Immunology:
Natural Killer Cells

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ISCORE Program

Immunology: Natural Killer Cells

Desiree Starzyk & Ana Campos Codo

What is ISCORE?

- An acronym for International Scholar Collaborative Opportunity for Research Exchange, ISCORE is a program that pairs pre-health undergraduate students from University of Colorado Denver with a mentor that is an international researcher at CU Anschutz Medical Campus. Mentor and mentee meet at the medical campus for a minimum for 3 hours a week over an 8 week period. The program is intended to provide a combined academic and cultural experience for both mentee and mentor.

[To Learn More About ISCORE, Click Here]

Who I Am

Desiree Starzyk

- I’m an undergraduate at CU Denver working to obtain a Bachelor of Science in Psychology with a Minor in Biochemistry. I worked in business operations before deciding to come back to school on a pre-health track. My future career goals are to attend medical school with a specialization in mental health.

My Mentor

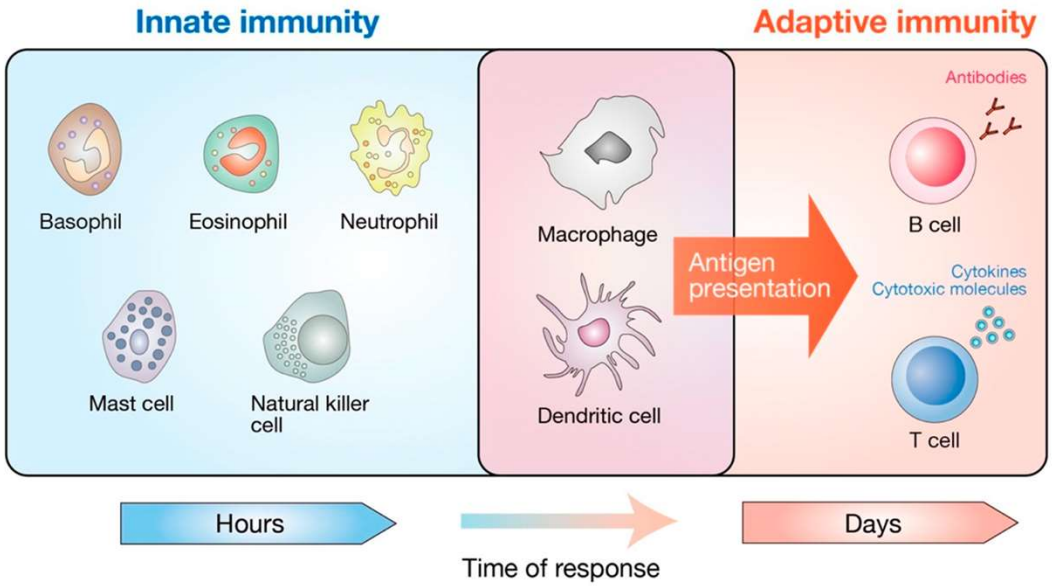
Ana Campos Codo

- Ana obtained her Master's Degree in Genetics and Molecular Biology with an emphasis in Immunology in Brazil. It was there she began researching the immunogenetics of COVID-19. She moved from Brazil in January 2022 to continue her research with NK cells with the Norman lab at CU Anschutz.

Intro to Immunology

There are 2 types of immunity:

