Bringing Immune Cell Migration into the High School Classroom

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Overview of My Fellowship

Timeline

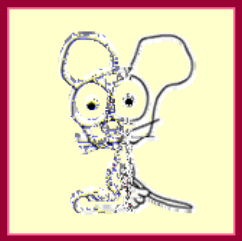
- **4 weeks in lab**
  - **June 13-July 17 2005**
- **Create and implement lesson plan**
  - **Fall 2005**
- Present
  - **AAI Convention 2006**

Lymphocyte Migration

- Lymphocytes specifically respond to invading pathogens.
- Lymphocytes monitor the body by migrating among various lymphoid tissues such as lymph nodes and spleen.
- Lymphocyte migration into lymph nodes is regulated by expression of specific receptors.

Research Design: In Vivo Cell Tracking

Isolation of Splenocytes



CSFE labeling of Splenocytes

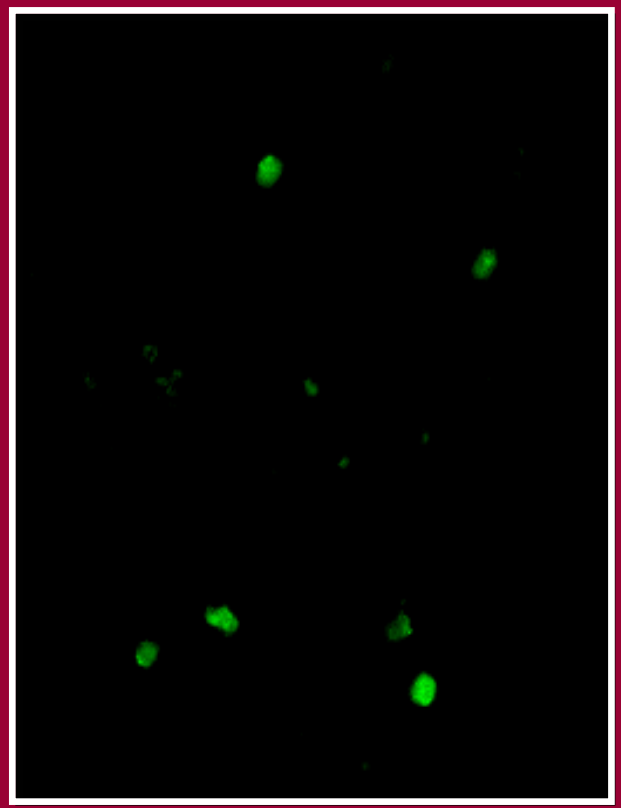
