10 NIH Grants Paying for Transgender Animal Experiments

Total cost to taxpayers for grants below: $10 million+

NIH GRANT NAME: **"Molecular Mechanisms of Hormone-Mediated Sex Differences in Wound Healing"**

- **Link:** https://reporter.nih.gov/project-details/11020434
  - Recipient: Brigham and Women's Hospital
  - Current start/end date: 2024-2029
  - Cost to date: $442,444
  - Key excerpts from NIH grant summary:
    - *We developed new models and showed that T limits wound healing in large animals with different effects in XX vs. XY animals.*

NIH GRANT NAME: **A Mouse Model to Test the Effects of Gender-affirming Hormone Therapy on HIV Vaccine-induced Immune Responses**

- **Link:** https://reporter.nih.gov/project-details/10849830
  - Recipient: Duke University
  - Current start/end date: 2023-2025
  - Cost to date: $455,120
  - Key excerpts from NIH grant summary:
    - *"we propose to develop an animal model of feminizing hormone therapy to study the effects of estrogen/anti-testosterone therapy on HIV vaccine-induced immune responses"*
    - *"we will develop a mouse model of XHT (Cross-sex hormone therapy) that recapitulates clinical hormone therapy for male-to-female transition in humans"*

NIH GRANT NAME: **Reproductive Consequences of Steroid Hormone Administration**

- **Link:** https://reporter.nih.gov/project-details/10619517
  - Recipient: University of Michigan
  - Current start/end date: 2019-2025
  - Cost to date: $2.5M
  - Key excerpts from NIH grant summary:
    - "the impact of long-term cross-sex hormone therapy on reproductive health is largely unknown, particularly in transgender men (female-to-male or FTM)"

        - "None of the existing animal models that address the effect of androgens on reproductive function in females are directly applicable to the clinical paradigm of cross-sex T therapy in transgender men or GnRHa-T therapy in transgender adolescents. To address this knowledge gap, we have developed a mouse model to mimic T treatment for FTM gender transition"

NIH GRANT NAME: **Cross Sex Steroid Therapy and Cardiovascular Risk in the Transgender Female**

- Link: https://reporter.nih.gov/project-details/11074016
    - Recipient: University of Mississippi
    - Current start/end date: 2023-2026
    - Cost to date: $65,948
    - Key excerpts from NIH grant summary:
        - *"the Alexander laboratory has developed a novel model of feminizing hormone therapy in the male rat that involves administration of E2 to mimic physiological levels observed in age-matched female rats in conjunction with androgen suppression.*
        - *a critical need involves the use of innovative animal models to provide reliable risk assessment and in-depth investigation into mechanisms that contribute to increased CV risk in adult [transgender females] individuals that undergo GAHT.*
        - *Aim 1 will test the hypothesis that the shift in the hormonal milieu in gender affirming hormone therapy in a rodent model of the transfemale rat is associated with increased end organ damage and cardiovascular risk that is further exacerbated with preexisting chronic disease. Aim 2 will test the hypothesis that increased end organ damage and cardiovascular risk in transgender females that undergo gender affirming hormone therapy involves an estradiol induced "male sex-specific" effect on the renin angiotensin system.*

NIH GRANT NAME: **Gender-Affirming Testosterone Therapy on Breast Cancer Risk and Treatment Outcomes**

- **Link:** https://reporter.nih.gov/search/Y3xbwNgJV0-V2-RIROPR1Q/project-details/10912193#description
    - Recipient: Beth Israel Deaconess Medical Center
    - Current start/end date: 2023-2025

- Cost to date: $299,940
- Key excerpts from NIH grant summary:
  - *"This proposal will undertake preclinical studies to address breast cancer (BC) risk and treatment concerns of transmasculine people (female-to-male transition)…. Most transmasculine individuals pursue testosterone therapy (TT) to treat their gender dysphoria."*
  - *"Aim 1 will use two mouse models to clarify the extent to which TT affects the risk of developing estrogen receptor positive (ER+) and negative (ER-) BC. We will compare the incidences and tumor specific survival in female mice (intact) and oophorectomized female mice receiving TT with their respective counterparts that do not receive TT*

NIH GRANT NAME: **Microbiome mediated effects of gender affirming hormone therapy in mice**

- Link: https://reporter.nih.gov/search/-NkoAnjCB0uKdDs0r_5qxw/project-details/10944419
  - Recipient: Emory University
  - Current start/end date: 2024-2029
  - Cost to date: $735,113
  - Key excerpts from NIH grant summary:
    - *"Gender affirming hormone therapy (GAHT) is used by transgender (TG) people to alleviate gender dysphoria.*
    - *This project will determine the contribution of the gut microbiome to the effects of gender affirming hormone therapy (GAHT) in mice.*
    - *The project is important because the skeletal effects of GAHT in humans is a critical medical concern in transgender medicine."*

