**Research Objective**

To investigate sex-based differences in T cell proliferation and differentiation by studying the activation and stimulation of murine CD8+ lymphocytes in vitro during early cell divisions.

**Introduction and Methods**

Currently, studies and literature describe:

- Lymphocyte counts are higher in males, while post-activation and post-stimulation counts are greater in females than in males, as shown in PBMC.
- Females have greater rates of activation and inflammation-associated gene expression than their male counterparts.

**How does proliferation and differentiation differ intrinsically to the cell’s sex and what are their changes over successive divisions?**

We hypothesize that in these early events, there will be differences in the activation markers after *in vitro* culturing with IL-2, as well as discrepancies in cytokine production between the male and female T cell proliferation and differentiation due to probable distinct characters in the microenvironments between the two sexes.

**Conclusion**

Altogether, these results were consistent with:

- Current studies on the sex differences in immune responses in adult humans.
- Existing studies claiming that females, in general, have a more vigorous immune system than their male counterparts.
- Also, the low production of pro-inflammatory cytokines such as IFN-γ and TNF-α in males may address the increased prevalence of specific disorders in males than in females (e.g., childhood wheeze).

More importantly, these reveal novel trends:

- during the early T cell events, such as activation;
- during the early stages of cell division and proliferation;
- about activation markers and pro-inflammatory cytokine productions that are already occurring prior to when they were investigated in current literature; and
- that can be used as preliminary studies for large-scale investigations on the sex differences in T cell immunity.

**Future Directions**

Having shown important conclusions, future directions may include:

- large-scale study to explore the specific intrinsic property in female cells that causes their propensity to form a more robust effector T cell army than males
- Adoptive transfer experiments that can explore the following variables:
  - Type of cognate antigen
  - Antigen dosage
  - Sensitivity to regulatory cytokines

**References**