

What are you doing in that classroom?!?!

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My Five Rules of "The New"

1. Start small!
2. Don't try to do everything at once!
3. Student success is the sum of all of the parts.
4. Success takes time (for the students AND you!).
5. It must be fun!

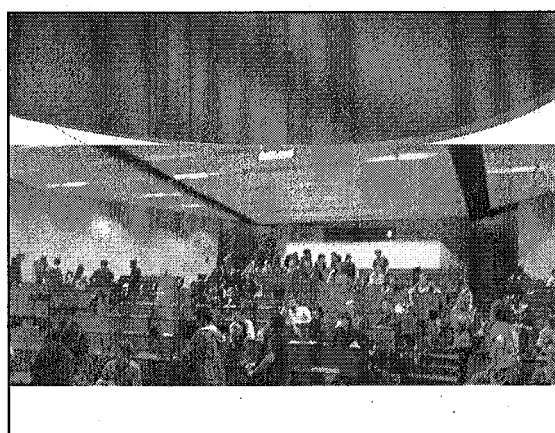
But, never forget ... learning is a marathon, not a sprint.

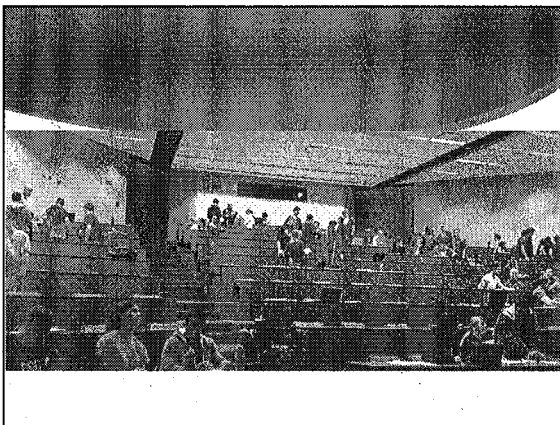
Today's Strategy

- My course structure
- Implementation of a few simple techniques
 - Are students prepared for the course?
 - How to make changes to maximize student learning
 - What does this do for the students?
 - What does this do for you?
 - How is this assessable?

My Course

- General Biology (year-long sequence)
- Typical # of students: 320 (taught in two sections)
 - This year = 408 taught in 4 sections
- Typical # of different majors: 60 from all RIT Colleges
 - ~ 50/50 science/non-science
 - Freshmen -> grad students
- Current grade calculation (2013-2014):
 - 70% exams; 20% Online HW; 5% Online quizzes; 5% in class participation





Are students prepared?

- ◆ Preparation (lack of!) comes in many forms
 - ◆ Reading / writing comprehension
 - ◆ English as a Second Language (or 3rd, 4th,)
 - ◆ Learning disabilities
 - ◆ Fundamental knowledge in sciences
 - ◆ Study skills
 - ◆ Dedication to the course
 - ◆ Dedication to the degree / college
 - ◆ Etc.....

Using Tools to Determine Preparation

- ◆ In Class
 - ◆ Enforced Course Pre-requisites (if any)
 - ◆ Pre-test Day 1
 - ◆ Compensation Modules
 - ◆ E.g. Will one video tutorial help?
- ◆ Outside of Class
 - ◆ Videos
 - ◆ Research

Using Tools to Determine Preparation

- ◆ Homework
 - ◆ Assign immediately on Day 1
 - ◆ Provide timely feedback on the assignment
 - ◆ Suggestions from instructor do hold water!
- ◆ In Class Response Activities
 - ◆ Every day! ("mock quiz" type).
 - ◆ Immediate or timely feedback critical

Using Tools to Determine Preparation

- ◆ Be clear about the goals of these pre-course activities
 - ◆ Benefit to students
 - ◆ Not enrolled in a class in which they cannot succeed
 - ◆ Decreases DWF rates
 - ◆ Increase retention – intangibles
 - ◆ Benefit to you / course
 - ◆ Less time on "catch up", More time on application
 - ◆ Fewer stresses associated with DWE, office hours, etc.


