EUROPEAN Gender Medicine

Maastricht University Leading in Learning!

How sex an gender analysis contributes to excellence in research and innovation

KNAW/LNVH Symposium, 2 July 2015, Amsterdam

Ineke Klinge

Chair Horizon 2020 Advisory Group on Gender

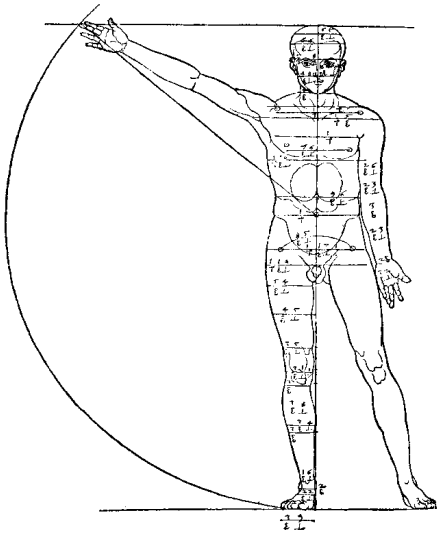
Visiting professor Institute of Gender in Medicine, Charité-Universitätsmedizin , Berlijn

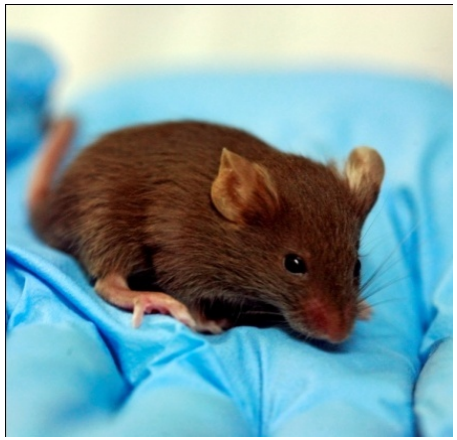
OUTLINE

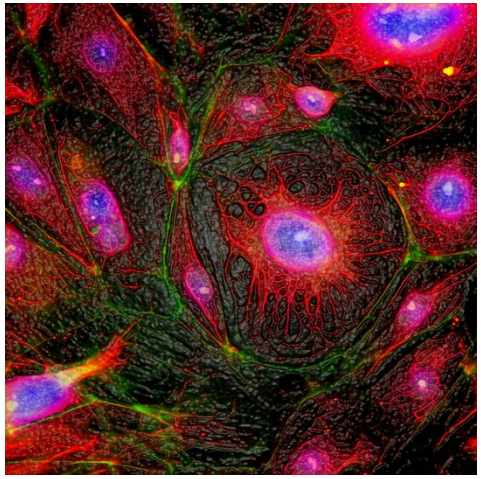
- Gendered Innovations project: definitions, methods of sex and gender analysis and case studies
- Advisory Group on Gender: preparing for Horizon 2020, WP 2016-2017
- Gendered Innovations and Horizon 2020; the 'gender dimension' of research & innovation content

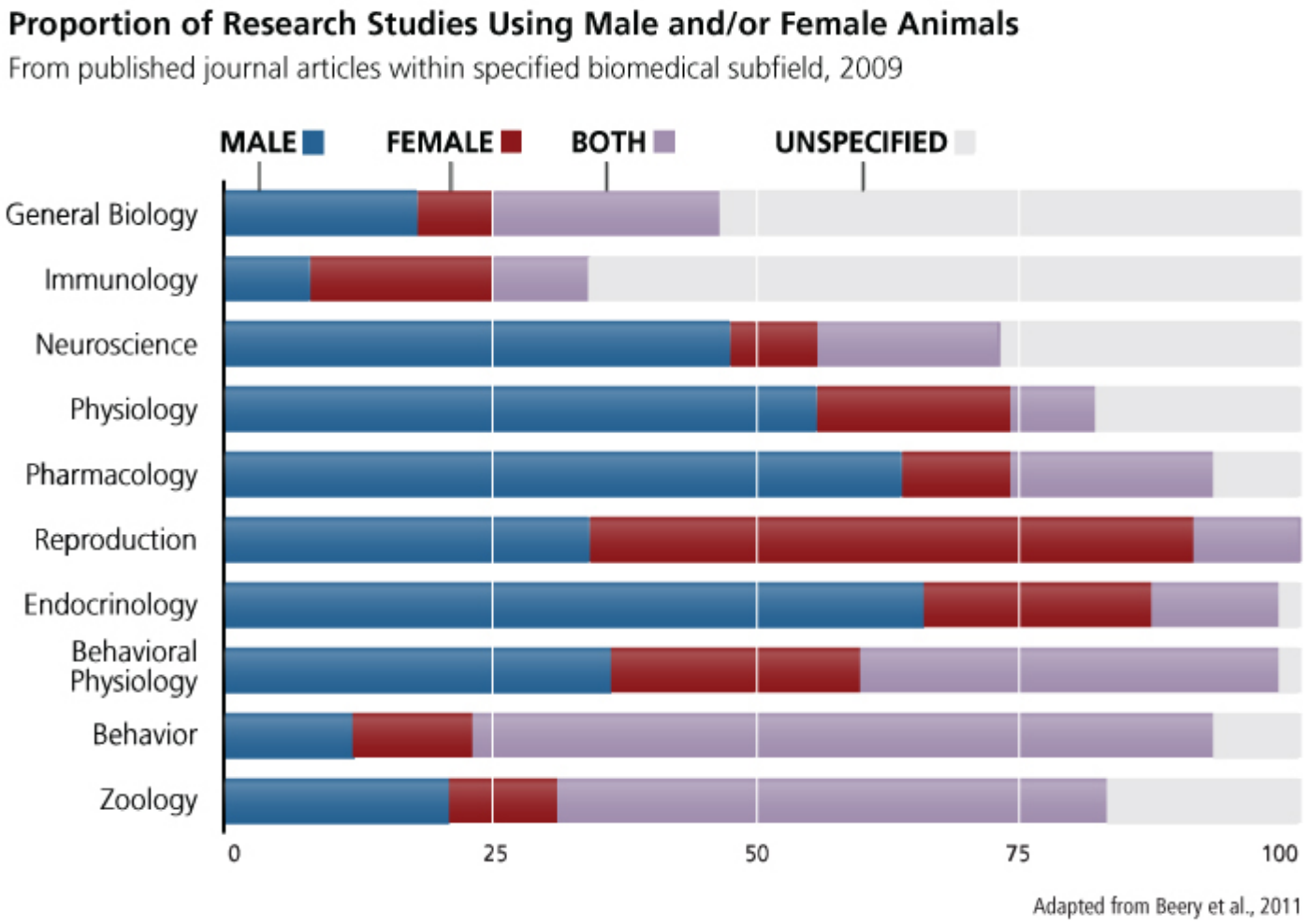
Why Gendered Innovations ?

