Cultivating a culture of 'Sex Matters' across multiple disciplines

Mayo Clinic
Specialized Center Of Research
on Sex Differences

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NIH workshop
Oct 20, 2014

Disclosures: Funding

National Heart, Lung and Blood Institute
National Institute of Aging

(P50 Specialized Center for Research on Sex Differences)

Aurora Foundation to Kronos Longevity Research Institute

(KEEPS)

NIH – Office of Research on Women's Health

(Building Interdisciplinary Research Careers in Women's Health)

Questions

- Is it acceptable to not include “sex” as a variable in experimental design?
- Can specific criteria be developed for excluding consideration of sex in experimental design?
- How can tools be acquired to work across disciplines toward understanding animal models of complex diseases in human?

Question 1: Is it acceptable to not include “sex” as a variable in experimental design?

Every cell has a sex

Facts of Life

Sex is always a biological variable of animal-derived material.

Sex of experimental material should always be included in Methods of scientific papers.

Question 2: Can specific criteria be developed for excluding consideration of sex in experimental design?

Sex Specific versus Sex Different

- Conditions/diseases unique to one sex.
- Conditions/diseases which occur more frequently or present differently in one sex compared to the other.

Sex-Biasing Factors Across the Life Span

Sex Specific

- Conditions related to reproductive (organs or processes)

- Established cell lines
  Sex should be identified
  Data are needed from cell lines of previously unrepresented sex

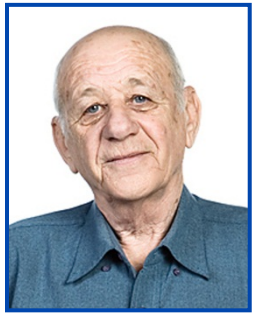
Sex Biasing Factors

XY **XX**

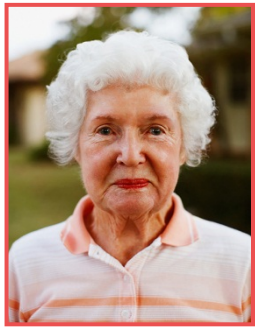
Cholesterol

Aromatase

↑ Testosterone **↑ Estrogen**



↓ Testosterone **↓ Estrogen**



Sex Differences – generative questions

1. Is there evidence of a sex difference in the disease incidence, prevalence, morbidity or mortality in humans? If so, what is it?

   (Keep in mind it may not have been studied or reported, which is not the same thing as no difference.)

2. Is there an experimental model of the condition/disease?

3. Does the experimental model demonstrate the sex difference observed in humans?

4. Are data lacking from an experimental model in one sex compared to the other?

Question 3: How can tools be acquired to work across disciplines toward understanding animal models of complex diseases in human?