Injection of labeled Cells

In vivo Incubation

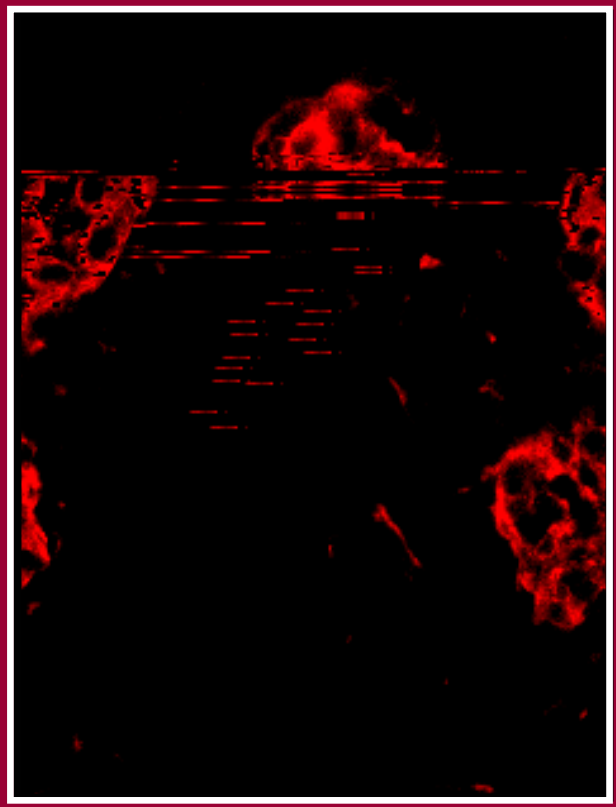
Harvesting of Tissue

Staining and Analysis of Section

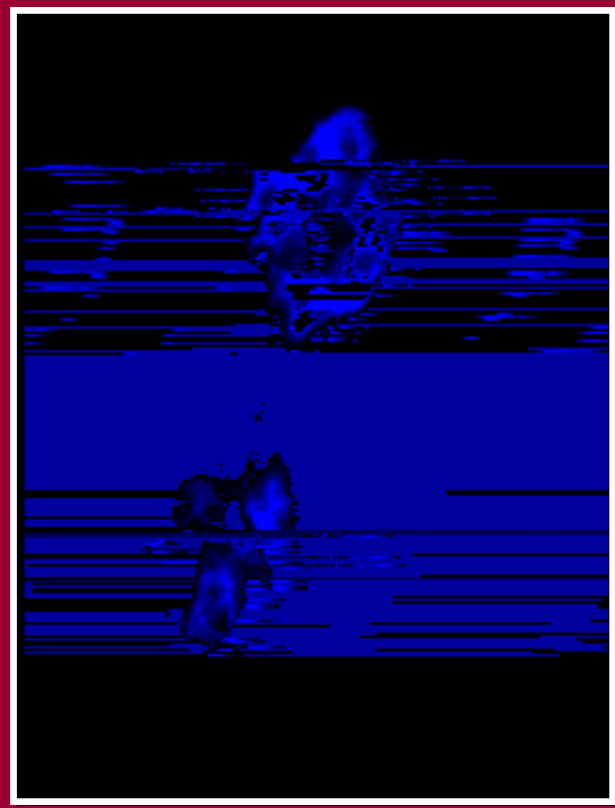
Injected cells **(CFSE)**



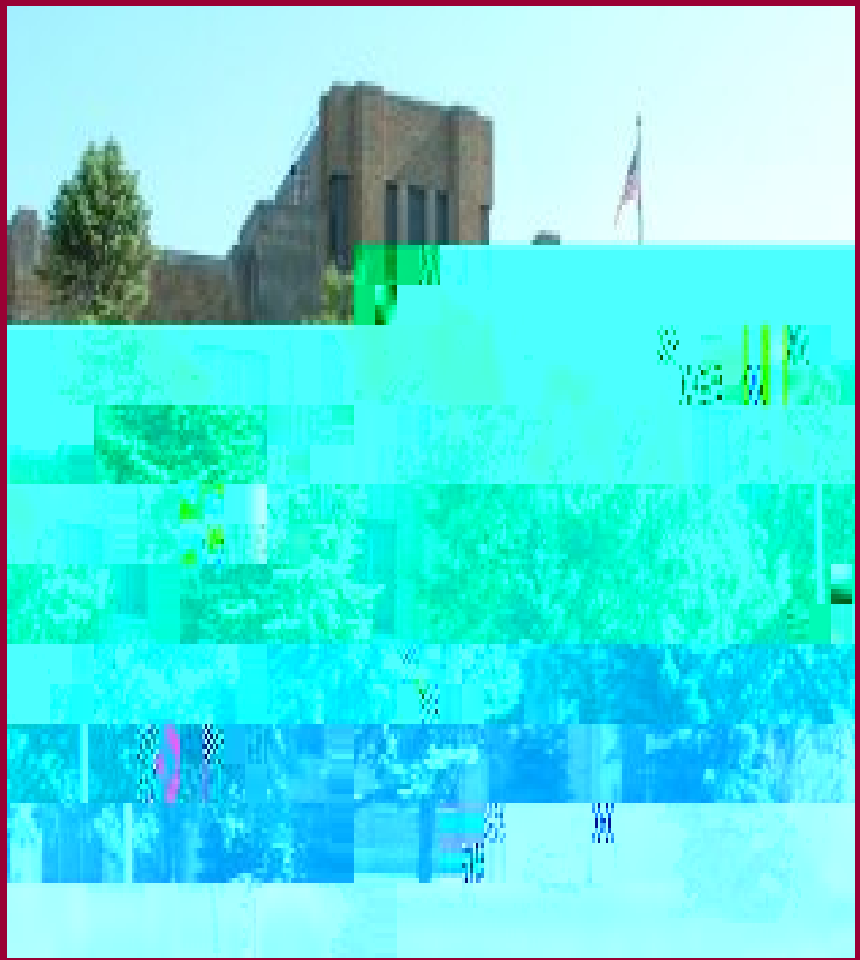
PNAd **(TRITC)**



MAdCAM-1 **(Cy5)**



How to Bring It Into the High School?



- West Allis Central High School
- 1600 students (Minority-18%)
- Urban
- 38% on Free/Reduced Lunch
- 95% graduation rate
- 65% go onto post secondary education

What needed to be addressed

Challenges:

- **Limited time**
- **Varied backgrounds of students**
- **Rules/regulations of school**

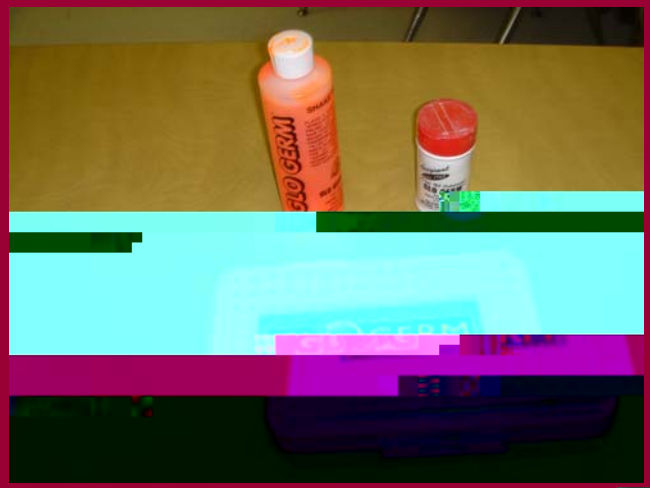
How to Overcome:

- **Keep it focused**
- **Motivational, diversified**
- **Use all non biological material**

“Which Way Did You Go George?”

1. Use inquiry to determine how disease can be passed
2. Understand the importance of immunity
3. Communicate how human immunity works
4. Apply new knowledge to a specific disease (extension project)

Glow Germ



Introduction Of Lesson

K What I *Know*	W What I *Want* To Learn	L What I Have *Learned*

Answers to "What I Know"

K What I *Know*	W **What** I *Want* To Learn	L What I Have *Learned*

Antibodies help fight bad bacteria

Can't get the same virus twice

Deals with lymph nodes

Can be enhanced with medicine or immunizations

T & Y cells

Consists of white blood cells, red cells and platelets

Enzymes fight off intruding virus cells

Mine sucks

Vitamin C

Answers to “What I Want to Learn”

