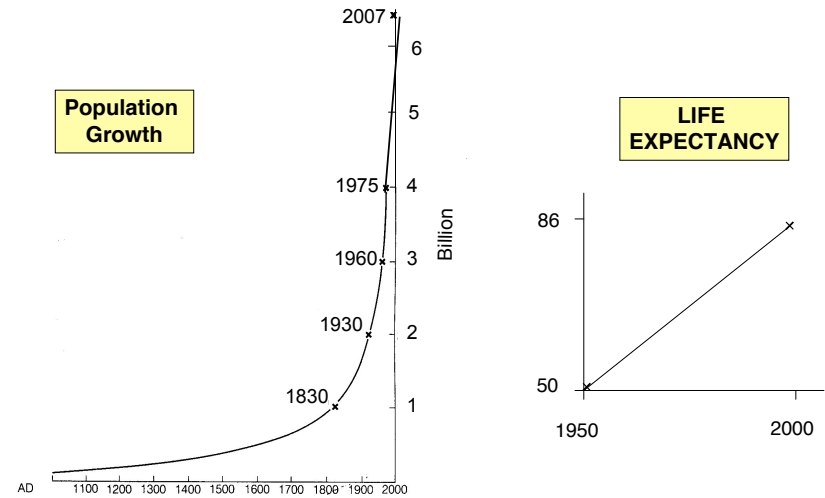
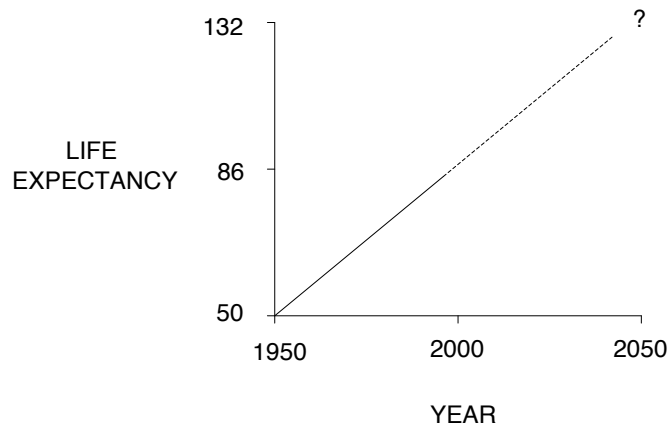


Human Population and Life Expectancy



Slide 2 - 7.013 - 4/25/07

THE FUTURE?



Slide 3 - 7.013 - 4/25/07

Early Humans and Disease

Hunter-gatherers:

- Life was short, death rates were high.
- Main causes of death were accidents, food shortage, predation, infectious disease.
- Non-communicable diseases (cancer, obesity, diabetes, hypertension) were rare to non-existent.
- Early nomads lived in small bands, infrequently contacting others. Numbers were not large enough -- and bands were not dense enough -- to maintain (spread) acutely infectious diseases, e.g. measles, smallpox, polio, enteric and respiratory infections.

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Early Humans and Disease

Domestication of plants and animals (~6000 years ago):

- Creation of first 'urban' areas with large populations in continuous close contact. Increase in food supply and expansion of populations.
- Main causes of death were accidents, food shortage, predation, infectious disease, with increases in communicable diseases.
TB, Measles, Smallpox, Leprosy, Polio
- Diet was different from that of hunter-gatherer, but still based mainly on unrefined plant foods.
- Non-communicable diseases (cancer, obesity, diabetes, hypertension) were rare to non-existent.

