

## Biology of Aging A&S300-002



Jim Lund

Class website: <http://elegans.uky.edu/300>

## What is the topic of this class?



This class will not cover the sociology or psychology of old people or the diseases of old age.

This course will cover the aging process: how and why organisms age

## What is the topic of this class?

What is aging if not the diseases of the old?

Do all organisms age the same?

How do lifespans vary among organisms?


Why do animals age?

Why do some people live to 100 but others die young?

Can anything be done about aging?

## What is aging?





## What is aging?

## What is aging?

Aging is a progressive process that converts a healthy, fit organism into a less healthy, less fit organism.

**Aging is a biological process  
Aging not disease, per se.**

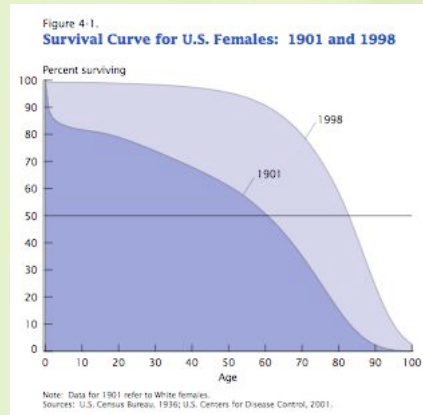
## What is aging?

Aging is a process of general, irreversible, and progressive physical deterioration that occurs over time.

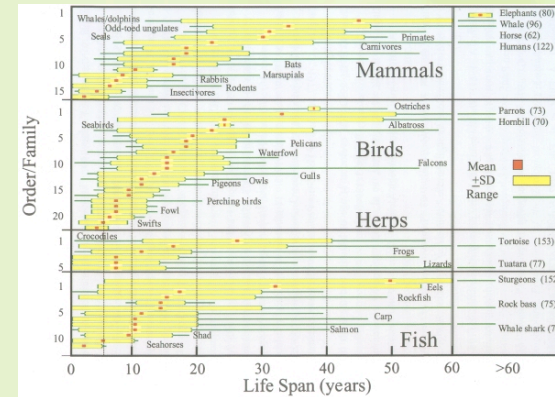
Genes, Aging, and Immortality. Charlotte A. Spencer

## Why do animals age?

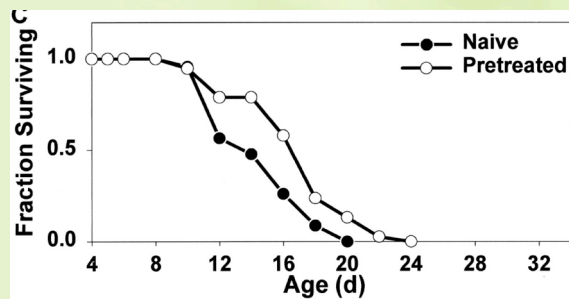
## Human lifespan demographics.