So you have
"prepared" students
... Now what?

Using Tools to Maximize Student Learning

- “Flipped classroom” – “Hybrid classroom” – “Alternative Content Delivery” = Learning!
- Videos
- In class activities
- Real world

“Alternative Content Delivery”

- Flipping your class is NOT turning it on its head!
- Must establish a foundation!
- Must inform the students of the purpose of perceived “extra work”!
- Must hold the students accountable!




Why Videos

- Why not?
 - Would you rather watch an animation or read?
 - What do you think your students would rather do?
- This is NOT Hollywood!!
- Keep them SHORT!!

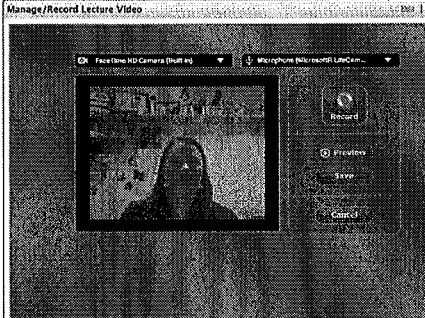
Don't be intimidated by videos!



In your pj's?!



In your office?!



Benefits of Videos

- A connection to ..
 - You
 - The course
 - The materials
- Be kind – rewind!
- More time in class

Tiny Steps to Try ...

Topic of Choice (active time = 40-60 minutes)

- Watch short videos before class
 - < 40 minutes on a given topic (no one video longer than 8-10 min)
- Complete an online homework on topic (10 questions)
- Take low stakes quiz online or in class (5 questions)
- In class write a note card / scrap paper guided response
 - Or case study ... or group activity ... or ... endless possibilities!
- Watch video(s) again after class
 - Write ONE note card of important points for application / exam

Before Class

- Flu Vaccine Song (2:46)
- Higher Dose Flu Vaccine (1:46)
- Is the flu vaccine good enough? (2:52)
- Against the flu shot? (6:48)
- Intro to your immune system (3:16)
- Types of immune responses (~3:00)
- Total time = 20 minutes

Homework Questions (Before Class)

Drag the terms on the left in the appropriate blanks on the right to complete the sentences.

antigen
pathogen
antibody
antigen-presenting cell
macrophage
T cell
B cell

1. A _____ is an agent in the environment that has the potential to cause disease.
2. The _____ is a collection of cells that signal the infected cell's immune system to respond.
3. _____ describes a set of defenses that is always at the ready and is the same whether a pathogen/disease agent has been encountered before or not.
4. _____ describes a set of defenses that is customized to each infectious agent, providing a stronger response after an agent has been encountered before.
5. _____ describe the process of signaling and destroying a foreign particle.
6. The _____ is a set of proteins that circulate in the blood, attaching to foreign particles (also known as invaders).

Homework Questions

The figure illustrates the development of B cells and T cells. Drag the terms on the left in the appropriate blanks on the right to complete the sentences.

antigen
pathogen
antibody
antigen-presenting cell
macrophage
T cell
B cell

	Types of lymphocytes	
	B cells	T cells
Develop within	<input type="text"/>	<input type="text"/>
Responsible for	<input type="text"/>	<input type="text"/>
Protect against	<input type="text"/>	<input type="text"/>

Homework Questions

Interpreting Data: Primary and Secondary Immune Responses

Use the graph to left to answer the questions.

Part A

What does the y-axis of this graph represent?

- the concentration of antigen X in the blood
- the concentration of antigen Y in the blood
- the antibody concentration in the blood
- the time in days

Homework Questions

Drag the terms to the table to match each type of immune system cell with its function.

Cell type	Function
a	secrete antibodies
b	stimulate other immune cells
c	destroy body cells that have been infected
d	engulf pathogens
e	display self-antigen complexes on their surfaces

Helper T cells

Cytotoxic T cells

Antigen-presenting cells

B cells

Macrophages

If content is outside ... what is left to do in class?