- Business case: 10 drugs withdrawn from the US market; 8 had more severe effects in women
- “one size fits all” does not represent excellent science





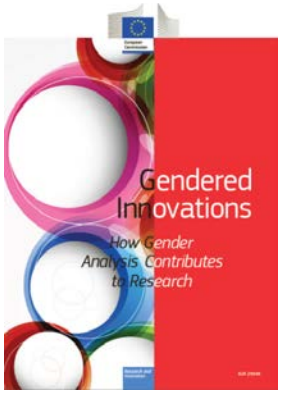




Beery, A., & Zucker, I. (2011). Sex Bias in Neuroscience and Biomedical Research. *Neuroscience and Biobehavioral Reviews, 35 (3)*, 565-572.

FP7 Expert Group Innovation through Gender 2011-13

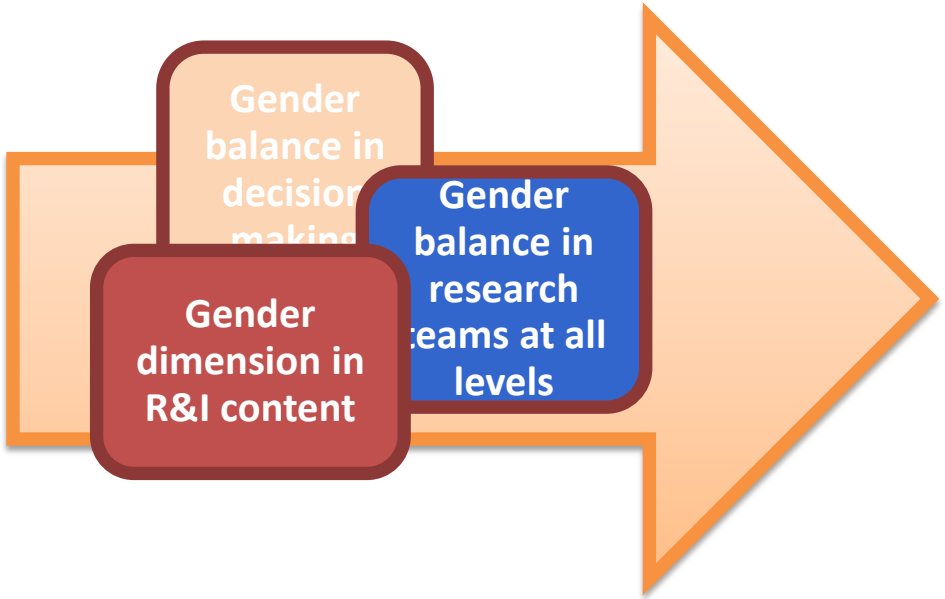
- Project: Gendered Innovations in Science, Health & Medicine, Engineering and Environment
- EU/US collaboration
  57 experts involved: from USA, Canada and EU (14 member states)
- Presentation of the project
  in the European Parliament
  on July 9, 2013
- Website and publication



http://ec.europa.eu/research/science-society/gendered-innovations/index_en.cfm

What does Gendered Innovations offer??

- Tools for researchers, to comply with the H 2020 conditions on the gender dimension
  - definitions
  - methods
  - case studies
  - checklists



What is **Gendered Innovations**?

SEX & GENDER ANALYSIS
- Methods
- Terms
- Checklists

CASE STUDIES
- Science
- Health & Medicine
- Engineering
- Environment

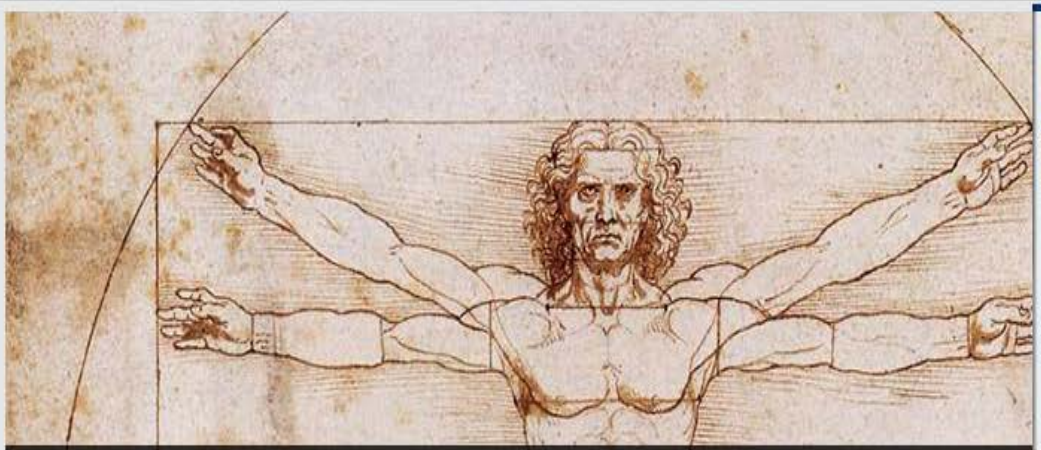
CASE STUDIES "IN A NUTSHELL"

POLICY RECOMMENDATIONS

INSTITUTIONAL TRANSFORMATION

VIDEOS

- Facebook
- How to cite website

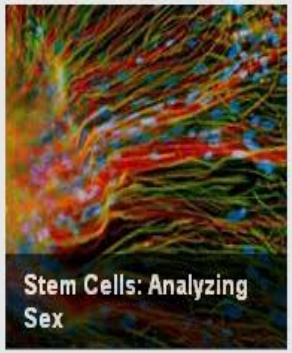


SCIENCE | HEALTH & MEDICINE | ENGINEERING | ENVIRONMENT

HEALTH & MEDICINE

Sex and Gender Methods for Research | Gendered Innovations

FEATURED CASE STUDIES



Stem Cells: Analyzing Sex

Osteoporosis Research in Men: Breaking the Gender Paradigm

HIV Microbicides: Formulating Research Questions & Analyzing Academic Disciplines

Why Gendered Innovations?

