Experimental Biology: Or How I Learned to Make Glowing Marmosets

HSSP@Harvard Spring 2010

Course Dates: Feb 6-Mar 6, Mar 20-Apr 3 from 1-3pm
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Class Location: Science Center 102b

Syllabus:

Feb 6	Recombinant DNA	• Restriction enzymes, plasmids, transposons, antibiotic resistance, PCR • Insulin/hormones, mouse models of human diseases, biological weaponry, bioelectrical sensors
Feb 13	Cell biology / microscopy	• Cell structure, organelles, mitochondria/chloroplasts, protein-tagging • Fluorescent microscopy, confocal microscopy, TEM, SEM, staining
Feb 20	Proteomics / drug design	• Protein cascades, small molecules, kinases, binding • Drug design, modeling receptor/ligand systems, EPO, GM-CSF
Feb 27	Stem Cells	• Embryonic stem cells, adult stem cells, iPS, differentiation • Neurodegenerative diseases, cosmetic purposes, sickle-cell in mice
Mar 6	Genotyping/ personalized medicine	• P1 phages, homologous recombination, gene structure • Old/new sequencing machines, bubble kids, drawback: causes cancer
Mar 13	**NO CLASS**	**Harvard Spring Break**
Mar 20	Evolution / population genetics	• Sexual selection vs. natural selection, genetic drift, vestigial organs/structures • Tay-Sachs testing, racial genetic characteristics, extinction: man-made vs. natural, origin of life: possible scientific explanation.
Mar 27	Cancer	• What is it and how does it happen? How did we treat it, how will we treat it? Why is it so difficult to cure and why does everyone get it? • Chemical treatments vs. biological treatments, testing for cancer predisposition, colonoscopies, mammograms, etc.
Apr 3	The future of biology	• The future is now! Glowing marmosets, virus batteries and pig valves in human hearts. How we're doing very cool and awesome things. • Chimeras/trans-humanism, designer babies and genotyping for life insurance - where do we draw the ethical line?