Connect Your Class to the World!

- Group activities
- Social contact
- Problem solving
- Critical thinking
- Popular science
- Application of concepts

Quiz Questions (Before or At Class)

Part A

Which of the following is an immediate effect of histamine release?

- increase in blood pressure
- dilation of local blood vessels
- blocking of a response to ragweed pollen
- conversion of histamine to histidine

Part B

The body's innate defenses against infection include

- memory cells.
- several nonspecific antibodies.
- increased production of certain hormones and changes in microcirculation.
- barriers such as dead skin cells and mucus.

Quiz Questions (Before or At Class)

Which of the following is an immediate effect of histamine release?

- increase in blood pressure
- dilation of local blood vessels
- blocking of a response to ragweed pollen
- conversion of histamine to histidine

DO NOT DISCUSS THIS! KEEP YOUR ANSWER SECRET!

Convince Me!

• Convince your neighbor that you are right!

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Your name: _____

Convince me! _____

People you talked to: _____

What was your consensus answer? (What did you agree was the correct answer?)

What else do we do in class?

Organs of the Immune System

Labels in diagram: Tonsils and adenoids, Thymus, Lymph nodes, Spleen, Bone marrow, Throat, Lymph nodes, Spleen, Throat, Lymph nodes, Spleen, Throat, Lymph nodes, Spleen.

WebMD Health Center: Cold, Flu, & Cough Health Center

Use Your Immune System to Prevent Flu

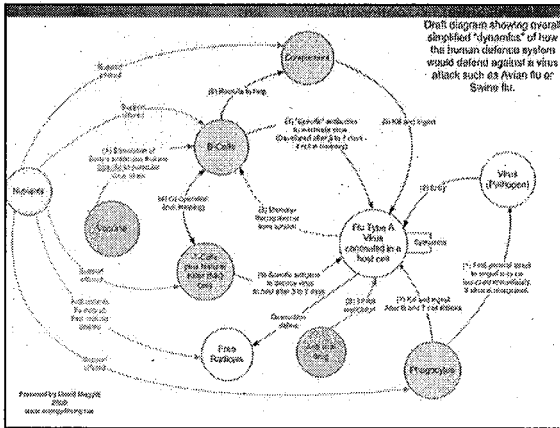
Looking for extra steps to boost your immune system so you can prevent the flu this year? The immune system is a network that helps you avoid illness — or at least it can become the center of your defense against colds. Here are some ways to strengthen your immune system to help prevent colds and bacteria infections.

Wise to die Immune System?

In simplest terms, the immune system is a balanced network of cells and organs that work together to defend you from disease. Your immune system blocks foreign invaders from entering your body. If the invaders happen to sneak by your biological safety, think of it as a powerful "search and destroy" task force your body deploys. A host of additional "command and control" units work to turn down the unwanted invaders and let military work to destroy them.

How Does the Immune System Prevent Illness and Flu?

The human body has an innate ability to manufacture antibodies that prevent and work as part of the immune system to destroy abnormal or foreign cells. Not only do these antibodies help fend off any viruses that the flu is a cold, but they also play a role in protecting you against catastrophic diseases like cancer or AIDS.



Turn to the Google!

News for Immune System flu

Flu virus wipes out first wave of immune response - Medical News ...

The flu virus over 100,000 immune cells away with the flu virus ...

Flu Virus Wipes Out First Wave of Immune Response - Medical News ...

The flu virus wipes out immune system's first response to establish ...

Settling the Record Straight: Debunking All the Flu Vaccine Myths

SCIENTIFIC METHOD / SCIENCE & EXPLORATION

Immune suppressor makes one flu vaccine work for many viruses

It's that time again — that time when dozens of questions arise regarding the best timing of the flu vaccine, whether it's worth getting at all, and how to get it. The good news is that the flu vaccine is safe and effective, and it's one of the best ways to protect yourself and your loved ones from the flu.