K What I *Know*	W **What** I *Want* To Learn	L What I Have *L*

Internet Day

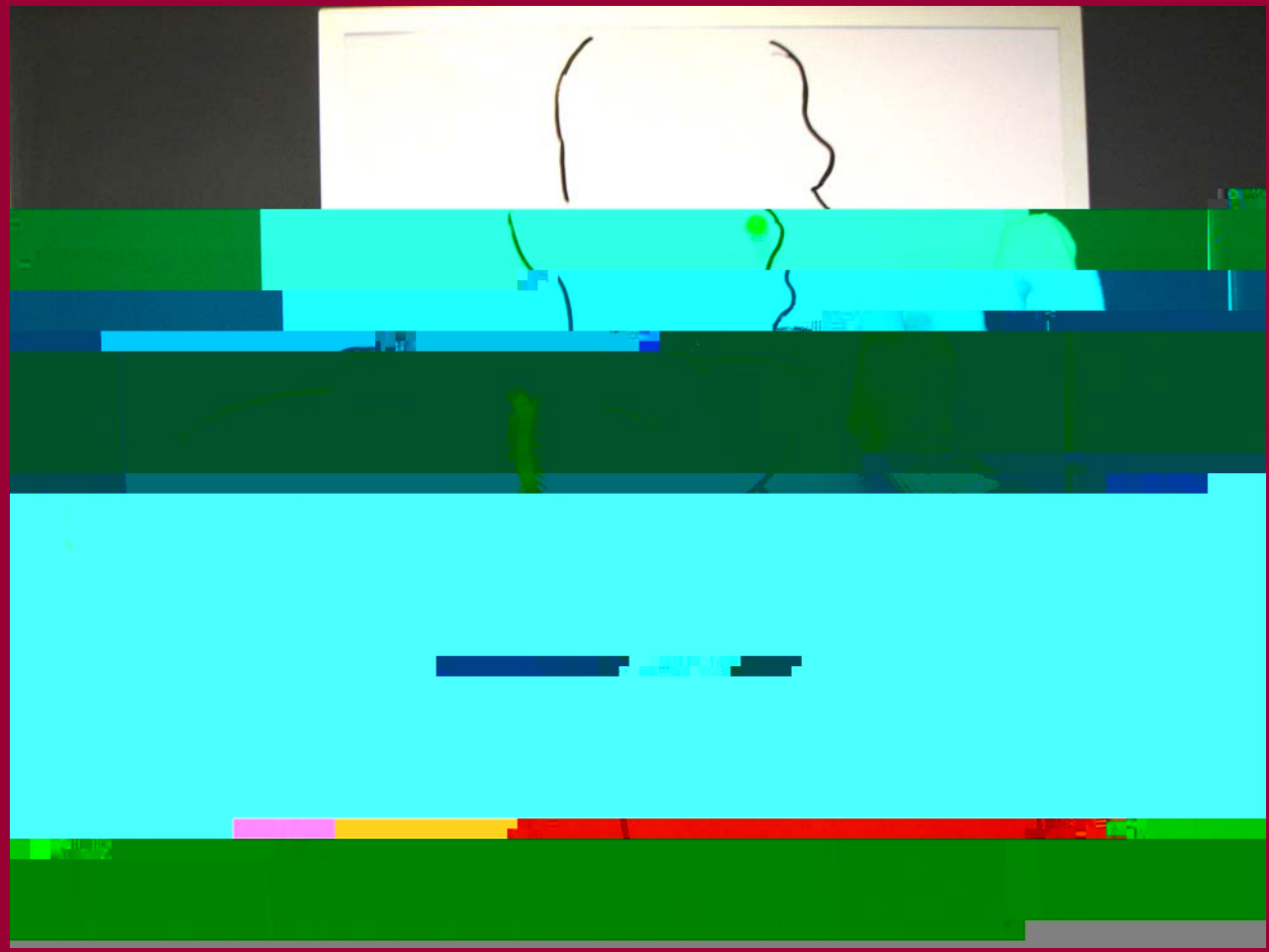
1. http://kidshealth.org/parent/general/body basics/immune.html
2. http://www.wisegeek.com/what-is-immunology.htm
3. http://www.biology.arizona.edu/immunolo-gy/immunology.html

Catch up Day

- Address misconceptions of “What they Know”
- Students take notes
- Use visual to help explain (from Peggy Deichstetter NABT convention 2005)