"Gendered Innovations" **employs methods of sex and gender analysis to create new knowledge.**

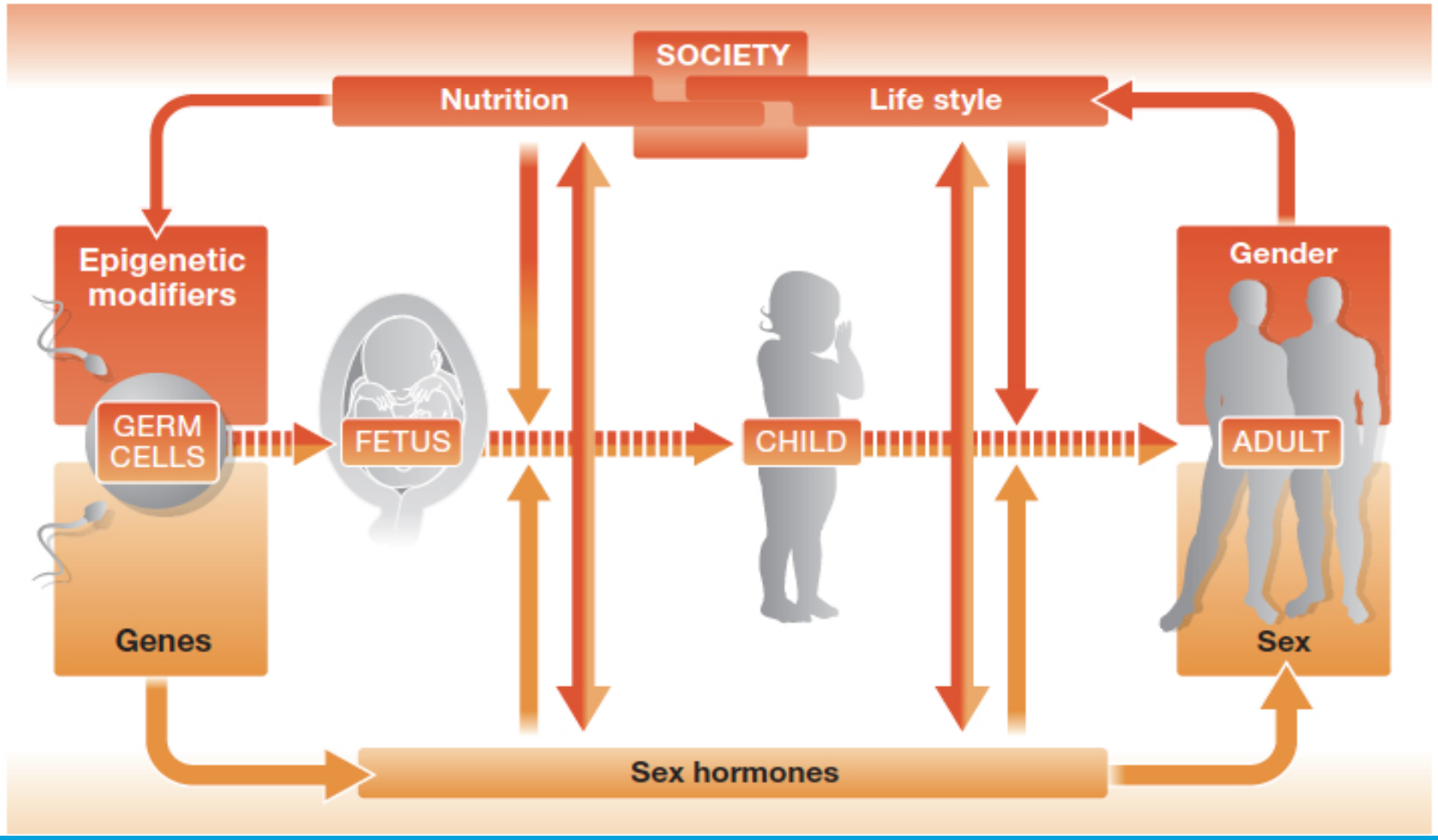
YOUR FEE

DEFINITIONS (AGG NOTE)

- ***Sex*** refers to biological characteristics of women and men, boys and girls, in terms of reproductive organs and functions based on chromosomal complement and physiology. As such, sex is globally understood as the classification of living beings as male and female, and intersexed. Sex differences relevant to the research and innovation should be investigated and addressed.
- G***ender*** is a key analytical and explanatory variable in research. Gender as a socio-cultural process refers to cultural values and social attitudes that together shape and sanction "feminine" and "masculine" behaviours, and also affect products, technologies, environments, and knowledge. Gender assumptions often go unquestioned and can unconsciously influence scientific priorities, research questions, and choice of methods.
- The ***gender dimension*** is a dynamic concept which puts researchers at the forefront of questioning gender norms and stereotypes, and addresses the evolving needs and social roles of women and men. Depending on the field of research, it entails an analysis of gender, sex or both.

Sex and Gender Interact

Regitz-Zagrosek, V. (2012). Sex and Gender Differences in Health. *EMBO Reports, 13 (7):* 596-603.



Methods of sex and gender analysis

1. Rethinking research priorities and outcomes
2. Rethinking concepts and theories
3. Formulating research questions
4. Analyzing sex
5. Analyzing gender
6. Analyzing how sex and gender interact
7. Analyzing factors intersecting with sex and gender
8. Engineering innovation processes
9. Designing health and biomedical research
10. Rethinking standards and reference models
11. Participatory research and design
12. Rethinking language and visual representations

