
SEX IS BINARY: MALE OR FEMALE

Science recognizes “sex” as an immutable binary classification: male or female. The classification of a person as male or female is based on the body’s organization for a reproductive role - to make either large gametes (eggs - female) or small gametes (sperm - male) for purposes of reproduction.

These authoritative sources emphasize the significance of sexual difference:

1. A [2001 Institute of Medicine book](#) on the importance of sex, stating (among other things) that “every cell has a sex”— male or female. It explains the genetic determination of sex.

“The male genome differs from the female genome in the number of X chromosomes that it contains, as well as by the presence of a [Y chromosome](#). It is the overriding presence of a gene on the Y chromosome (SRY) that results in development of the male gonadal phenotype.”

Exploring the Biological Contributions to Human Health: Does Sex Matter? Institute of Medicine (US) Committee on Understanding the Biology of Sex and Gender Differences; Editors: Theresa M. Wizemann and Mary-Lou Pardue. Washington (DC): National Academies Press (US); 2001 <https://doi.org/10.17226/10028>.

2. A [2015 National Institutes of Health instruction](#) to researchers underscored the importance of documenting whether the person participating in clinical research is male or female. The instruction reiterated the 2001 IOM statement that “every cell has a sex” and stressed the necessity of documenting the sex of the subjects of clinical trials, as sexual difference (being male or female) may affect symptoms, diagnosis criteria, disease progression, response to medicine or other therapeutic interventions, and outcomes.

“Women now account for roughly half of all participants in NIH-supported clinical research, which is subject to NIH’s Policy on the Inclusion of Women in Clinical Research. However, more often than not, basic and preclinical biomedical research has focused on male animals and cells. An over-reliance on male animals and cells may obscure understanding of key sex influences on health processes and outcomes. Accounting for sex as a biological variable begins with the development of research questions and study design. It also includes data collection and analysis of results, as well as reporting of findings. Consideration of sex may be critical to the interpretation, validation, and generalizability of research findings. Adequate consideration of both sexes in experiments and disaggregation of data by sex allows for sex-based comparisons and may inform clinical interventions. Appropriate analysis and transparent reporting of data by sex may therefore enhance the rigor and applicability of preclinical biomedical research.”

NIH research notice: National Institutes of Health (NIH). “Consideration of sex as a biological variable in NIH-funded research.” June 9, 2015. Online document at: <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-15-102.html>

3. A 2017 commentary on the importance of considering (binary) sex in research.

“Since the landmark Institute of Medicine report entitled Exploring the Biological Contributions to Human Health: Does Sex Matter? there has been an exponential expansion of basic science evidence and clinical data to support the concept that sex is a basic biological variable and that every cell has a sex.”

“The Sex as a Biological Variable (SABV) policy is part of the National Institutes of Health’s (NIH’s) reenergized focus on the importance of rigor and transparency to reproducibility, including appropriate accounting for the potential influence of sex on experimental outcomes in preclinical research. Just like randomization, blinding, sample-size calculations, and other basic design elements, consideration of sex is a critical component of experimental design... Sex is a fundamental biological variable with profound consequences. Underrepresenting female cells and animals in preclinical research has resulted in a poorer understanding of the biological, physiological, and pathophysiological mechanisms in the female compared with the male. Without data from females, it is impossible to determine whether results obtained in male cells and animals also apply to female cells and animals. Historical reliance on male vertebrate animals (e.g., rats, mice) in preclinical research has resulted in the generation of incomplete data available to inform translation to clinical trials enrolling both men and women.”

Terri Lynn Cornelison, MD, PhD, FACOG, 1, 2 and Janine Austin Clayton, MD, “Considering Sex as a Biological Variable in Biomedical Research,” *Gender and the Genome*, Volume 1, Number 2, 2017.

<https://journals.sagepub.com/doi/full/10.1089/gg.2017.0006>

These three sources, and countless others, make clear that sex is binary. Disorders of sexual development (intersex) are variations within the two basic sexes, not additional sexes. It helps to recall that sex is defined by reproductive design — in humans, reproduction only occurs with two gametes, one large (female - ovum) and one small (sperm - male). No human reproduction occurs in any other way, except through the joinder of these two sexed gametes. The bodies of males and females are designed — as a whole — around that reproductive function.

Even if a person is infertile (e.g., something goes wrong in the development or function of various organs), the person’s body as a whole is still organized around that original design of male or female. It cannot and does not change. It is not surprising that the most severe intersex conditions are usually accompanied by sterility — the more something goes awry in sexual development, the less likely the person is to be able to reproduce, because sexual development is optimized for reproduction.