

Sex Differences in Aging

Lessons from the ITP*

James F. Nelson, PhD

*NIA Interventions Testing Program
2004 - present










Drug Efficacy (Longevity extension)

Longevity of untreated mice




Resilience (internal & external stressors)

Male Bias in Drug Efficacy (Longevity extension)

7 of 10 drugs only or more effective in males

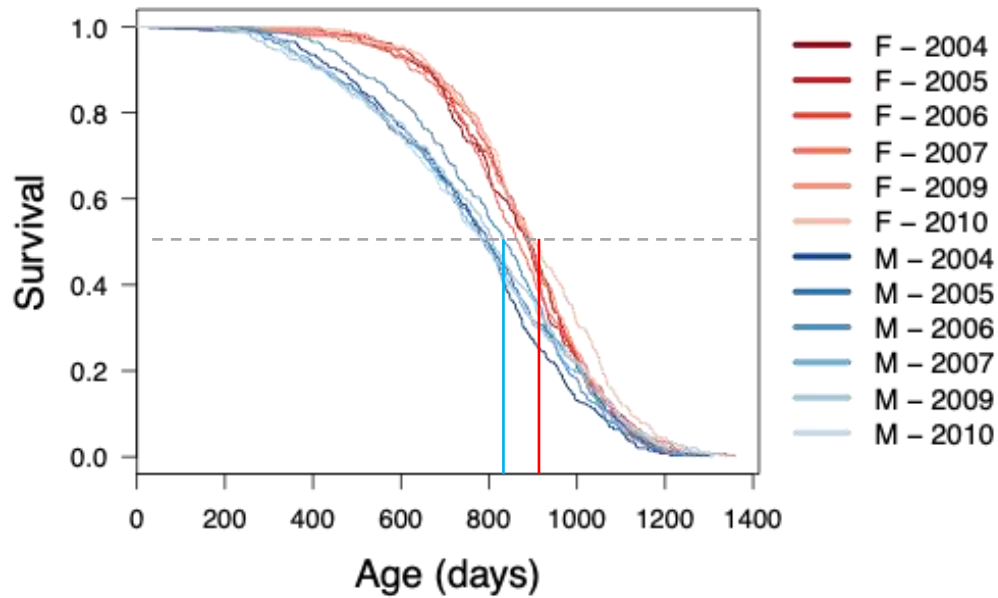
- Aspirin 
- Nordihydroguaiaretic Acid 
- Rapamycin
- 17 α -estradiol – weak estrogen receptor agonist 
- Acarbose – α -glucosidase inhibitor  >> 
- Protandim - Nrf2 activator 
- glycine
- Canagliflozin 
- Captopril  > 
- 1,2 butanediol

2 of 10 drugs only or more effective in females

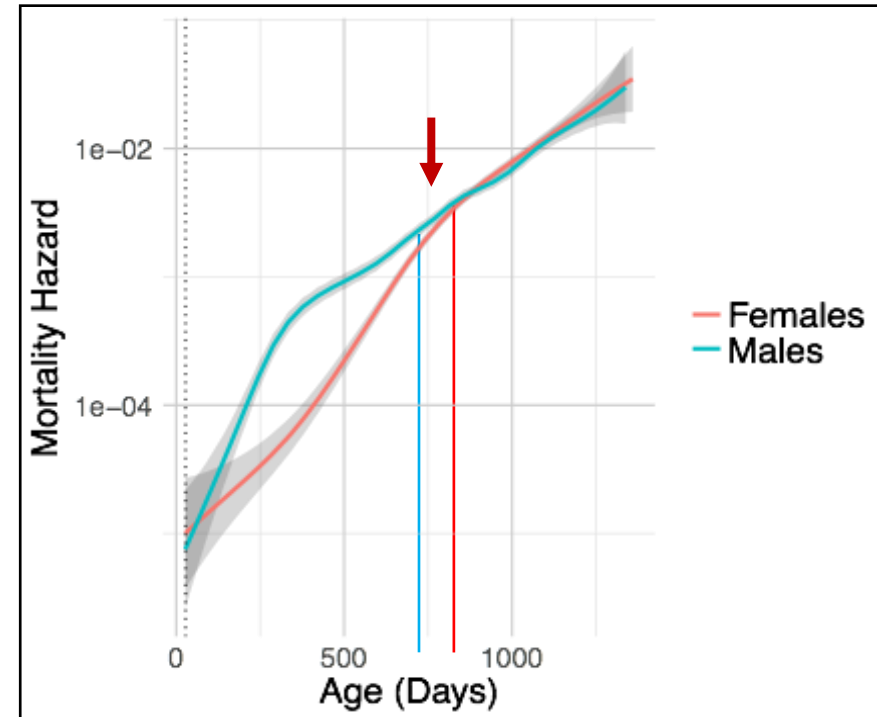
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- Canagliflozin
- Captopril
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Females live longer than males, but.....