EUROPEAN Gender Medicine

Sex and Gender Analysis

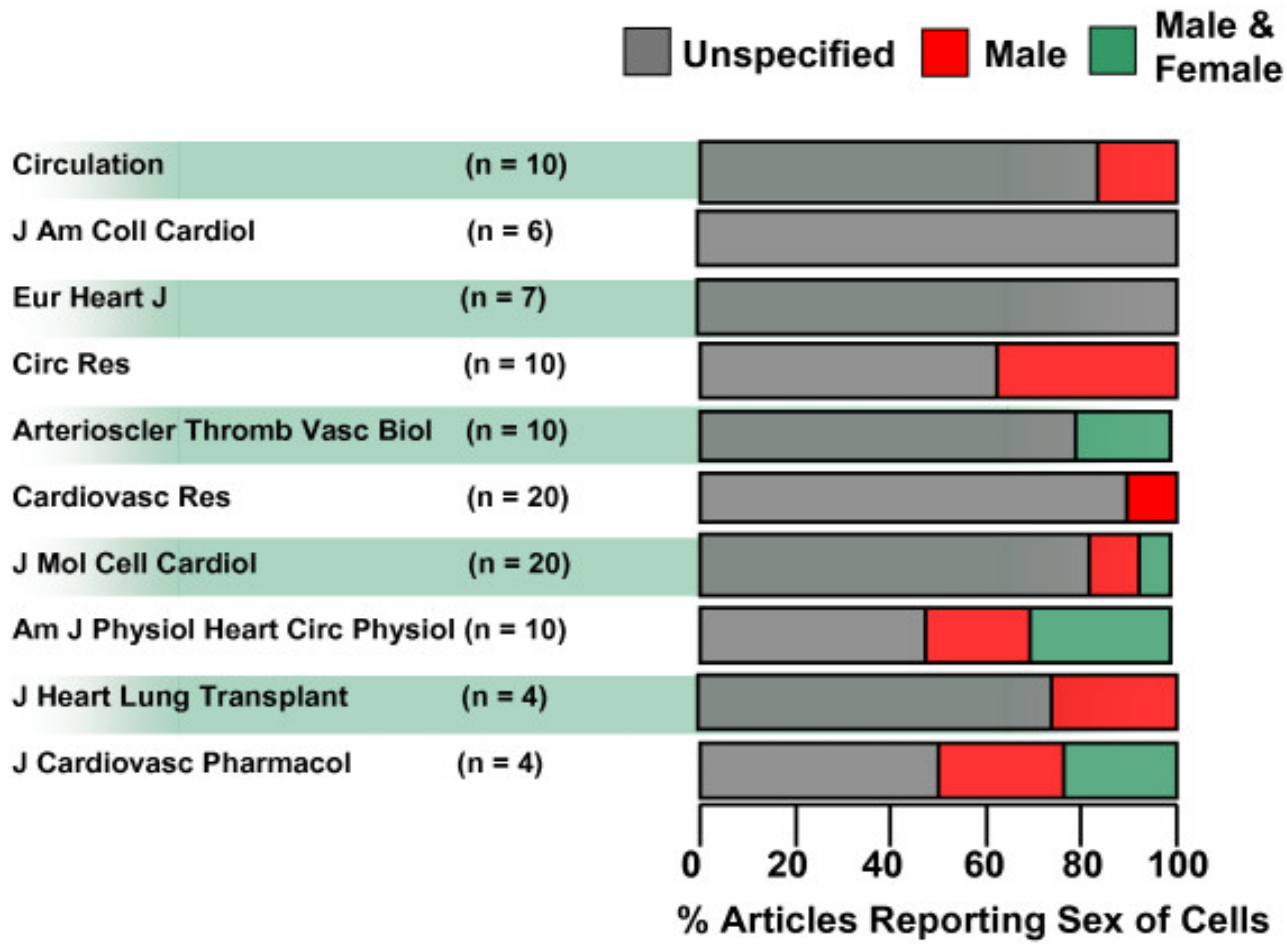
Enhances all phases of research

Gendered Innovations

- New knowledge generated by application of methods of sex and gender analysis. Cases studies from basic research, clinical research, public health (risk factors), engineering, climate change, transport
- Stem cell research / *Analyzing Sex*
- 'Male' and 'female' diseases (CVD and osteoporosis)/*Rethinking concepts, Rethinking standards and reference models*
- Risk factors for NCDs / *Analysing Gender*
- Assistive technologies for the elderly/ *Analyzing How Sex and Gender Interact*
- Climate change/*Analysing factors intersecting with gender*
- Transport , pregnant crash test dummies/ *Analysing sex, Rethinking standards and reference models*

Taylor, K., Vallejo-Giraldo, C., Schaible, N., Zakeri, R., & Miller, V. (2011). Reporting of Sex as a Variable in Cardiovascular Studies using Cultured Cells. *Biology of Sex Differences, 2 (11)*, 1-7.

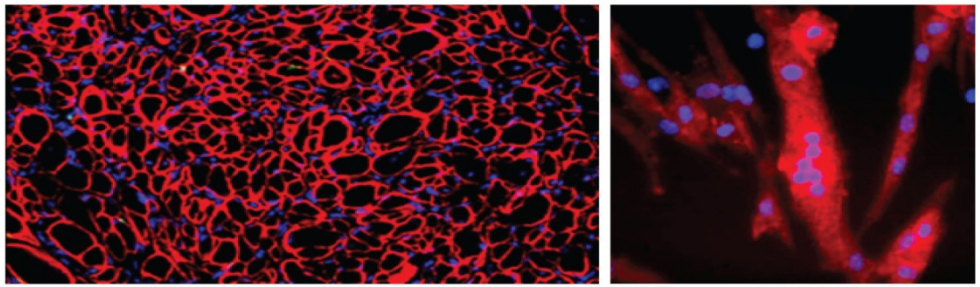
Percentage of articles reporting sex of cells used in the experiments



Stem cell research
Analyzing Sex

Magnified Muscle Fiber Developed from XX and XY Stem Cells
After two weeks' development in *mdx* mice

