

## Plan Overview

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*A Data Management Plan created using DMPTool*

**DMP ID:** <https://doi.org/10.48321/D1VH4D>

**Title:** Modeling Hormone and Genetic Mechanisms Driving Sex Differences in Influenza Immunity

**Creator:** Sabra Klein - **ORCID:** [0000-0002-0730-5224](https://orcid.org/0000-0002-0730-5224)

**Affiliation:** Johns Hopkins University (jhu.edu)

**Contributor:** Andrew Pekosz

**Funder:** National Institutes of Health (nih.gov)

**Funding opportunity number:** RFA-AI-23-056

**Template:** NIH-FDP Pilot Template Bravo

### **Project abstract:**

Influenza viruses contribute to a substantial number of illnesses and fatalities annually, underscoring their impact on both health and the economy. Biological sex significantly influences immune responses to influenza infection and vaccination, where females experience higher morbidity and mortality than males despite being more likely to get vaccinated. Sex hormones and genetics are increasingly recognized as two host factors that have a substantial impact on immunity and the development of protective responses during influenza virus infection and after vaccination. To advance the goals of understanding how sex hormones and X-linked genes influence immune memory and protection from influenza, it is essential to develop new computational tools that can dissect the contributions of multiple mechanisms, account for multiple sources of heterogeneity, and precisely forecast the dynamics that yield better protection. To address this, we aim to establish new predictive immune models and simulate human populations using virtual patient cohorts that differentiate the effects of sex hormones and X-linked genes while considering variable hormonal landscapes. The studies will identify controlling factors of sex-influenced immunity with calibration and validation in samples obtained from human populations of infected patients and vaccinated individuals with age, sex, and hormone levels stratified. **PUBLIC HEALTH RELEVANCE STATEMENT:** Influenza is a leading cause of death in the United States despite availability of vaccines, with sex hormones and genetics emerging as critical host factors influencing the risk of infection. This project provides validated computational methodologies and tools needed to assess sex differences in immunity to this important pathogen.

**Start date:** 12-01-2024

**End date:** 11-30-2029

**Last modified:** 01-21-2024

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# Modeling Hormone and Genetic Mechanisms Driving Sex Differences in Influenza Immunity

- New

This data sharing plan is specific to the model validation experiments involving use of stored plasma and cells from ongoing studies as well as testing of hypotheses in mouse models. Oversight will be provided by Dr. Sabra Klein, <https://orcid.org/0000-0002-0730-5224>

v1

01/18/2024

Sabra Klein, <https://orcid.org/0000-0002-0730-5224>

MO21H236

- No

not applicable

Raw immunology data (protein and cells from mice and stored human samples) will be deposited at the JHU data repository

Raw viral titer data from mice will be deposited at the JHU data repository

Raw steroid data from mice will be deposited in the JHU data repository

Raw morbidity data from mice will be deposited in the JHU data repository

Processed data from mice, if needed, will be deposited in the JHU data repository

Processed data from human cells, if needed, will be deposited in the JHU data repository

Statistical analysis scripts can be deposited in GitHub, but also in the JHU data repository so that our code can have a DOI that is associated with our data.

Data will be made available in standard formats and will not require the use of specialized tools to be accessed or manipulated.

open source

n/a

Long-term archiving of non-genomic data will be managed by Johns Hopkins Data Services (JHUDS) using the Johns Hopkins Research Data Repository. The Data Repository provides public access to data through an established repository platform supported by storage and preservation practices that follow the Open Archival Information System reference model. Deposited data is given standard data citations and persistent identifiers (DOIs). JHUDS provides system administration and consultative support for researchers preparing data for deposit. Data will be archived under a memorandum of understanding renewed every 5 years with the PI's consent.

We will deposit data in the JHU data repository, which will not be made public until the time of publication. We will receive an identifier that will be included in any publication for easy access to our dataset.

Deidentified data may be reused

- Yes

This is not applicable to the majority of data from this project, which will be from mice. For the data derived from human PBMCs and plasma obtained from the Johns Hopkins biorepository, all identifiers will be removed to maintain confidentiality. Sharing of anonymized human PBMC data is pending IRB's review of the donor licensing for secondary open access sharing. If controlled access is required, the plan will be updated with an alternative repository such as Vivli.org

- Open access

Open access to mouse data with identifiers. Open access to deidentified human cellular data.

The corresponding author on the resulting publication would be responsible for providing any needed oversight.

- No

not applicable

Question not answered.

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## **Planned Research Outputs**

### **Bioassays and measurements - "antibody responses"**

ELISA and live virus neutralization data

### **Bioassays and measurements - "cytokines and chemokine"**

multiplex concentrations of cytokines and chemokine in plasma from humans and mice and tissues from mice only

### **Bioassays and measurements - "Sex steroids"**

measure sex steroids by either multiplex luminex assay or ELISAs

### **Bioassays and measurements - "Virus measurements"**

virus titers measured in tissues from mice

### **Bioassays and measurements - "Raw immune cell data"**

Immune cell quantifications from mouse tissues and human PBMCs

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## **Planned research output details**

Title	Type	Anticipated release date	Initial access level	Intended repository(ies)	Anticipated file size	License	Metadata standard(s)	May contain sensitive data?	May contain PII?
antibody responses	Bioassays and measurements	Unspecified	Open	JHU Research Data Repository	80 MB	Creative Commons Attribution Non Commercial Share Alike 4.0 International	None specified	No	No
cytokines and chemokine	Bioassays and measurements	Unspecified	Open	JHU Research Data Repository	80 MB	Creative Commons Attribution Non Commercial Share Alike 4.0 International	None specified	No	No
Sex steroids	Bioassays and measurements	Unspecified	Open	JHU Research Data Repository	40 MB	Creative Commons Attribution Non Commercial Share Alike 4.0 International	None specified	No	No
Virus measurements	Bioassays and measurements	Unspecified	Open	JHU Research Data Repository	100 MB	Creative Commons Attribution Non Commercial Share Alike 4.0 International	None specified	No	No
Raw immune cell data	Bioassays and measurements	Unspecified	Open	JHU Research Data Repository	60 MB	Creative Commons Attribution Non Commercial Share Alike 4.0 International	None specified	No	No