While it's true that the flu vaccine is safe and effective, it's also true that it's not a magic bullet. The flu vaccine is just one of many ways to protect yourself and your loved ones from the flu. Other ways include avoiding close contact with sick people, covering your mouth and nose when you cough or sneeze, and washing your hands frequently.

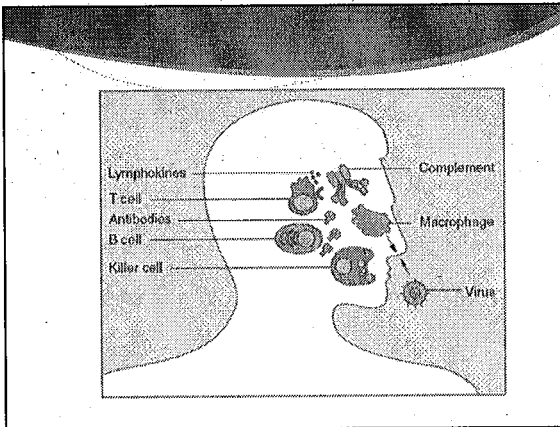
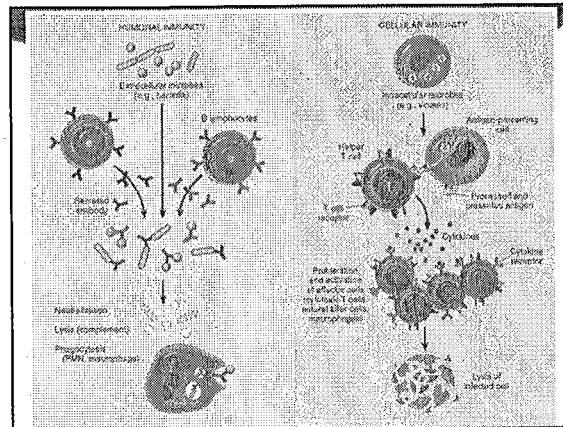
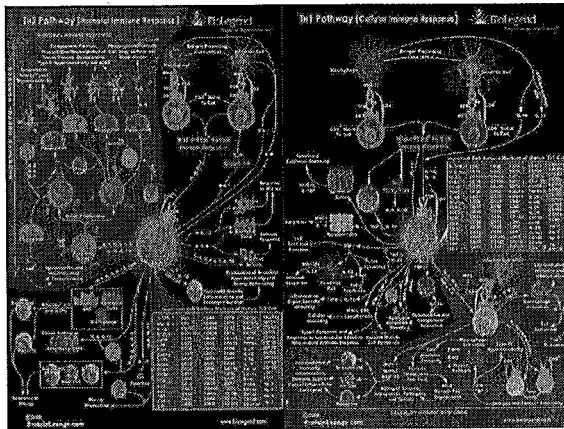
Critical Thinking & Application

Flu virus wipes out first wave of immune response

The immune system is the body's natural defense against disease, and it's one of the most complex and sophisticated systems in the body. It's made up of many different parts, including white blood cells, antibodies, and the lymphatic system.

When a virus enters the body, the immune system goes to work. It sends out "scouts" to look for the virus, and once it's found, it sends out "soldiers" to attack it. The flu virus is a particularly tricky one because it can hide from the immune system's first wave of response.

The flu virus is able to do this because it can hide from the immune system's first wave of response. It does this by hiding in the cells of the respiratory tract, where it can wait until the immune system's first wave of response has passed. Once the immune system's first wave of response has passed, the flu virus can then move on to other parts of the body.



NOTE CARD

Fill out your note card as indicated here. Answer the questions on your own, please.