Female survival exceeds that of males



But female survival advantage disappears by 25 mo



n = 3690



Catherine Cheng
PhD

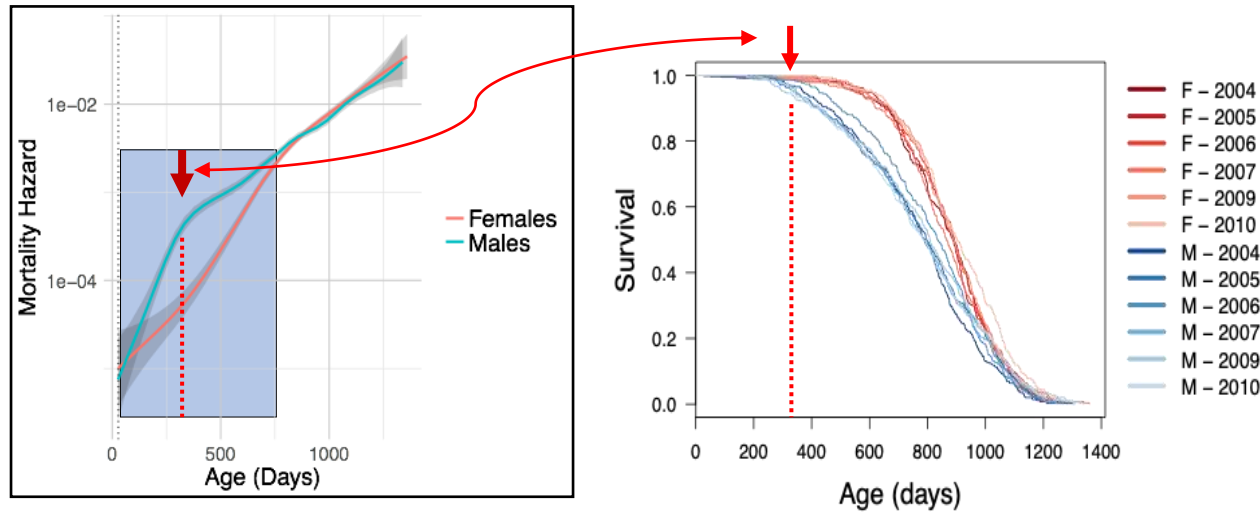


Jonathan Gelfond,
MD PhD

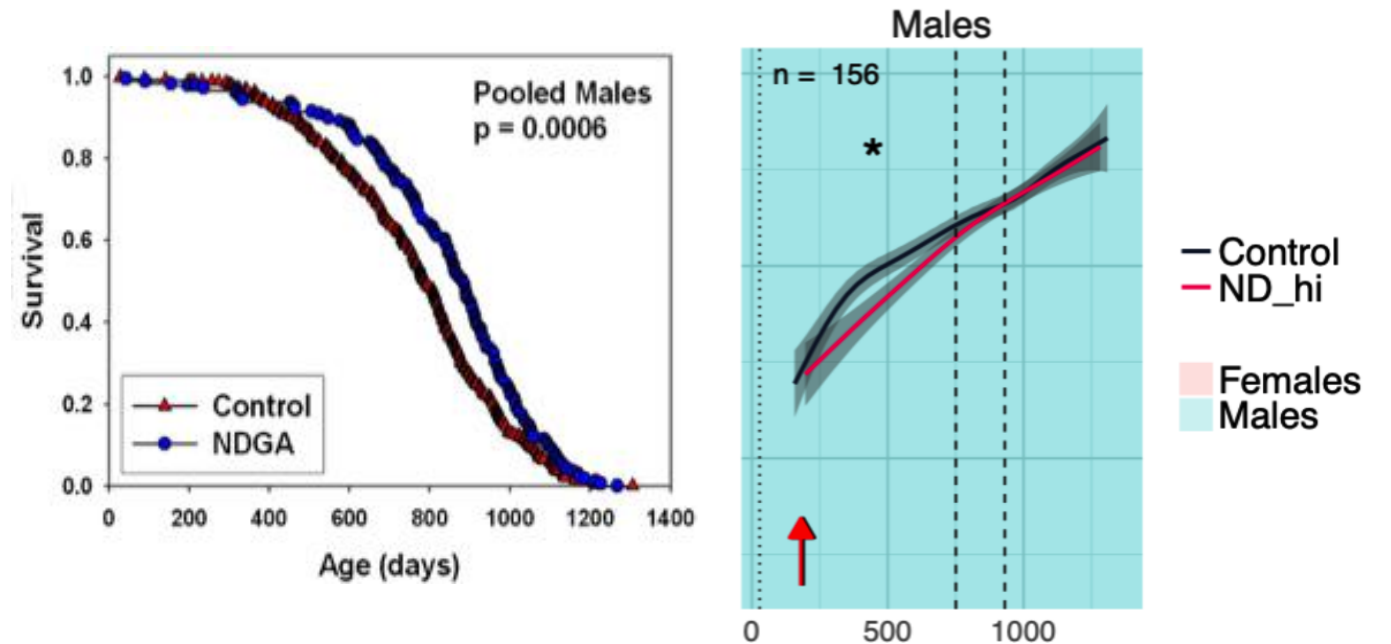
Cheng, Gelfond, Diaz, Strong, Nelson,
Aging Cell (2019)