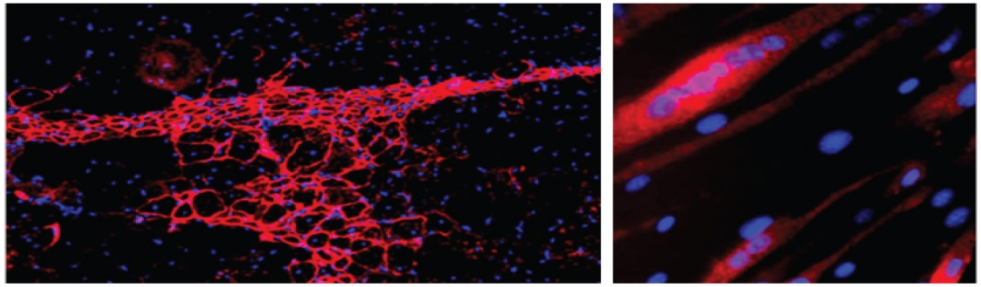
XX STEM CELLS



100µm Lower magnification

50µm Higher magnification

XY STEM CELLS

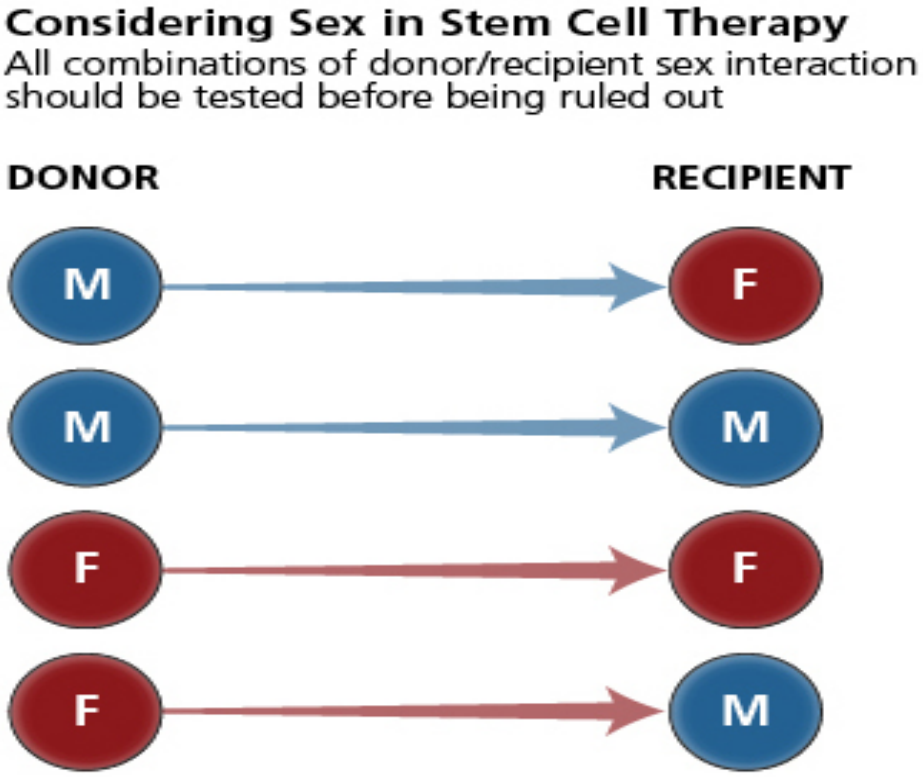


100µm Lower magnification

50µm Higher magnification

These micrographs show muscle fibers produced from XX and XY MDSCs and demonstrate that XX MDSCs induce "more efficient skeletal muscle generation" than their XY counterparts based on the number of dystrophin-positive muscle fibers produced for a given number of donor cells. Muscles were harvested after two weeks of development in *mdx* mice. Dystrophin-containing muscle fibers are stained red, indicating that they arose from transplanted stem-cells, as *mdx* mice lack a functional dystrophin gene and develop a syndrome similar to muscular dystrophy in humans. Nuclei are stained blue. Reproduced with permission from Deasy et al., 2007.

Considering sex in stem cell research



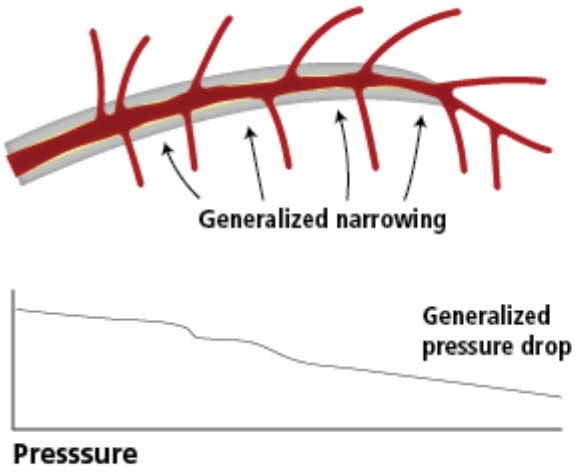
Donor and recipient sex also interact with other factors, such as: cell type, disease being treated, and other variables: hormonal, immunological, and environmental.

Heart disease in women

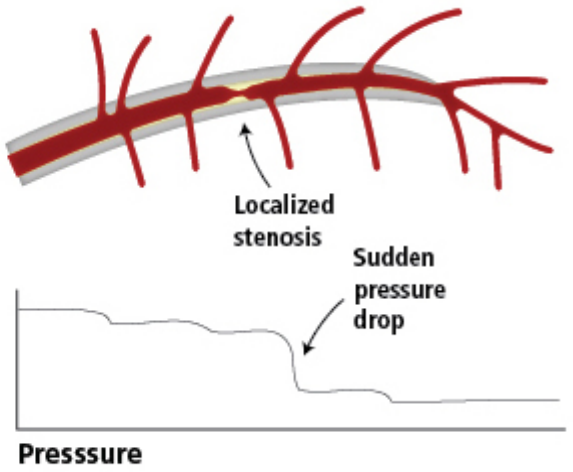
Rethinking concepts, Rethinking standards and reference models

Coronary Angiograms for Patients with Chest Pain
Women are more likely to have minor or no obstruction

Diffuse atherosclerosis
Most often seen in younger women with IHD



Obstructive atherosclerosis
Most often seen in men and older women



Adapted with permission from (K. Lance Gould, 1999).

Osteoporosis research in men

Rethinking concepts, Rethinking standards and reference models

Osteoporosis in U.S. Women and Men

	WOMEN	MEN
Average Age of Onset	65 years	75 years
Lifetime Incidence of Osteoporotic Fracture	25%	13%
Fraction of Hip Fractures Due to Osteoporosis	70%	30%
Criteria Used to Diagnose	$T \leq -2.5$ or Fragility Fracture	$T \leq -2.5$ or Fragility Fracture