Your Name
(PRINT)

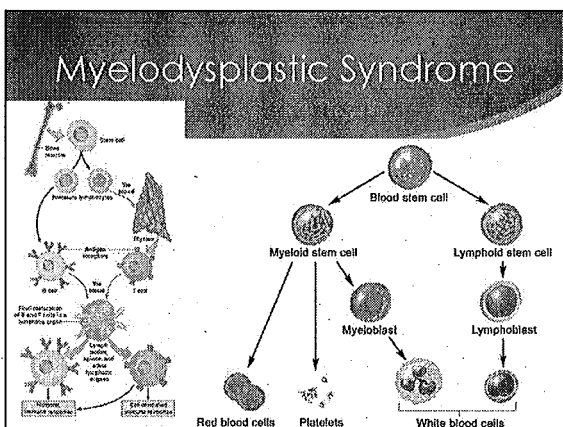
- Invertebrates have only innate immunity and rely on lysozymes for protection. Do you have innate immunity?
- TRUE or FALSE.** You can rely on nonspecific defenses alone to protect you from this year's flu. Why or why not?
- Questions on the immune system so far?

NOTE CARD

On the back!

WHAT IS THE STRANGEST FOOD YOU HAVE EVER EATEN?

How would the flu impact a person with a bone marrow disorder?



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 GSBio I Lecture
 Group Worksheet
 "Think, Pair, Share"

Partner #1: _____
 Partner #2: _____
 Partner #3: _____

	Write what you think ... I think that _____, because _____	Listen and respond to your partner ... Are your ideas similar? Very different? What points do you share in common and which are different?	Share with the class ... We agreed that _____ One important idea we discussed was _____
Question	What I think	What my partner(s) think(s)	Common summary points
1: Symptoms of the disease			
2: Treatment of the disease			



TIME!

- Time is the obstacle for everyone ..
- Take 5 minutes
 - Sit down! (or better yet – while you are shampooing!)
 - Think of a topic that is hard for the students
 - Why is that topic so important? *Why* are you teaching it?
 - What should the students take away?
 - How can YOU make that topic approachable?
 - Which tools will you use?

Challenges

- Things I have considered and modified
 - How much do I want the students to do outside of class watching videos?
 - Limited to ~ 30 min per class
 - How much do I want the students to do outside of class on other activities for class?
 - 15 – 30 minutes per class

Challenges

- Things I have considered and modified
 - What is the value of a long assignment if the students don't do it, copy it from another student, etc.?
 - For students who are failing exams, but have 100%+ on the homework, assess time spent (and bigger issues?!?)
 - Discuss issue with them in person and report in their "Early Alerts" and "Mid Term Reports"

Challenges

- ◆ Things I have considered and modified
 - ◆ Are the students just memorizing answers, or are they applying the information and retaining it?
 - ◆ Implement more low stakes quizzes
 - ◆ Forced recall of information in class

You have turned your class on its head ... Now what?

Student Data Assessment

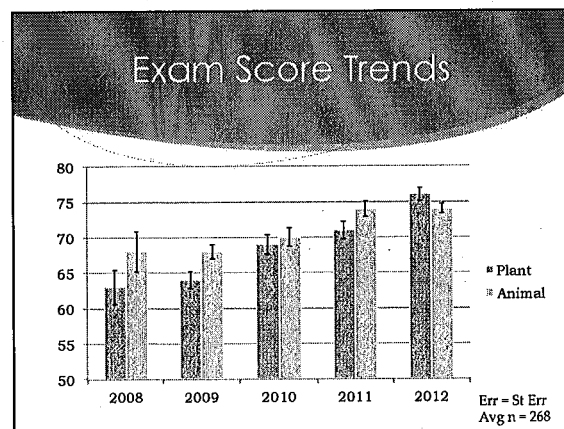
- ◆ Why assess?
 - ◆ My general interest
 - ◆ Are the students learning what I think they are learning?
 - ◆ How can I improve this course?
 - ◆ University call to assess Gen Ed courses (Accreditation)
- ◆ Assessment needs?
 - ◆ My interest
 - ◆ Exam and homework scores before and after any implementation
 - ◆ University Guidelines: 1 – 4 scale of comprehension

Student Data Assessment

- ◆ What was assessed?
 - ◆ Kept it simple to start!
 - ◆ Exam averages
 - ◆ Add as I have interest / time!