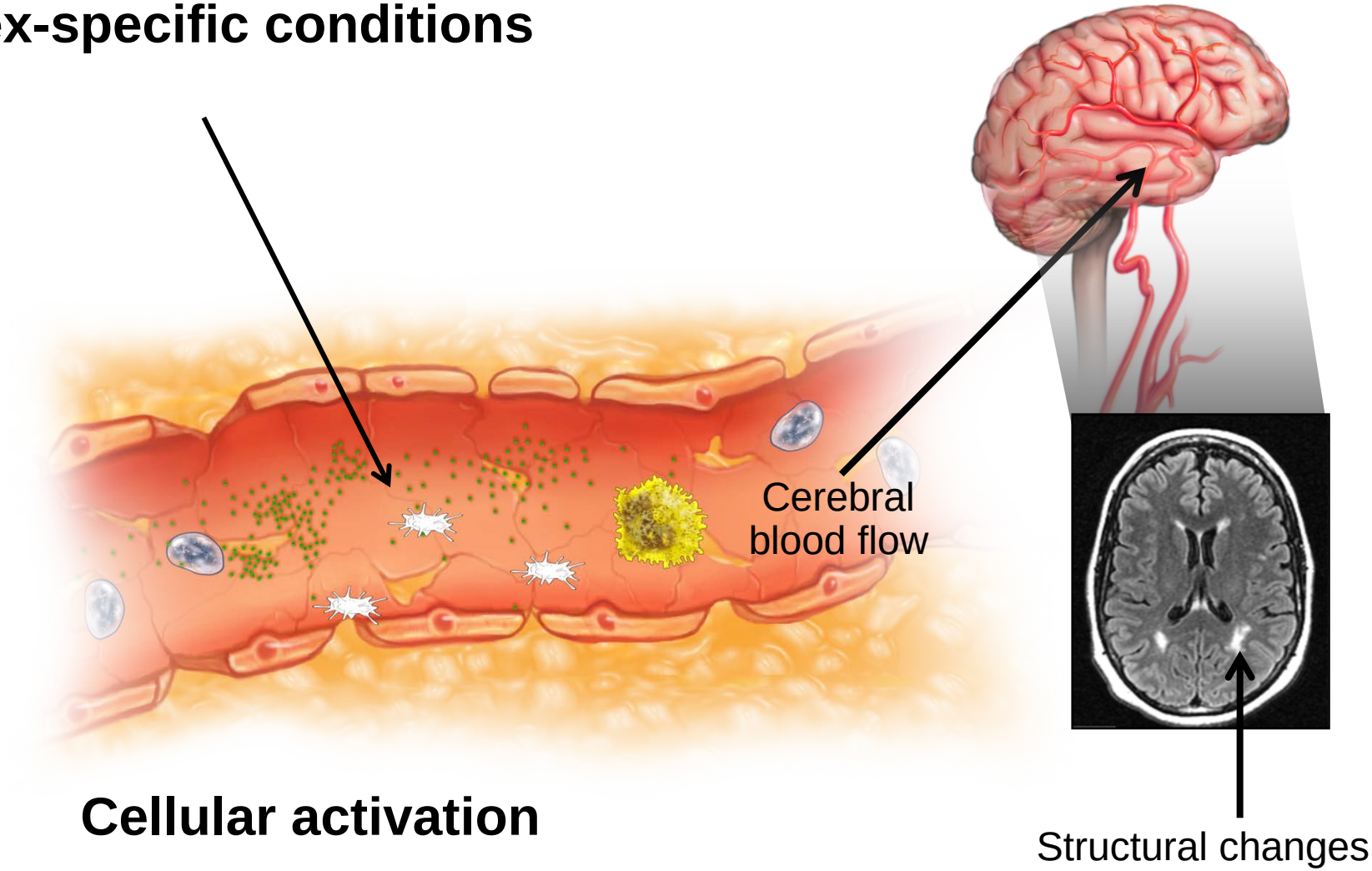
Think differently

Sex Differences – generative considerations

1. Silos vs networks
2. Limited resources/shared resources
3. Programmatic approach

Cognitive health

Sex-specific conditions



Administrative Core

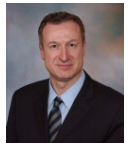
Platelets/MV
Cerebral Blood Flow

Miller

Surgery and Physiology and Biomedical Engineering

Rocca

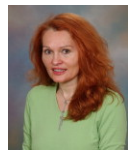
Epidemiology and Neurology



Disorders of Pregnancy

Jayachandran

Physiology and Biomedical Engineering



Garovic

Nephrology And Hypertension

Joyner

Anesthesiology

Mielke

Epidemiology

Clinical and Cognitive testing & Statistical Coordination

Shuster

Women's Health Clinic

Kantarci

Neuroradiology

Bailey

Biostatistics

Fields

Psychiatry and Psychology

Lowe

Nuclear Medicine

Brain imaging

Italics = CTSA/BIRCWH faculty

Established projects/ publications

SCOR/new projects

Sex Differences – generative considerations

1. Silos vs networks
2. Limited resources/shared resources
3. Programmatic approach
4. Alternative funding models