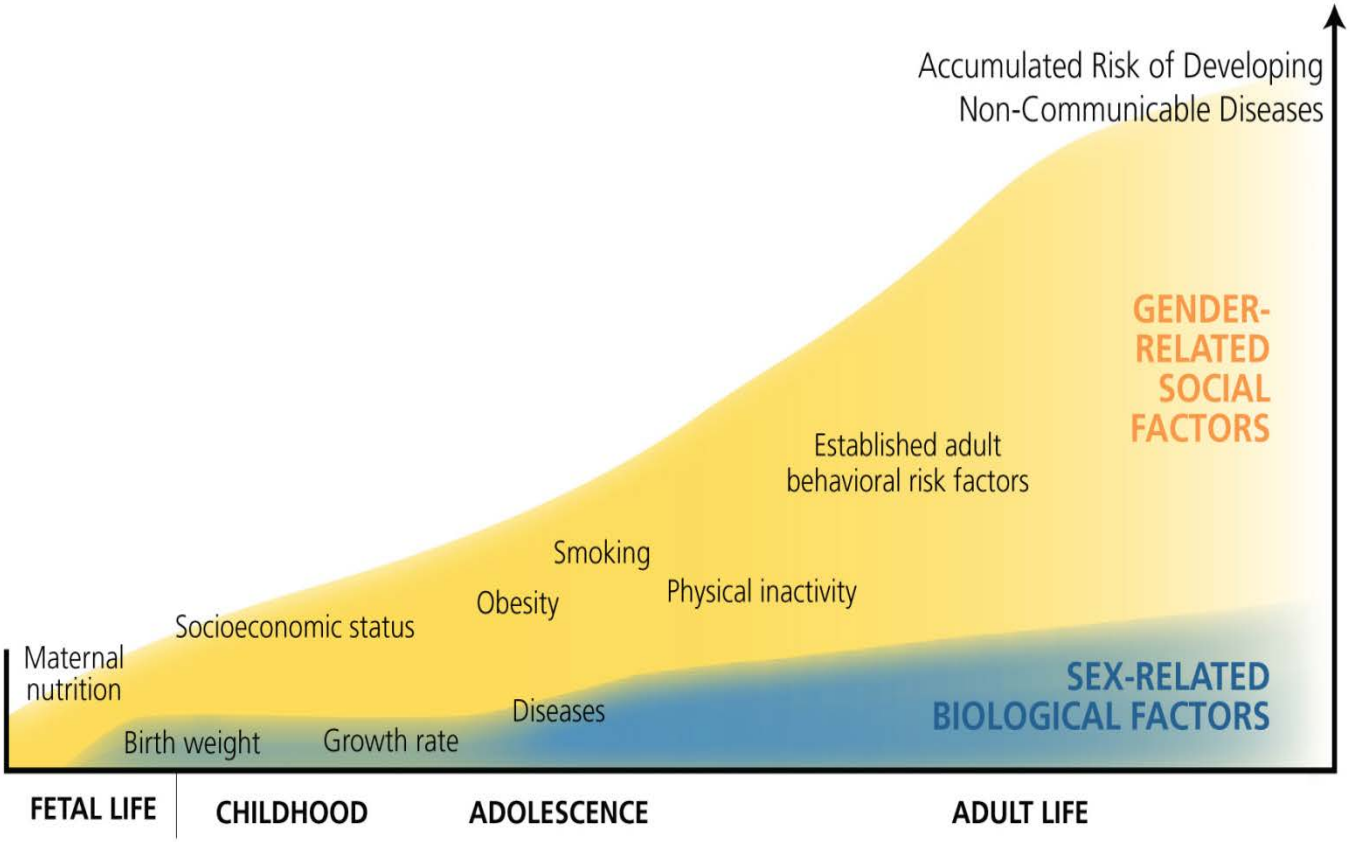
Data from Burge et al., 2007

Risk factors for NCD's

Analysing factors intersecting with sex and gender

Cumulative Life Course Risk Factors for Non-Communicable Disease (NCD)

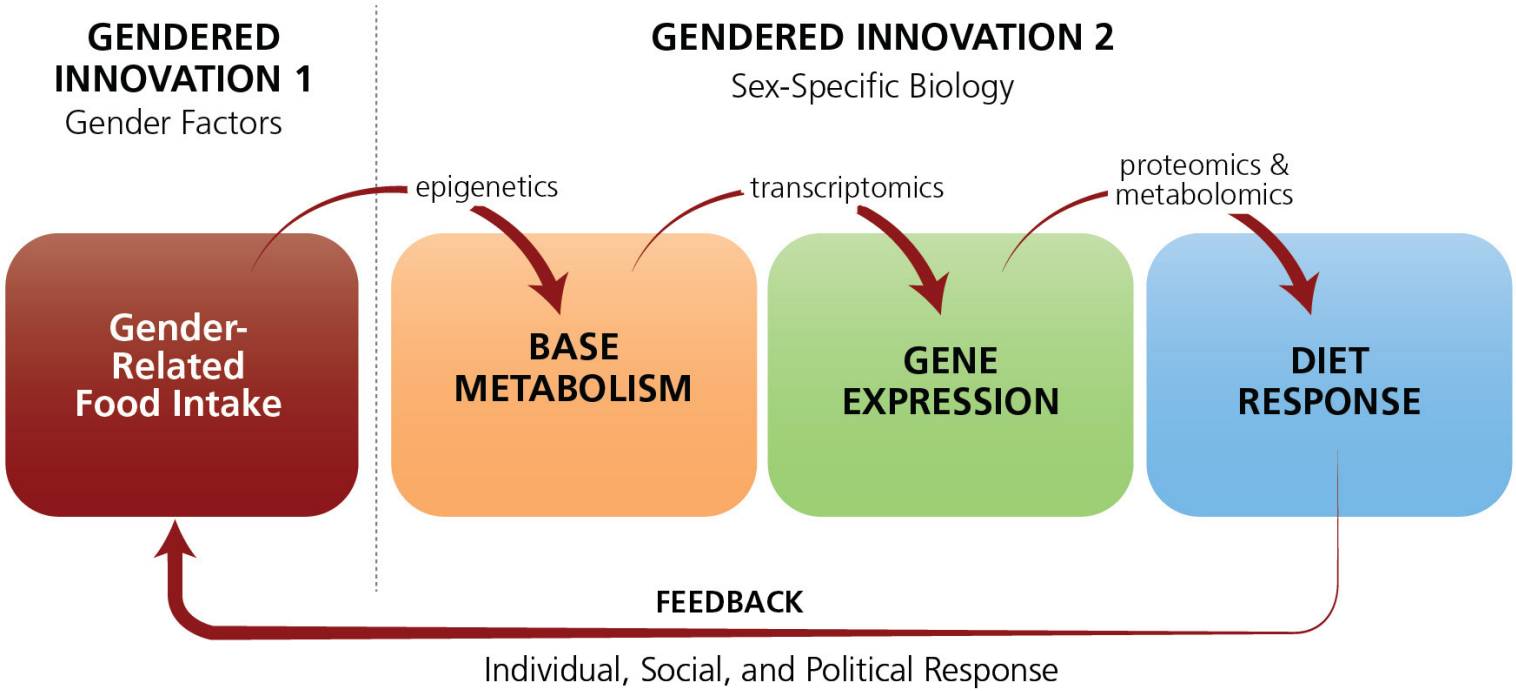
Highlighting the influence of sex and gender-related factors