## Comparing lifespans among species

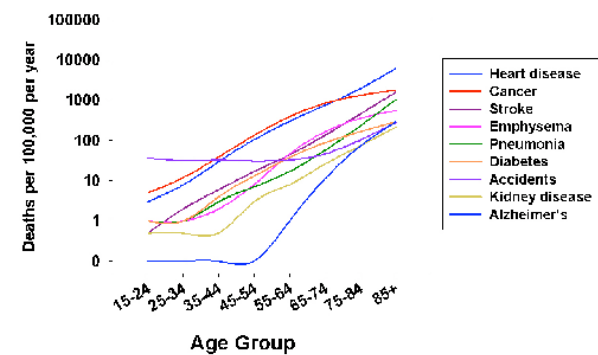


## Aging phenotypes

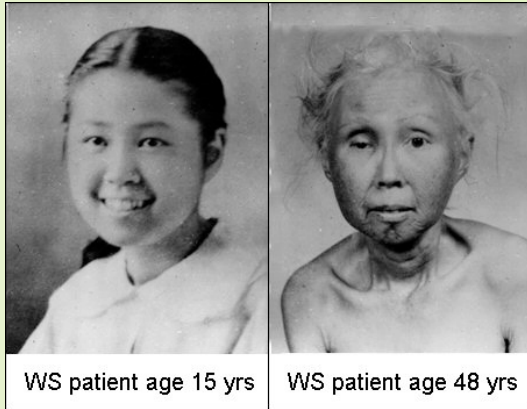


Resistance to high oxygen levels declines with age

## Aging and age-related diseases



## Premature Aging (Progeria)

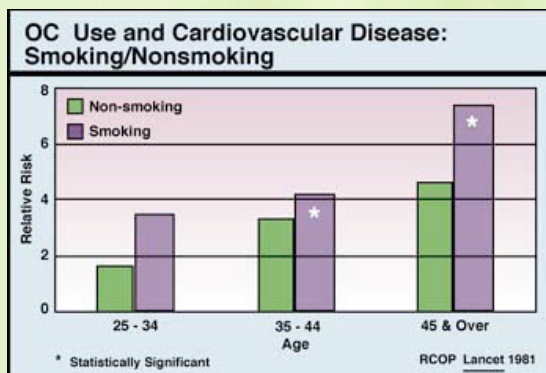


## Environmental effects

Sun damage causes premature aging of the skin:

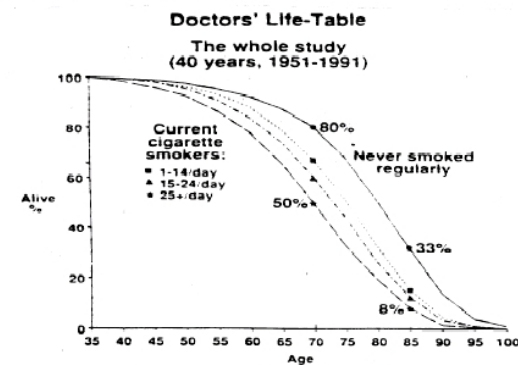


## Smoking->premature aging

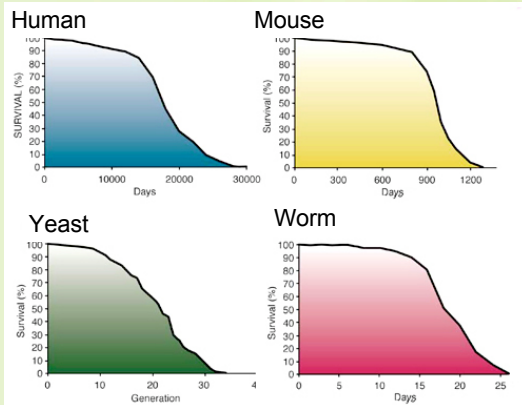


## Smoking->premature aging

Source: Doll et al. BMJ 1994;309:901-911



## Universality of aging



## Aging junk science

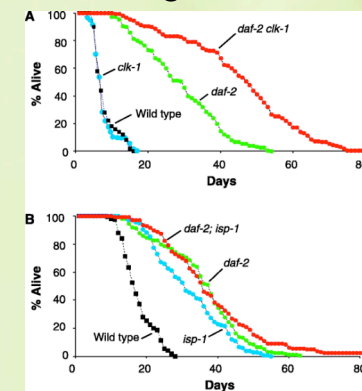


- Monkey glands
- Human growth hormone
- DHEA
- Supplements
- Oxygen chambers
- "Purification"

## Centenarians: what have we learned from studying them?



## What we've learned from model organisms



Hekimi and Leonard Guarente, 2003



## Aging Theories

- Telomeres
- Free Radicals (molecules with unpaired electrons)
- Accumulated damage theory
- Evolutionary aging theory

Aging is still poorly understood!

## What can be done about aging?

Today, very little can be done!

- Healthy lifestyle
  - Avoid premature aging
  - Prevent diseases of aging
- Caloric restriction?

## A&S300-002: Biology of Aging

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and after class

**There is no required textbook.**

Readings will be made available on the class website.