Lessons: Age-specific mortality analysis

1. unmasks differences hidden in survival plots

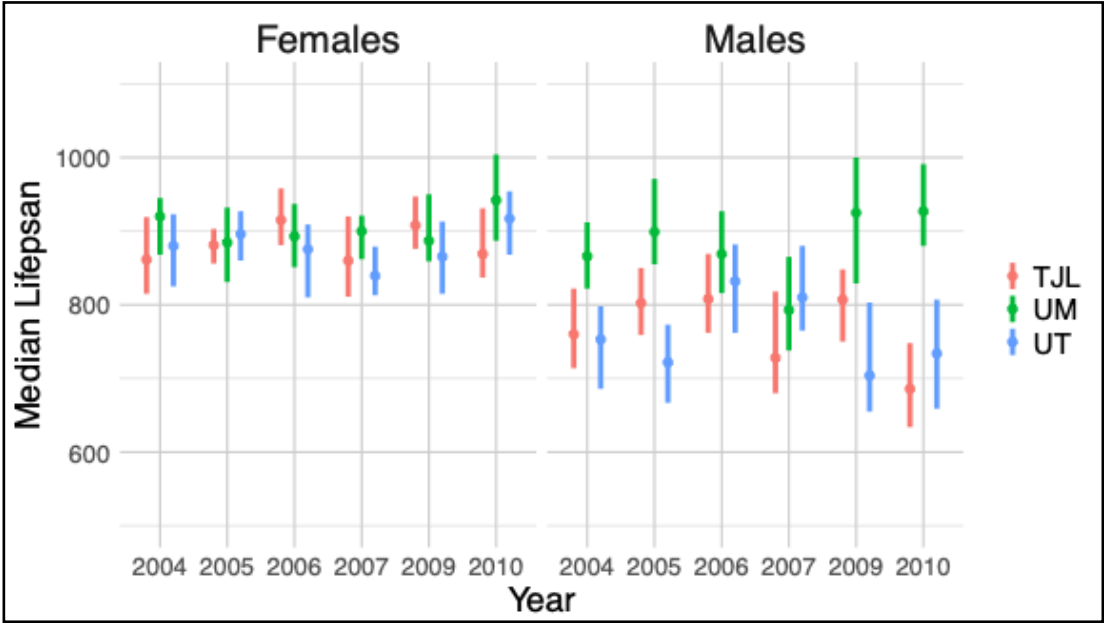


2. Reveals age-selectivity of drug interventions

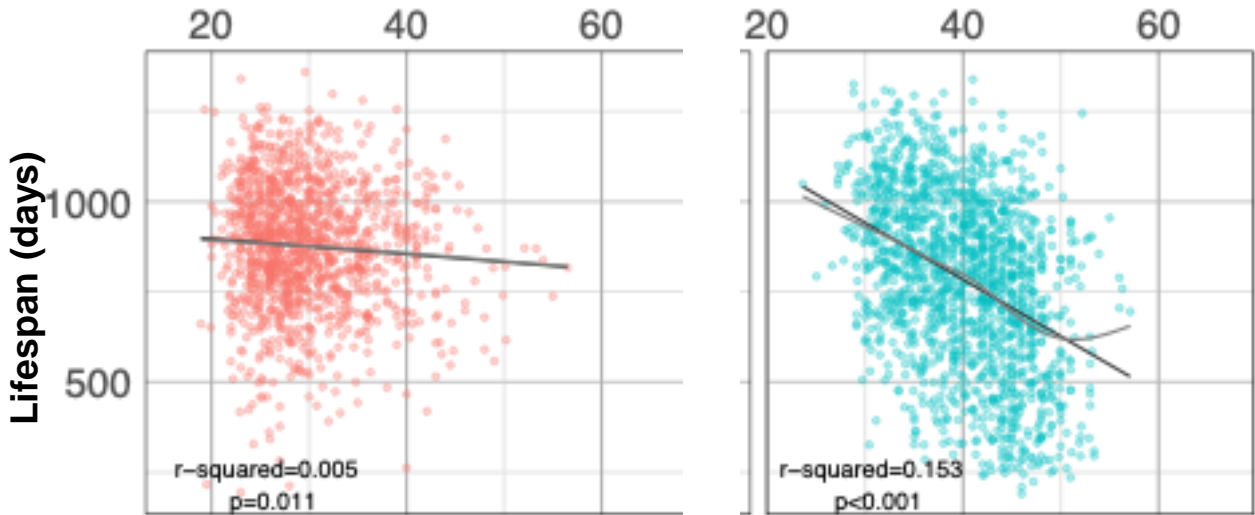


Greater Female Resilience (internal & external stressors)

Female lifespan less affected by site & cohort influences



Female lifespan less affected by body mass



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