter 2020

Tu/Th 2-3:20 Steinhaus 174

Office Hours Tu/Th 3:30-5:00 or by appointment

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TA – Angela Kuo (ykuo4@uci.edu)

Required text – **Genomes 4**, T. A. Brown. Garland Science Press, 2018 ISBN 978-0-8153-4508-4
(but feel free not to buy this if you would rather not; there will be nothing covered in exams that we do not discuss in class)

[Link to Academic Integrity policy](#)

<u>Date</u>	<u>Topic</u>	<u>Reading</u>
1/7	1. Organization, structure and mapping of genomes Model organisms, genome size and complexity, implications of split genes for functional diversity of proteins	1-86 203-217
1/9	Presentation and discussion of week 1 paper	Angela
1/14	2. Genomic mapping continued, introduction to sequence analysis Comparative genomics, synteny, genome evolution	155-179 429-460
1/16	Presentation and discussion of week 2 papers	Students
1/21	3. Sequencing methods and strategies Automated sequencing, large scale genomic sequencing, nextgen sequencing	87-117
1/23	Presentation and discussion of week 3 papers	Students
1/28	4. Sequencing and individual variation Nextgen sequencing and intro to transcriptome analysis.	87-117 257-290
1/30	5. In depth analysis of gene expression Whole genome analysis of mRNA and protein expression,	257-290 135-138
2/4	Presentation and discussion of week 4 papers	Students
2/6	Presentation and discussion of week 5 papers, Outlines due (2/7 @ 24:00)	Students
2/11	6. Identification of gene function Genome annotation, functional analysis, introduction to chromatin	146-154
2/13	Midterm examination	Week 1-5
2/18	7. Introduction to gene networks and epigenetic analysis Chromatin immunoprecipitation, DNA and protein methylation analysis	219-256
2/20	Presentation and discussion of week 7 papers	Students
2/25	8. Comprehensive mutant libraries High throughput gene knockout, gene targeting, gene trapping, genome-wide mutagenesis	139-145 Class notes and papers
2/27	Presentation and discussion of week 8 papers	Students
3/3	9. The proteome and mapping protein interactions Methods – two hybrid, mass spectrometry, global profiling.	293-306, Class papers
3/5	Presentation and discussion of week 9 papers – TERM PAPERS DUE (3/6 @ 24:00)	Students
3/10	10. Introduction to metabolomics and the importance of the microbiome Metagenomics and impact of the microbiome on other aspects of physiology	322-328 Class papers
3/12	Presentation and discussion of week 10 papers	Students
3/19	Final examination – (covers only weeks 6-10)	1:30 - 3:30

Grading criteria: Midterm (35%), Paper (10%), Presentation (10%), Class participation (10%), Final exam (35%)