Student Data Assessment

- ◆ Exam grades (presented herein)
 - ◆ All stored in Excel_{TM} since 2007
- ◆ Homework (not presented)
 - ◆ Export grades to Excel_{TM}
- ◆ Processing, Compilation, and Statistical Analyses
 - ◆ Excel_{TM}



What the Data Said

- Higher exam averages every year
 - Significant differences only in plants – but trends are obvious
 - Too many students from too many majors to see huge jumps in scores despite all efforts
- Tightening of exam scores
 - Standard deviations and ranges decreasing
- Increasing amount of “average time spent” on activities

Assessment Challenges

- Why do exam grades change?
- Things that I want to consider
 - Students
 - Time spent on studying (other than homework)?
 - Major?
 - College entrance exams? AP Bio?
 - DWF rates by major and biology “experience”
 - Me
 - Lectures improved?
 - Lecture structure change with new implementations?

“Napkin Notes”

- General observations:
 - Increased effort spent on activities after 1st exam of term
 - Increased # questions in office hours on activities / learning
 - Increased time spent “off topic” in lecture – *not a bad thing!*
- Changes implemented to date:
 - Lecture time is more interactive
 - Participation activities with the students (worksheets, group work, think-pair-share, flipped lectures, etc.)
 - Modifications were required to assignments and quizzes to “challenge” the students in preparation for class and exams

Advice for Instructors Looking to Assess Success

- Don't assess while you are teaching the course!
 - Assessment can be done any time!
 - Store the data, save it for later
 - Even if you have time ... subconsciously not good for your teaching!
- Don't try to assess everything at once!
 - Pick one exam in your course, and compare the average \pm standard deviation (standard error) between years
 - Even simpler?
 - Compare exam averages between class sections. TA DA! You just did an assessment!

Advice for Instructors Looking to Assess Success

- Don't expect new activities to make your students into geniuses!
 - The activities are tools and how the students implement that tool (accept the tool) will be highly variable.
 - You may not see immediate changes in exam grades
- Accept the “intangible” as a result!
 - You can not grade student enthusiasm (which means you can't assess it – sorry!)
 - Student enthusiasm is contagious – not just to other students – but also to you!
 - Alternate learning has made me a better Professor!

Final thoughts ...

Simple Techniques: Why Change?

- I got my class back!
 - Not spending class time on giving long quizzes
 - Not spending class time answering questions about homework format, etc.
 - What do we do then? Talk about Biology!
- This is a HUGE time savings for my class
 - I have "recovered" 35 minutes per week in class (of 150 min) with no quizzes and homework things in class
 - Prepared students means < 45 min lecture!
> 105 min biology exploration!

Simple Techniques: Why Change?

- I got my day (weekend) back!
 - Not grading 300-400 written homework's > 6 times per session
 - Fewer emails about homework assignments (next to none)
- Time savings?
 - Written HW = 12 hrs x 6 assignments = 72 hrs per term
 - *I only spent 1.8 - 2.5 minutes evaluating a student?!!*
 - Online HW = 1 hr x 10 assignments = 10 hrs per term
 - *Feedback = instantaneous and much more informative!*
 - Time saved? = 62 hrs per term = ~2.5 days!! = priceless!!

But .. The Most Important Thing to Me?



What the Students Have to Say!

- "I never liked Biology – my advisor put me in this class. But, after studying Biology this way, I will be back in the spring!"
- "My friends insist on coming to class with me, even though they aren't taking it!"
- "Videos that Dr.C. selects are the best for me to study from. It helps me focus on one thing at a time."
- "I never knew how much I could learn in 50 minutes!"

THOUGHTS!?

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