Slide 5 - 7.013 - 4/25/07

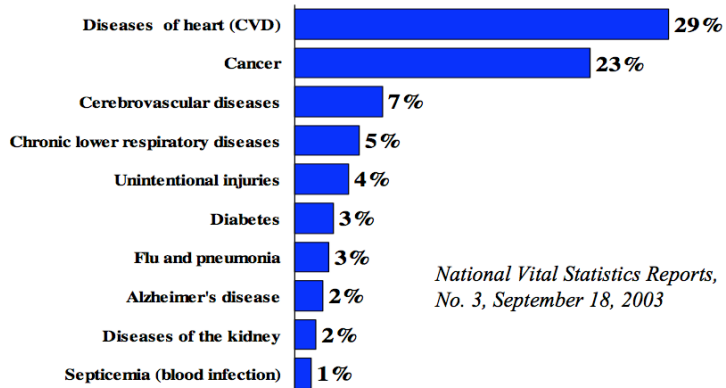
Modern Humans and Disease

Highly Developed Countries

- Life expectancy has increased from ~50 yrs in 1950 to 86 yrs in 2000. For the first time in history a mother knows that the loss of one of her children before maturity is an unlikely event.
- Main causes of death are non-communicable diseases (cancer, obesity, diabetes, hypertension).
- Food plentiful, sedentary lifestyle.
- Acute infections decline because of improved public health information, vaccines, medical treatments, and increased resistance to infection due to nourishment.

Slide 6 - 7.013 - 4/25/07

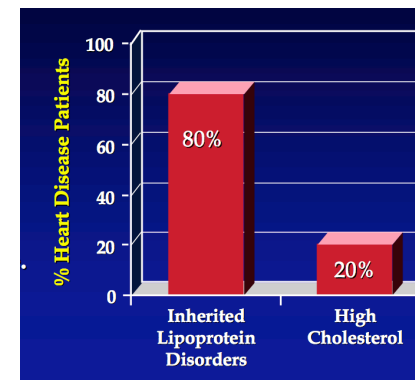
Causes of Death in US



National Vital Statistics Reports, Vol. 52, No. 3, September 18, 2003

Slide 7 - 7.013 - 4/25/07

Cardiovascular Disease: Genetic and Environmental Contributions

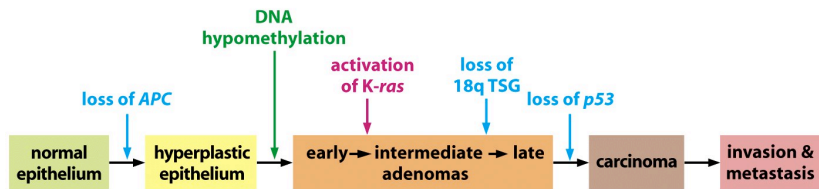


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Source: Dr. Thomas C. Isaacson

Common Diseases Can Have Multiple Genetic and Environmental Contributions

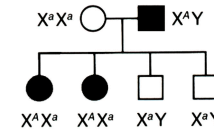
Colon Cancer



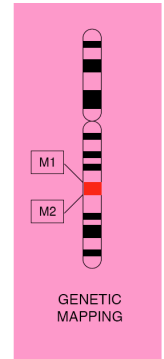
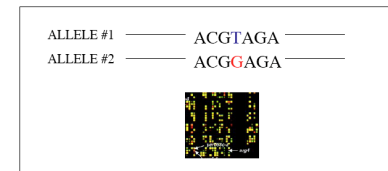
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Figure 11.10 *The Biology of Cancer* (© Garland Science 2007)

Positional Cloning: Finding Associated Markers



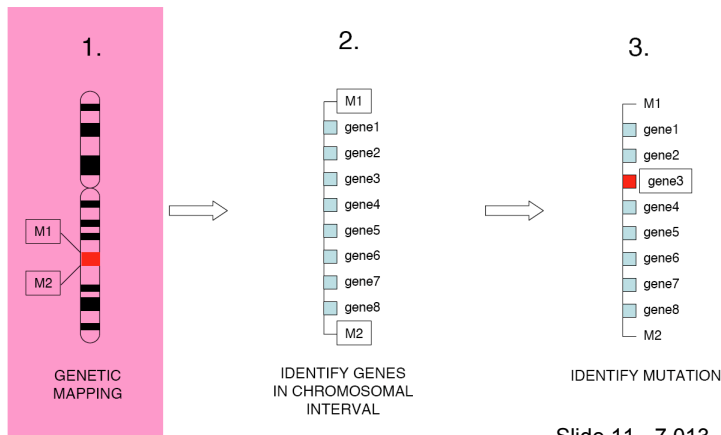
Find Markers associated with disease
 - SNPs can be used: 1M SNPs already mapped
 - Microarray-based method



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Positional Cloning: Finding the Affected Gene

- 1) Use Markers (M1 and M2) to identify chromosomal interval
- 2) Identify genes in known genome sequence
- 3) Sequence to identify mutation that may be responsible for phenotype



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