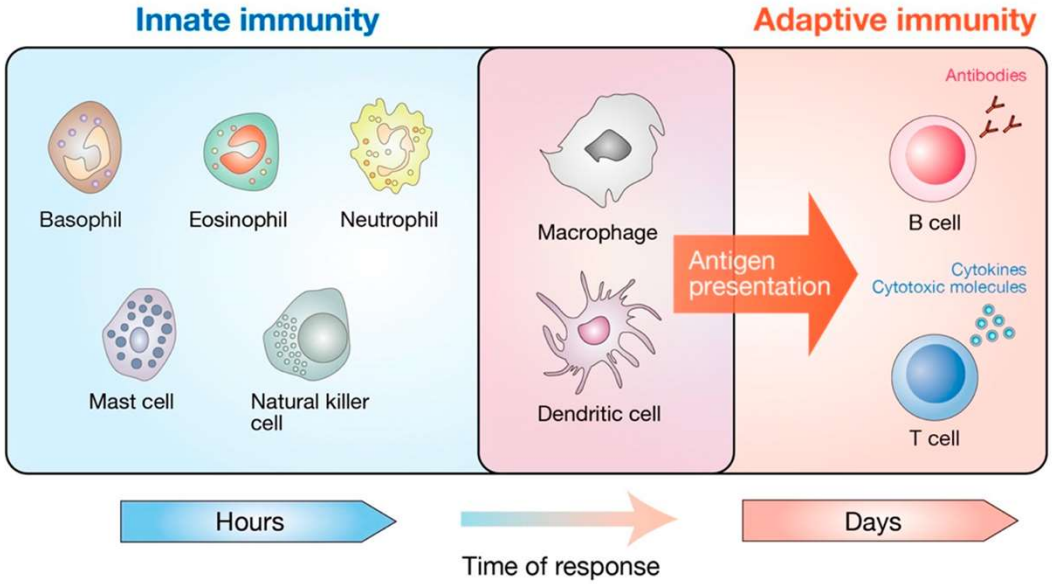
- Innate
- Adaptive



Intro to Immunology

Innate Immunity

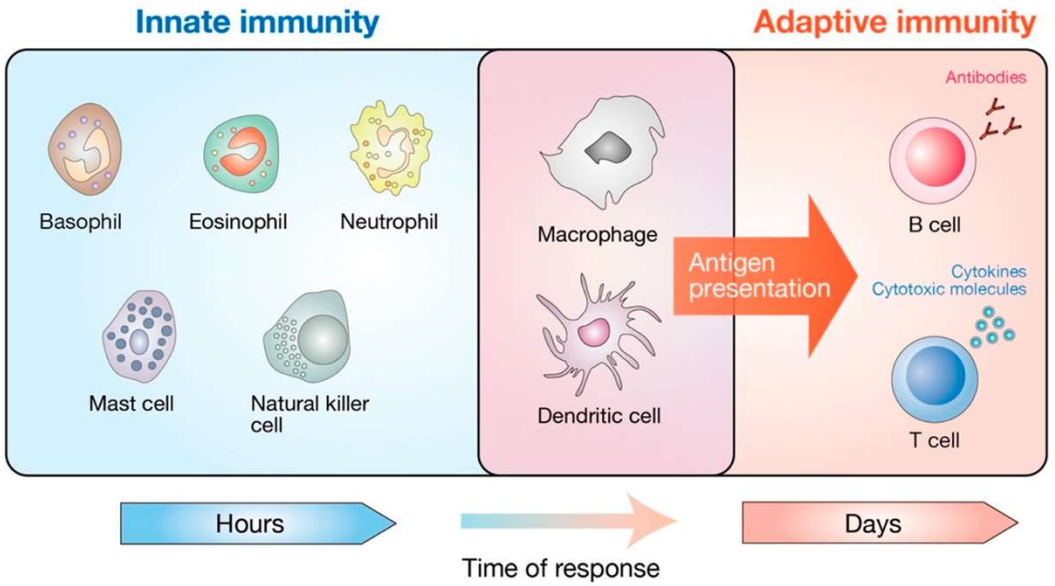
- This is a fast acting, non-specific immune response to any pathogens that enter your body. It is comprised of four types of defense:
  - Anatomic
  - Physiologic
  - Endocytic & Phagocytic
  - Inflammatory



Intro to Immunology

Adaptive Immunity

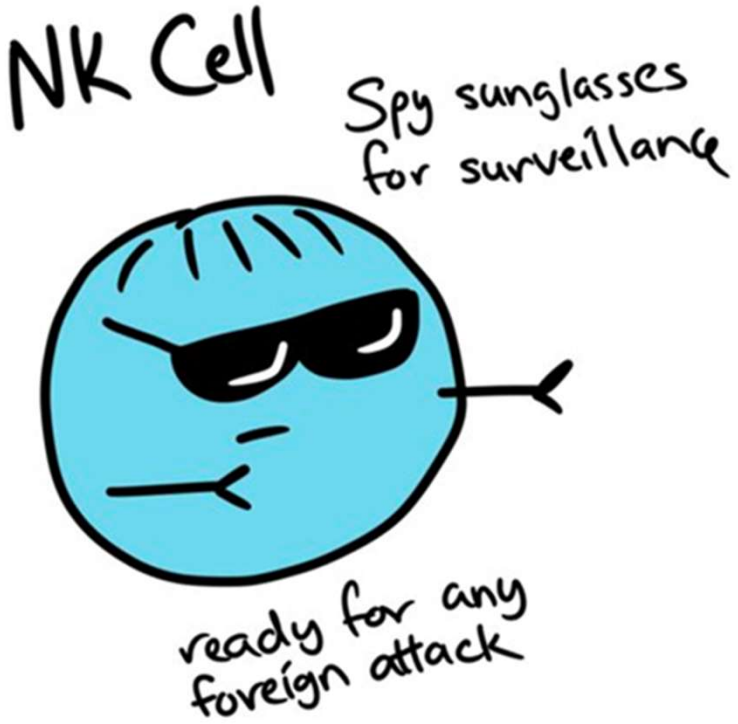
- This is a longer term immune response to fight pathogens the innate system is unable to rid of. This is mostly comprised of:
  - T cells
  - B cells