Adapted from Darton-Hill et al., 2004

Risk factors for NCDs
Analysing sex

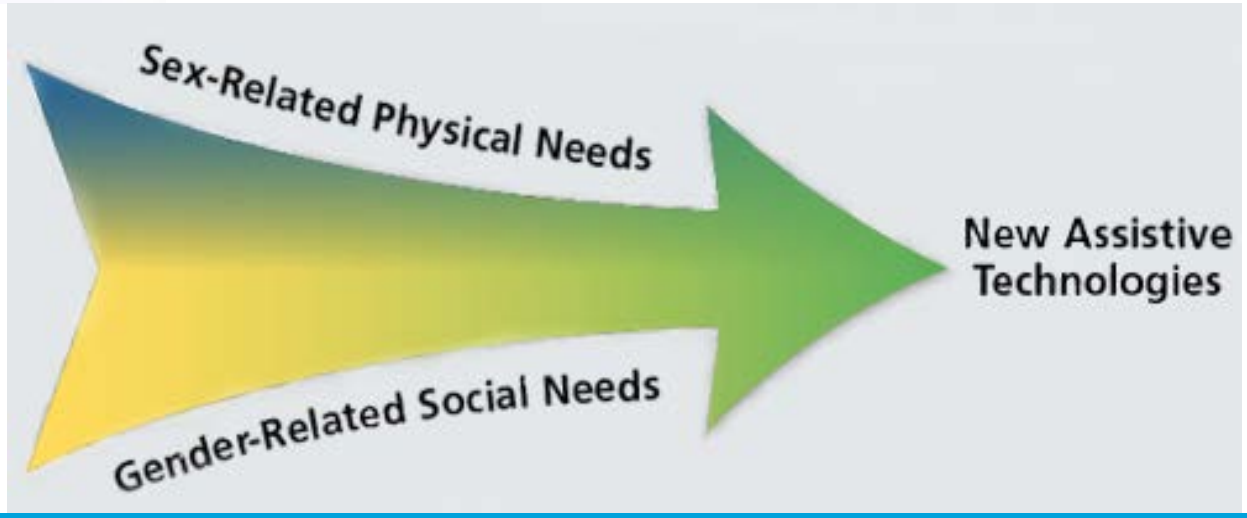
Gendered Model for Analyzing Mechansims Involved in Food Intake and Processing



The diagram above illustrates how researchers might analyze a three-way interaction between gender-related factors, sex-specific biology, and various biological mechanisms involved in human food intake and processing. Gender-related food intake is translated into different sex-specific base metabolisms, gene expressions, and dietary responses, thereby making nutrigenomics a pervasive Gendered Innovation. As such, it exemplifies the relationship between the Gendered Innovation (GI1) discussed above and Gendered Innovations 2a, 2b, and 2c discussed below.

Exploring markets for assistive technologies for the elderly

Analysing Interaction sex and gender

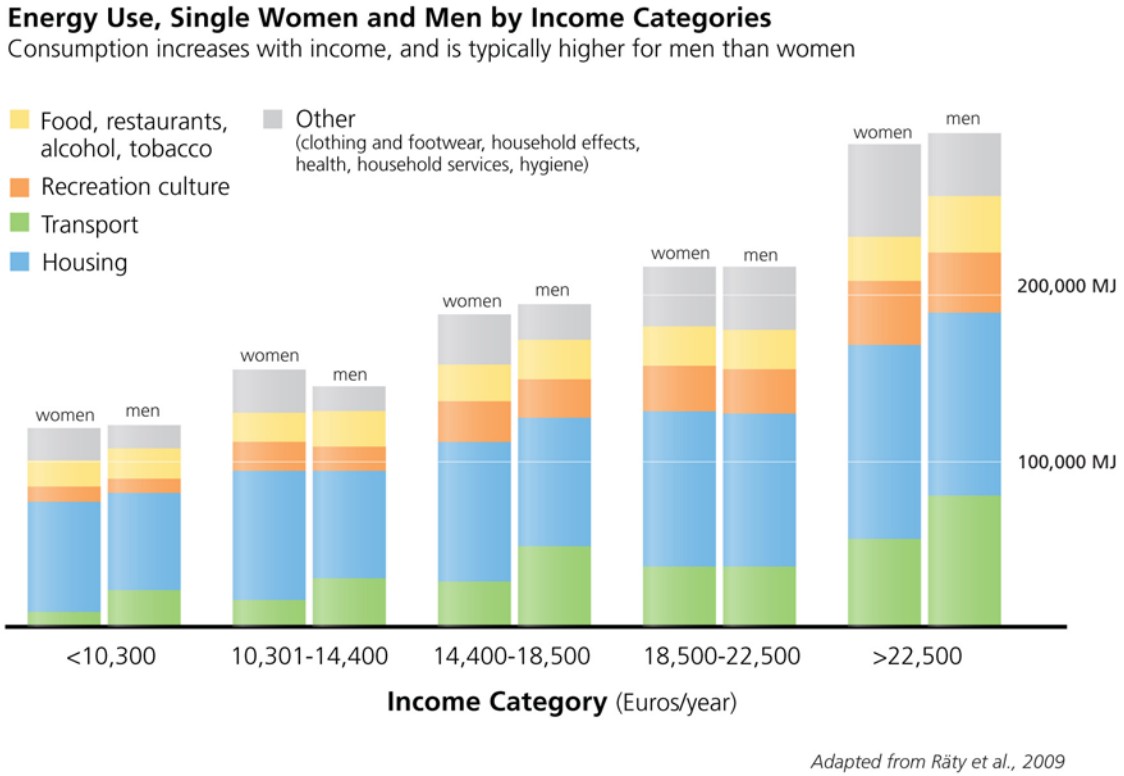


Climate Change

Analysing factors intersecting with gender

- The challenge: mitigation in industrialized countries
- Changes in lifestyle are implicated . How can a gender analysis contribute to curbing global warming?
- Method: analyzing factors intersecting with gender

Climate change



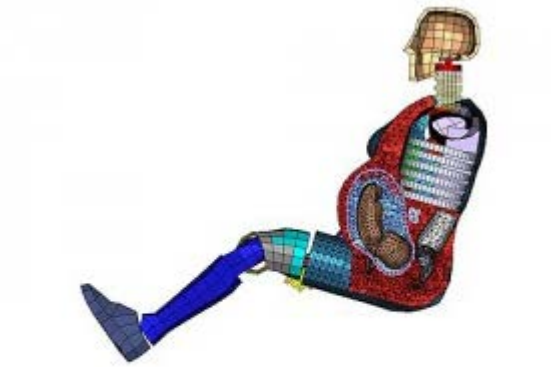
Transport

Analysing sex, Rethinking standards and reference models

- The challenge: Conventional seatbelts do not fit pregnant women properly, and motor vehicle crashes are the leading cause of fetal death related to maternal trauma.

