

Cancer Resources on HHMI's BioInteractive

Lectures

Lecture: Cancer as a Genetic Disease, Charles Sawyers, MD, 2013 Holiday Lectures on Science (<http://www.hhmi.org/biointeractive/cancer-genetic-disease>). Understanding that cancer is caused by mutations in genes that regulate cell proliferation has led to the development of targeted drug therapies.

Lecture: From Cancer Genomics to Cancer Drugs, Charles Sawyers, MD, 2013 Holiday Lectures on Science (<http://www.hhmi.org/biointeractive/cancer-genomics-cancer-drugs>). Genetic data from a large number of tumor types reveal commonly mutated genes and uncover connections between different types of cancer.

Lecture: Research Mechanics: Putting the Brakes on Cancer, Bert Vogelstein, MD, 2003 Holiday Lectures on Science (www.hhmi.org/biointeractive/research-mechanics-putting-brakes-cancer). Although there are numerous kinds of cancer, all stem from alterations that allow cell division to outstrip cell demise.

Lecture: Chaos to Cure: Bringing Basic Research to Patients, Bert Vogelstein, MD, 2003 Holiday Lectures on Science (<http://www.hhmi.org/biointeractive/chaos-cure-bringing-basic-research-patients>). The identification of hundreds of genes involved in the formation and spread of cancer is leading to promising new methods for diagnosis, prevention, and treatment.

Classroom Activities

Classroom Resource: Cancer Discovery Activities (<http://www.hhmi.org/biointeractive/cancer-discovery-activities>). In Activity 1, students identify the locations on chromosomes of genes involved in cancer, using a set of 139 "Cancer Gene Cards" and associated posters. In Activity 2, students explore the genetic basis of cancer by examining cards that list genetic mutations found in the DNA of actual cancer patients.

Interactive Tutorials (Click and Learns)

Click and Learn: Cell Cycle and Cancer (<http://www.hhmi.org/biointeractive/eukaryotic-cell-cycle-and-cancer>). Explore the phases, checkpoints, and protein regulators of the cell cycle and find out how mutated versions of these proteins can lead to the development of cancer.

Click and Learn: The p53 Gene and Cancer (<http://www.hhmi.org/biointeractive/p53-gene-and-cancer>). Learn about what p53 does, and how interfering with its function can lead to cancer.

Animations

Animation: p53 (<http://www.hhmi.org/biointeractive/p53>). A 3D animation showing the molecule p53 binds to DNA and initiates the transcription of mRNA.

Animation: Using p53 to Fight Cancer (<http://www.hhmi.org/biointeractive/using-p53-fight-cancer>). This animation demonstrates how cancerous cells could be destroyed using a modified virus.

Animation: Damage to DNA Leads to Mutation (<http://www.hhmi.org/biointeractive/damage-dna-leads-mutation>). Reactive molecules, such as free radicals, and solar ultraviolet radiation can lead to mutations in DNA. Most mutations are corrected, but in rare cases mutations can accumulate and cause diseases such as cancer.

Animation: Mismatch Repair (<http://www.hhmi.org/biointeractive/mismatch-repair>). During DNA replication mistakes can occur as DNA polymerase copies the two strands. The wrong nucleotide can be incorporated into one of the strands causing a mismatch. Fortunately cells have repair mechanisms.

Articles

Scientific Research Article: Cancer Genome Landscapes by Vogelstein *et al* (<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3749880/>)

Article: The Evolution of Cancer (<http://www.hhmi.org/biointeractive/evolution-cancer>)

Article: Understanding Cancer Diversity (<http://www.hhmi.org/biointeractive/understanding-cancer-diversity>)