Intro to NK Cells

Natural Killer Cells

- Innate immunity
- Target viral infected and tumor cells
- Can either be activated or inhibited by the human leukocyte antigens (HLA) markers present on the cell
- Typically induce apoptosis when activated



ISCORE Experience

Ana and I met every Friday for about 5-6 hours. These meetings included:

- Prepping our various NK cells in solution
- Allowing them to incubate
- Introducing them to B-Cells without HLA
- Performing flow cytometry to assess the killing

ISCORE Experience

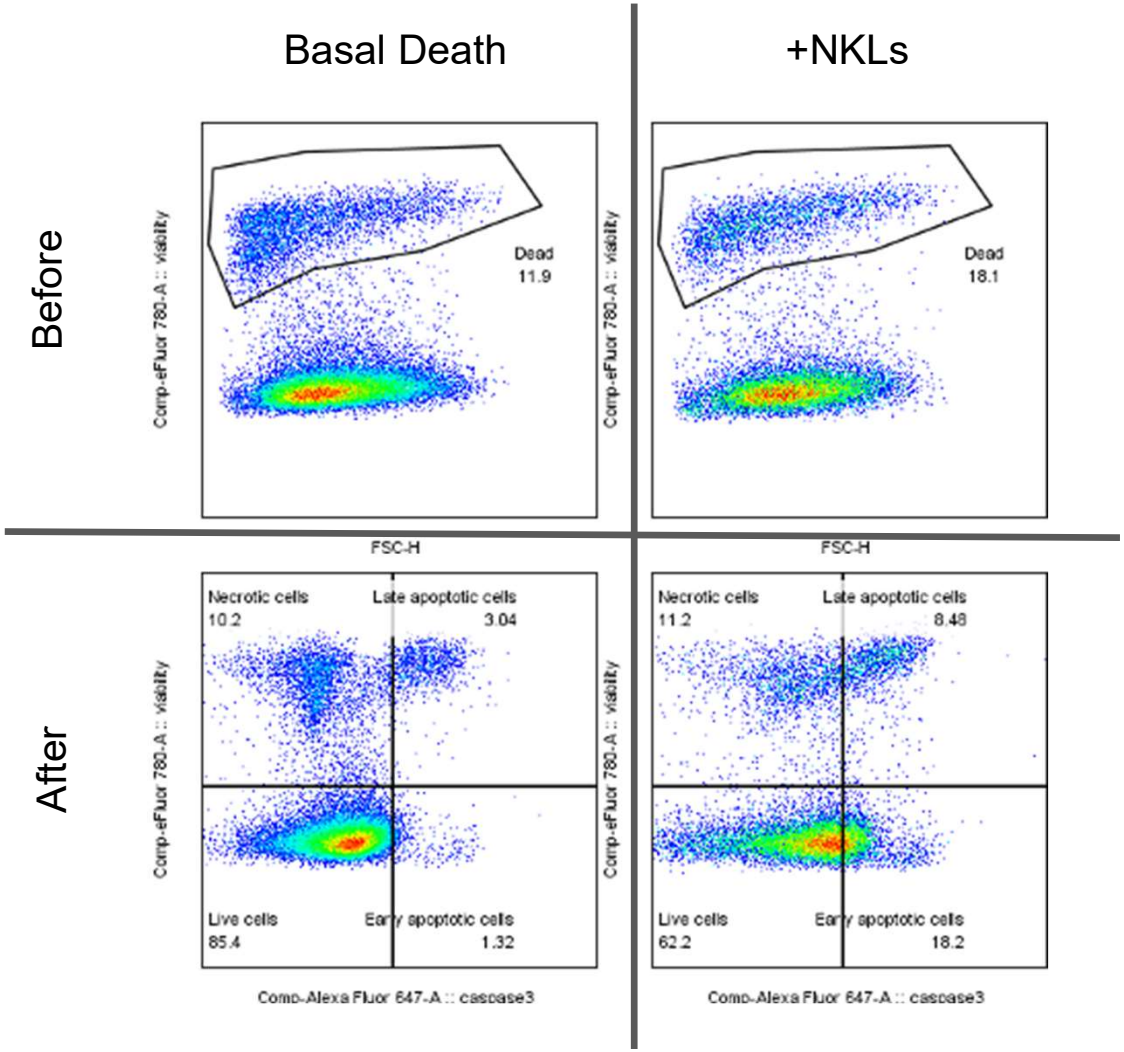
When NK cells stopped killing the targets, we manipulated the following variables to determine the best conditions to monitor NKLs:

- Add marker to dying cells
- Change IL-2 concentration
- Change the FBS
- Increase amount of cells in the assay

Results

Add marker to the dying cells

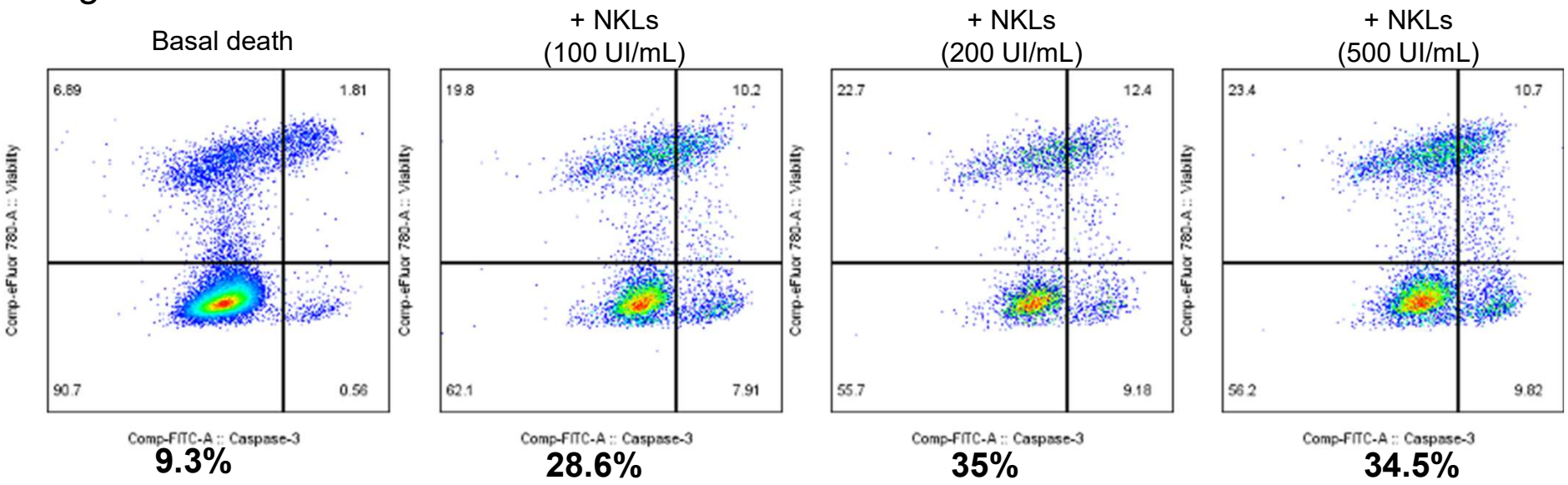
- The before only showed a marker of when cells were dead, not dying
- This brought NKL kills from 6.2% before to 23.4% after