NIH GRANT NAME: **Androgen effects on the reproductive neuroendocrine axis**

- Link: https://reporter.nih.gov/project-details/11000334
  - Recipient: UC-San Diego
  - Current start/end date: 2023-2028
  - Cost to date: $1.2M
  - Key excerpts from NIH grant summary:
    - *This proposal includes clinical studies of transgender individuals and the effects of androgen treatment on their reproductive health.*
    - *We test this hypothesis in two complementary Aims that study the role of high exogenous androgens in both a clinical setting in transgender male*

(female sex) human subjects and corresponding transgenic female mouse models.

NIH GRANT NAME: **GHB Toxicokinetics: Role of sex hormone dependent monocarboxylate transporter regulation and potential for altered overdose risk in transgender men and women**

- **Link:** https://reporter.nih.gov/project-details/10593926
  - Recipient: University of the Pacific
  - Current start/end date: 2020-2025
  - Cost to date: $1.1M
  - Key excerpts from NIH grant summary:
    - *Gamma-hydroxybutyrate (GHB), is a popular drug of abuse utilized at raves and in drug-facilitate sexual assault due to its' euphoric, aphrodisiac, and sedative effects.*
    - *In the last decade the use of GHB has been increasing in the LBGTQ community due to the prevalence of a phenomenon referred to as chemsex.*
    - *Our hypotheses for this aim are that [1] GHB renal clearance and systemic exposure (AUC) will be altered in response to individual male and female sex hormones; [2] males, and animals [they're using rats] exposed to testosterone will have an increased risk of acute overdose due to decreased renal clearance.*
    - *these studies will address the knowledge gap regarding GHB toxicokinetics and toxicity in vulnerable female and transgender populations.*

NIH GRANT NAME: **Gonadal hormones as mediators of sex and gender influences in asthma**

- **Link:** https://reporter.nih.gov/project-details/10891526
  - Recipient: Indiana University
  - Current start/end date: 2021-2025
  - Cost to date: $3.1M
  - Key excerpts from NIH grant summary:
    - *"no studies have explored the effects of feminizing hormone therapy with estrogen in the lungs of trans women.*
    - *Prior studies from our laboratory using mouse models have reported sex differences and influences of the estrous cycle and circulating sex hormones in the inflammatory response to environmental exposures.*
    - *Our studies will be the first to characterize estrogen-mediated mechanisms of inflammation in asthma phenotypes in the male and female lung, contributing to the characterization of sex- and*

gender-specific factors accounting for inter-individual differences, as well as the effects of feminizing hormone therapy in lung pathobiology.

- *We expect that our studies would serve to develop potential sex- and gender-specific treatments and recommendations for dosage of therapeutic agents to treat and prevent asthma in cis and transgender women."*

NIH GRANT NAME: **Understanding how chromosomal makeup and cross-sex hormone administration affect wound healing in mice**

- Link: https://reporter.nih.gov/project-details/10826027
  - Recipient: Johns Hopkins University
  - Current start/end date: 2024-2027
  - Cost to date: $48,974
  - Key excerpts from NIH grant summary:
    - *"Transgender individuals experience persistent psychological distress caused by an incongruency between one's assigned sex at birth and one's internal sense of self. For transgender males (i.e., assigned female at birth and identifying as male), medical treatment can involve administration of lifelong exogenous testosterone (T) and/or gender affirming surgery (GAS).*
    - *We hypothesize that T may modulate wound healing in a more complex manner than the scientific community had understood up until this point by shifting cell phenotypes and operating under novel pathways, with sex chromosome- and sex hormone receptor-dependent effects, and by preferentially affecting immune cells. We will test these hypotheses using various assays including planimetry, histology, immunofluorescence, flow cytometry, single cell RNA sequencing, transgenic mouse models, and chemical and genetic depletion.*
    - *Successful completion of these aims will give us a new understanding of the biological mechanisms responsible for this observed impaired wound healing in transgender men, who undergo lifelong T therapy, and has the potential to significantly rewrite perioperative guidelines for gender affirming surgery."*

Three Papers Promoting More Transgender Animal Experiments Funded in Part by DEI grants

Paper title: **Perspective on equitable translational studies and clinical support for an unbiased inclusion of the LGBTQIA2S+community**