- In 2002, Volvo developed a virtual pregnant crash test dummy "Linda"—in her 36th week of pregnancy.

- The traditional 3-point seatbelt can be redesigned to accommodate pregnancy. This would enhance public safety and potentially be a profitable innovation for an entrepreneur.



"Linda" by Volvo, a virtual pregnant crash-test dummy designed in 2002 by engineer Laura Thackray. "Linda" models the effects of high-speed impact on the womb, placenta, and fetus.

Preparation of Work Programme 2016-2017

- Advisory Group on Gender (AGG), March 2014
- Preparation process, activities AGG
- NOTE March 2015 : Clarification of terminology and concepts

Gender dimension in research content

is not

gender balance in research teams

Both are Horizon 2020 objectives in gender equality.

This paper addresses the gender dimension in the *content* of research, whereas gender balance in research teams refers to the *composition of the personnel* primarily responsible for carrying out the research and innovation activities.

H2020 “Incentives”

Did you know that ...

applicants have the possibility to include in their proposals, as eligible costs, *specific studies on gender*, as well as *training on gender*?

These are novelties of Horizon 2020. The aim is to help researchers develop and share gender expertise in relation to the funded projects.

Next Steps for stakeholders beyond researchers

- Research funding bodies
- Research policy
- Editorial boards / peer review
- Curriculum developers
- Best practice examples health research field:
- CIHR/IGH, NIH & FDA, Institutes for Gender in Medicine (DE, SE, AT), Alliance for Gender & Health (NL), EUGenMed

NIH Developments: to balance sex in cell and animal studies

- Janine A. Clayton& Francis S. Collins, Nature, May 14, 2014.

In PNAS (April 28,2015,vol112, 17,5257-8):

Sabra L Klein et al:

Sex inclusion in basic research drives discovery

MONITORING:
Canadian Institutes of Health Research

- The questions are:
- Are sex (biological) considerations taken into account in this study? (Y/N)
- Are gender (socio-cultural) considerations taken into account in this study? (Y/N)
- If YES, please describe how sex and/or gender considerations will be considered in your research design. (maximum of 2,000 characters)
- If NO, please explain why sex and/or gender are not applicable in your research design. (maximum of 2,000 characters)

Ref: Johnson J, Sharman Z, Vissandjée B, Stewart DE (2014) Does a Change in Health Research Funding Policy Related to the Integration of Sex and Gender Have an Impact? PLoS ONE 9(6): e99900. doi:10.1371/journal.pone.0099900.

CIHR INSTITUTE OF
GENDER AND HEALTH
SHAPING SCIENCE FOR A HEALTHIER WORLD

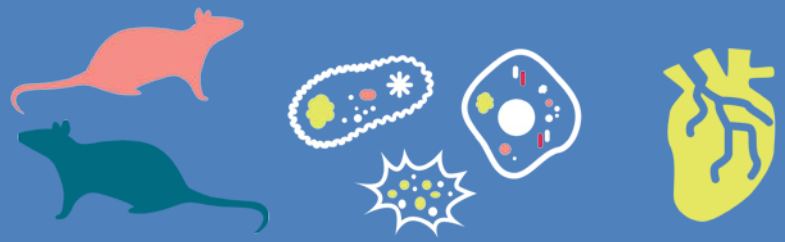
Science is Better with Sex and Gender:

CIHR Online Training Modules

Cara Tannenbaum, MD, MSc
Scientific Director, Institute of Gender and Health

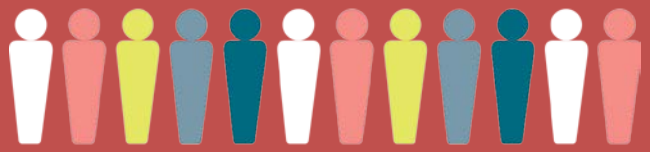
3 ONLINE TRAINING MODULES

① **Biomedical Research**



② **Primary Data** Collection with Human Participants

③ **Secondary Data Analysis** of Human Participants



CORE COMPENTENCY # 1:

DISTINGUISH SEX AND GENDER IN A HEALTH RESEARCH CONTEXT.

APPLY THE TERMS CORRECTLY.

Alliance for Gender & Health

- A unique collaboration of relevant stakeholders such as policymakers, medical specialists, health insurance companies, knowledge institutes (SCP, CBS) , women's organizations, gender researchers & scientists
- The Alliance strives for acknowledging relevant differences between women and women in health and health care in order to secure optimal health for both men and women.
- In collaboration with ZonMW a knowledge agenda has been offered to the Minister of VWS in June 2016 leading up to a research programme Gender & Health at ZonMW

  http://www.zonmw.nl/nl/actueel/nieuws/detail/item/programma-gender-gezondheid-van-start

EUGenMed Project

- Development of a roadmap for the implementation of sex and gender in biomedical and health research across Europe
  Working fields:
  (1) clinical research and clinical pharmacology, (2) public health and prevention, (3) basic research and pre-clinical drug development, (4) medicines regulation, and (5) medical education.
- Final conference: 30 June Brussels

Gendered Innovations added value

Add value to research and engineering by ensuring excellence and quality in outcomes and enhancing sustainability

Add value to society by making research more responsive to social needs

Add value to business by developing new ideas, patents, and technology

Thank you for your attention

- Questions?

i.klinge@maastrichtuniversity.nl

http://ec.europa.eu/research/science-society/gendered-innovations/index_en.cfm

http://ec.europa.eu/research/science-society/document_library/pdf_06/gendered_innovations.pdf

http://www.eugenmed.eu

Londa Schiebinger & Ineke Klinge Gendered Innovation in Health & Medicine, *Gender*, *Journal for Gender, Culture and Society,* vol.7, 2, (2015), 29-50