Results

Change IL-2 Concentration

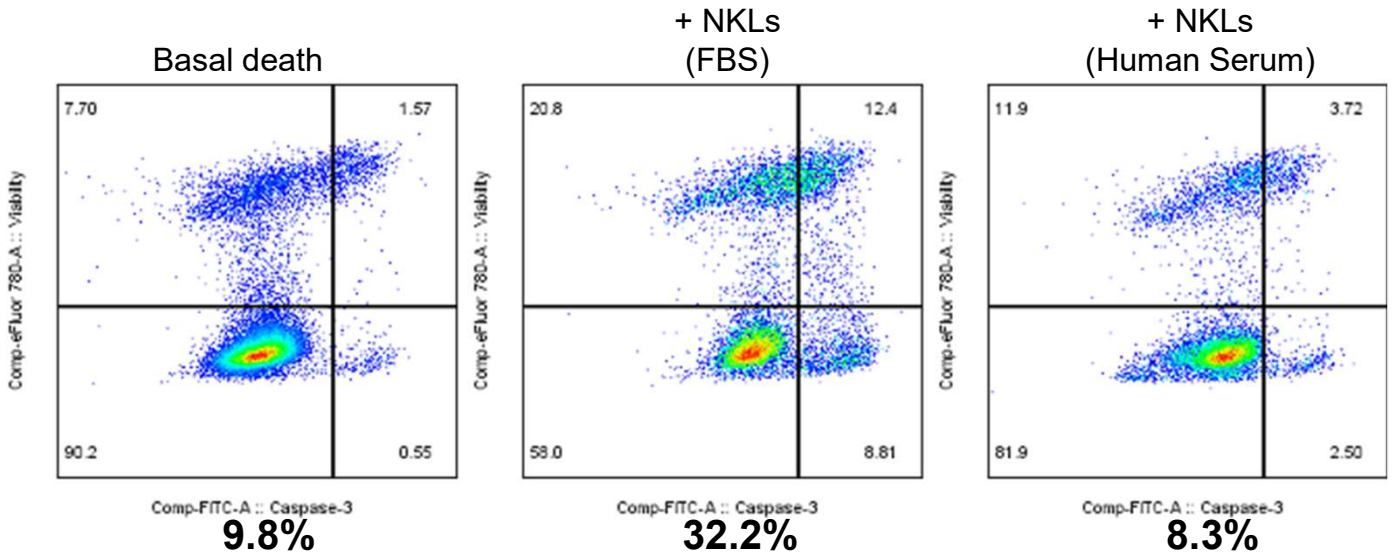
- There was no significant difference between other concentrations and the original 200 UI/mL used



Results

Change the FBS

- FBS proved to be more effective than human serum

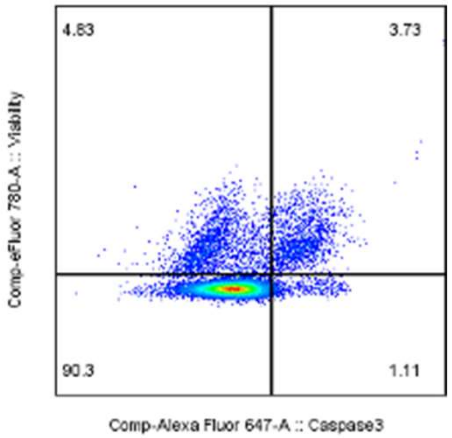


Results

Increase amount of cells in the assay

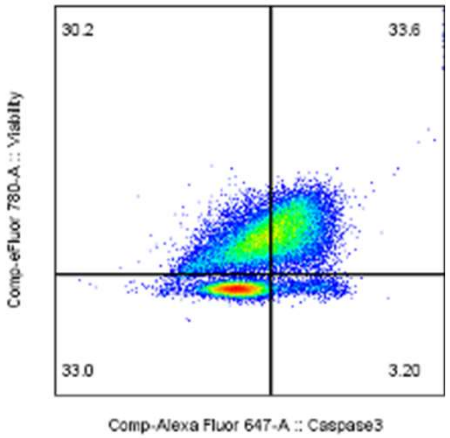
- An increase from $5x10^5$/well to $1x10^6$/well
- Resulted in largest percentage of NK cell deaths yet

Basal death



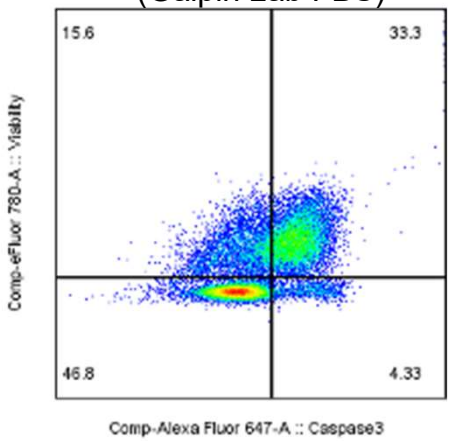
9.7%

+ NKLs
(regular FBS)



57.3%

+ NKLs
(Galpin Lab FBS)



43.5%

Cultural Aspect

While the cultural aspect wasn't our main focus, we did exchange a few things

- I learned desculpa means sorry
- Ana was really excited to celebrate her first halloween
- The current political state of Brazil
- In Colorado fashion, I'm teaching Ana to ski this winter!

Gratitude

Thank you to everyone who organizes this program, it was such an awesome experience that I am so glad I participated in. A personal thanks to Cristina Cenciarelli for making this happen, to Liz Evans for making my experience seamless, to Ana for sharing her lab and knowledge with me, and to the Norman team for making me feel especially welcome the whole time.