Lung Cancer
A Case Study of Genetics and Environment

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Lung Cancer

- Leading cause of cancer for men and women in United States
- Every year, about 164,000 new cases are diagnosed in the US, with an estimated 157,000 deaths.
- Leading cause of cancer death
Types of Cancer

- Squamous cell carcinoma
- Adenocarcinomas
- Large cell carcinomas
- Small cell carcinomas
- Normal Lung
Squamous cell carcinoma

Adenocarcinomas
Causes of Cancer

- Genetic Factors
- Carcinogenic Substance Exposure
Carcinogens Substances

Environmental Factors and Exposure

Smoking and Secondhand Smoke
Cigarette Smoking

- Higher risk of lung cancer
- Higher cancer mortality rate
- 4,000 different chemicals, many carcinogens
- Roughly 90% percent of lung cancer deaths are rooted in smoking
Genetic Factors

• Lung cancer free survival among old heavy smokers
• Extremely exposed, extremely resistant aged survivors
• Genetic resistance or susceptibility
• Family Heredity
• Women
Genetic Mutations

- FHIT
- GRPR
- SLC22A1L
- p53
- KRAS2
- BRAF
- Many, many more...
Genetic influence on Cancer

- Tumor-suppressor genes
- Oncogenes
- Chemotherapy resistance
Treatment

- Genetic screening to determine cancer type
- Varies with cancer type: Nonsmall Cell Lung Cancer (NSCLC) or Small Cell Lung Cancer (SCLC)
  - NSCLC – Surgery and Radiation/Chemotherapy
  - SCLC – Radiation/Chemotherapy, selected surgery situations
Inherited mutations in these genes seem to rarely cause lung cancer, but some people inherit a reduced ability to detoxify certain carcinogens, and environmental factors can be the deciding factor in cancer onset.