
Our Genes, Our Future, The Revolution

OSHER 519-001

Dates: Wednesdays: October 14 – November 18

Time: 9:30 am – 11:00 am

Location: Online via Zoom

Instructor: Ray Gesteland - rgesteland@yahoo.com

This course will provide a background in basic genetics from DNA to RNA to proteins. The goal is to give students the tools to understand genes, genetic predispositions, and gene editing. We will discuss the ethical, legal, and social issues raised by this revolution.

Course Overview:

The goal is to develop an understanding of genome science. What can the DNA sequence of our genes tell us about our risks and benefits? The technology is now in hand to collect everyone's genome information. These 3 billion bits of DNA information in each of our own genomes could be the cornerstone of our electronic medical record and thus be a basis for personalized healthcare. We will examine how this information can inform medical diagnoses, guide therapies, and perhaps even lead to savings in healthcare expenditures.

We will discuss the dramatic advances in gene-editing technology that will ultimately allow editing of any gene in any organism including humans, unleashing the power to alter the course of evolution.

An emphasis will be on discussion of the ethical and social issues that are crucial as we begin to use these new technologies.

The format will be Zoom lectures with the hope that we can have interactive Q and A.

The initial sessions will be heavy on the basic concepts of the science of DNA, genes, and genomes. But, do not worry, the concepts are really quite simple.

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- Week 1:** The Basics – The molecular revolution from Watson and Crick to the Human Genome Project. The players: DNA, genes and genomes.
- Week 2:** The Basics - The molecular tools
- Week 3:** What Genomes Tell Us About: Relatedness of all creatures – Evolution - Our individual uniqueness
Genome Sequence - The Cornerstone of Your Medical Record?
Epigenetics - nature vs. nurture.
- Week 4:** Gene Discovery - The Utah Genome Project – a personal story
Guest: Dr. Lynn Jorde, Chair of the Department of Human Genetics
- Week 5:** Gene Editing – Technology to change any gene - CRISPR
Guest: Dr. Dana Carroll – Distinguished Professor of Biochemistry
- Week 6:** Social and Ethical Issues – panel discussion
Guests:
Dr. Jeff Botkin, Pediatrician - Associate Vice President for Research Integrity and Chief of the division of Medical Ethics and Humanities.
Dr. Peggy Battin Distinguished Professor of Philosophy – Program in Medical Ethics.

