



News from

**The American Society
for Cell Biology**

49th Annual Meeting

San Diego, CA

December 5–9, 2009

**EMBARGOED
FOR RELEASE**

**10:00 am, U.S. Pacific Time
Tuesday, December 8, 2009**

Contact

Melanie Ann Stegman

Federation of American
Scientists

1725 DeSales St., NE, 6th Floor

Washington, DC 20036

mstegman@fas.org

(202) 454-4681

Author presents

Tuesday, December 8, 2009

11:00 am–12:30 pm

Poster Session 3: Pre-College

and College Science Education

Program 2356

Board B733

Exhibit Halls D–H

*Immune Attack, a Video Game
in the Molecular World*

M. Stegman, M. Fox

Learning Technologies

Program, Federation of

American Scientists,

Washington, DC

Teen video gamers acquire immunity

In a “shoot-’em-up” video game, teens flying “microbot” fighters against bacterial pathogens significantly increase their knowledge of the immune system

The educational psychologist Jerome Brunner pointed out that by the time most children start school, they have an instinctive grasp of the grammar of their native tongue. Today most seventh graders start with an instinctive grasp of pop music, pro sports, and consumer electronics. Few have the biological “grammar” of the human immune system or even basic cell biology at their fingertips.

Enter Immune Attack, a highly polished, “fly around and shoot ’em up” computer game devised by Melanie A. Stegman and Michelle L. Fox of the Learning Technologies Program at the Federation of American Scientists in Washington, DC. Immune Attack is a “third-person shooter” in the vocabulary of video games, yet it has an ulterior motive—plunging 7th–12th graders into the microscopic world of immune system proteins and cells. The mission in Immune Attack is to save a patient suffering from a raging bacterial infection, but the goal of its designers is to give game players intuitive knowledge of the cellular world.

This approach seems to work. Using players of a nonmolecular medical mystery video game as a control, Stegman and Fox tested Immune Attack players. Against the control group, the students

who had played Immune Attack showed highly significant gains in confidence with molecular science–related materials and significant gains in their knowledge of cell biology and molecular science.

In Immune Attack, the player’s mission is to identify the proteins and cells responsible for the malfunction of a patient’s immune system. Remotely controlling the Microbot Explorer (named for its 25-micron diameter), players travel through the bloodstream and connective tissue, interacting at the nanometer scale with receptors, hormones, and lipids. Stegman reports that an advisory panel of 20 active scientists peer reviews each “mission” to keep the game accurate and challenging. Students can design their own game levels or write three-sentence/two-reference additions to the onboard database. Submissions are posted online, and the most popular additions are incorporated into the game.

The first edition of Immune Attack is available for free download at ImmuneAttack.org. Immune Attack 2.0 should be released in early 2010, says Stegman. 



In this screen shot from Immune Attack 2.0, the Microbot (lower left) spots monocyte (blue) cells sailing past a vein where an infection lurks. The monocytes should be snagged by selectin proteins on the vein surface, but instead they fly by unaware. In the main screen, the player has discovered the problem and is using the PMTD (Protein Mimic Targeting Device) of the Nanobot to plant selectin protein mimics on the vein surface.