Visualization of Immune System

Here Come the Pathogens



The Macrophage is here

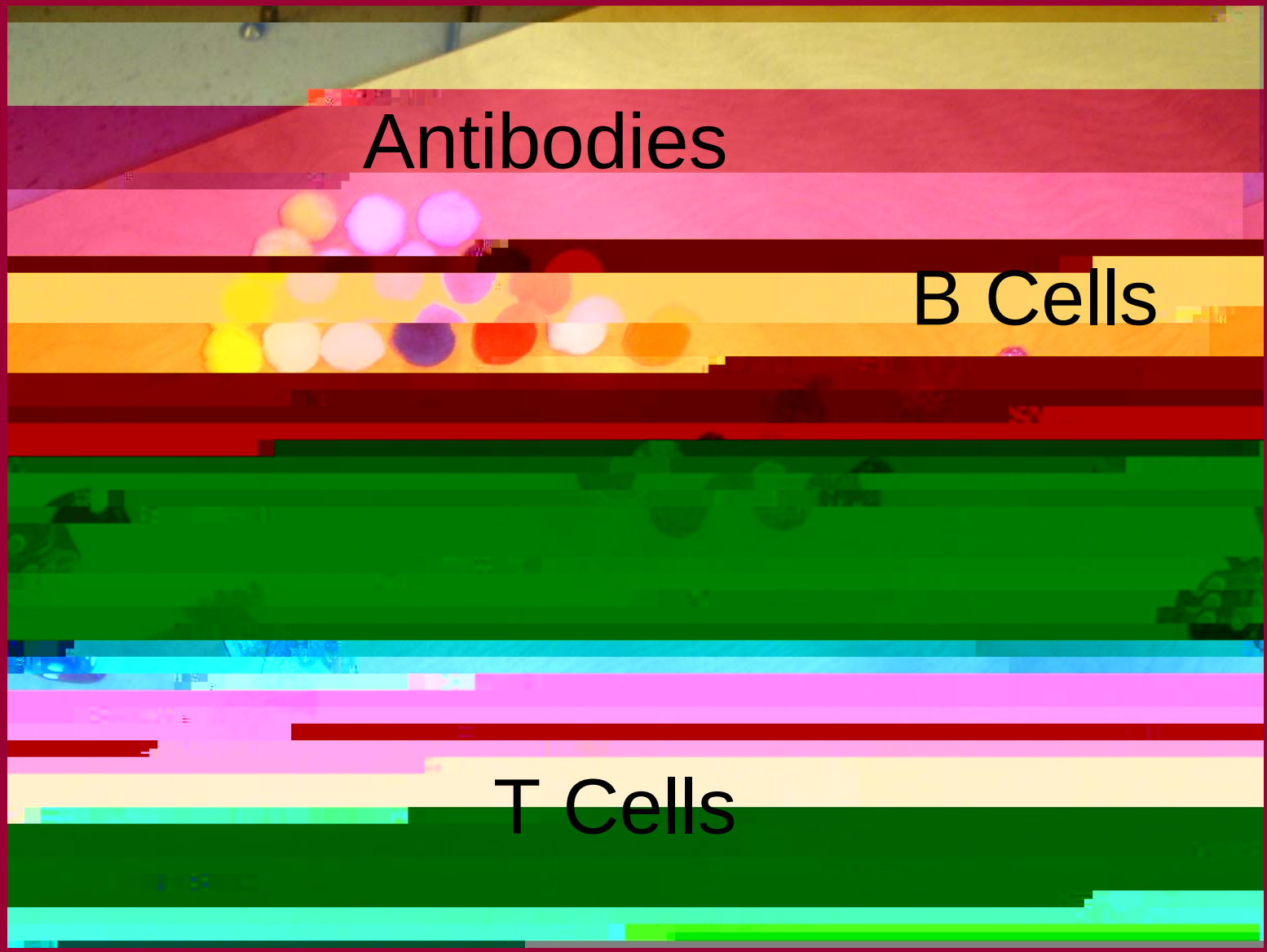
Trying to Find the Right B Cell

The Antibodies Are Here!

Game Day

- Arrows—tell direction
- Virus-pick a card
- Green Circle-Lymph node (where you start)

Game Pieces



Sample B Cell Cards

You are needed in the capillary of the brain. A possible infection is there. You match!! Take an antibody.

You need to hang out in a lymph node. Lose a turn.

You have successfully survived for one year. Happy Birthday!! Take another turn.

Your body signed up to a health club and has been going for 3 weeks. All right!!

Go again.

What students learned from the lesson

- There are more B Cells than T Cells
- There is another liquid called lymph
- White blood cells travel all over
- There are other things that make you sick

My experiences with project

- Pushed my limits
- Allowed my mind to participate in the world of research
- Made me understand ‘hurry up and wait’
- Gave me a better understanding of immunology

Acknowledgements

- American Association of Immunologists
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