- **Link to paper:** https://www.nature.com/articles/s41386-023-01558-8#Abs1
  - *"Research regarding the mental health of the Lesbian, Gay, Bisexual, Transgender, Queer, Intersex, Asexual, 2 Spirit (LGBTQIA2S+) community has been historically biased by individual and structural homophobia, biphobia, and transphobia, resulting in research that does not represent the best quality science."*
  - *Translational research historically failed to acknowledge TNG or intersex people. The first animal model of GAHT use was recent—one year after the U.S. National Institute of Health mandated use of females (in addition to males), in research. No regulations yet require gender expansive individuals be included.*
  - *Animal models of GAHT enable genetic manipulation and precise neuronal/molecular recordings impossible in humans."*
  - rodent research aimed at better treating/preventing stress effects and on long-lasting behavioral outcomes will benefit LGBTQIA2S + communities. Other species exist for which same-sex preferences may be clearer (e.g., non-human primates), but such laboratory-based research opportunities remain limited.
  - *How can researchers conduct preclinical work that benefits LGBTQIA2S + communities? Rodent models enable the study of LGBTQIA2S + health, if used with due consideration of translational applicability and to societal issues faced (not reproducible in rodents). While such limitations need to be considered generally, interpretation of rodent behavioral data presents a particular challenge for questions related to gender identity/sexual orientation given political standpoints [12], writing laws for political expediency hurting LGBTQIA2S + youth.*

This paper was funded by these NIH grants:

- $1.2M to UPENN (2019-2029)
  - https://reporter.nih.gov/project-details/10848737
    - This is a DEI grant

- **$40K to UC- San Diego (2021-23)**
  - https://reporter.nih.gov/project-details/10236735
    - This is a DEI grant

- Grant name: *"Promoting Diversity, Inclusion, and Professional Development in the International Behavioral Neuroscience Society"*

Paper title: Centering the Needs of Transgender, Nonbinary, and Gender-Diverse Populations in Neuroendocrine Models of Gender-Affirming Hormone Therapy (GAHT)

- Link to paper: https://pmc.ncbi.nlm.nih.gov/articles/PMC10472479/
    - *"We highlight key biomedical questions regarding GAHT that can be investigated using animal models. We discuss how contemporary research fails to address the needs of GAHT users and identify equitable practices for cisgender scientists engaging with this work. We conclude that if necessary and important steps are taken to address these issues, translational research on GAHTs will greatly benefit the health care outcomes of TNG people."*
    - "We believe that animal models of GAHT can help fill this gap by allowing researchers to conduct studies not possible in humans to better understand the specific biological systems affected by GAHT."
    - "Cultural conversations about GAHT almost exclusively center around development of physical characteristics—beards, deep voices, and broad shoulders with T (testosterone)-GAHT versus breasts, hips, and softer skin with E2 (estradiol)- and/or P4 (progesterone)-GAHT. Such portrayals fail to recognize the profound effect of hormonal milieu on neural function and behavior. Here, we review current deficiencies in our understanding of GAHT effects on neurological processes and illustrate how to best model GAHT using current experimental paradigms in common laboratory animals."

This paper was funded by these NIH grants:

- $1.2M to UPENN (2019-2029)
    - https://reporter.nih.gov/project-details/10848737
    - This is a DEI grant
- $2.5M to University of Michigan (2019-2025)
    - https://reporter.nih.gov/project-details/10619517
- $2.4M to Rutgers (2020-2025)

- https://reporter.nih.gov/project-details/10808104

- $3.6M to Cold Spring Harbor Lab (2018-2028)
  - https://reporter.nih.gov/project-details/10789940

- $169K to Princeton (2022-2024)
  - https://reporter.nih.gov/project-details/10768655

Paper title: Challenges and inclusive practices for LGBTQIA2S+ scientists in the American Physiological Society

- Link to paper: https://pmc.ncbi.nlm.nih.gov/articles/PMC9236859/

  - *"Research-oriented seminars and workshops aimed to enhance scientists' understanding of how to design appropriate preclinical studies with animal models and inclusive practices for human and clinical studies regarding sexual orientation and gender identity. These activities should highlight the need to produce science that improves the lives of community members and not the etiology of these identities, which can be used to justify eugenists practices against the community..*
  - *In particular, seminars on and funding for research that supports actions being challenged by anti-LGBTQ groups, such as the safe use of puberty blockers and hormone-affirming therapy for transgender youth"*

This paper was funded by these NIH & USDA grants:

- HL007224
- $17.5 million
- Boston University
  - This is a DEI grant

- MH123544
- $2.4 million
- Rutgers University

- ES005022
- $58 million

- Rutgers University

- NJ06195 (USDA)
- $25,000
- Rutgers University

- CA244271
- $2.2 Million
- University of Iowa