

A boost for the immune system

A new study led by DMS immunologist Edward Usherwood, Ph.D., hints at a potential target for treating chronic viral infections in patients whose immune systems are compromised by an organ transplant, AIDS, or some other cause.

Researchers in Usherwood's lab examined mice missing CD4 T cells, a type of immune cell that is depleted in people with AIDS. The mice were infected with a virus specific to mice (MHV-68) that is similar to two viruses that can infect humans: the Epstein-Barr virus and human herpesvirus 8, both of which can be deadly in people with compromised immune systems.

Intact: They then examined the activity of another type of immune cell, CD8 T cells, which were intact and functioning in the mice. From previous studies, they knew that those cells respond to infection with MHV-68, which puzzled them. Why was the infection running rampant if the immune system was responding?

"Initially, the mice are okay," says Usherwood. "After six weeks, they lose control of the virus, a process we refer to as virus reactivation. We've been trying to understand why we see initial control of infection, followed by reactivation."

One possible explanation was that there was nothing wrong with the CD8 T cells, but there was some other factor hampering the ability of those cells to clear the infection. When the researchers took a closer look, they realized that levels of a cytokine, interleukin-10 (IL-10), were higher in the mice that experienced viral reactivation. The next step was to block IL-10 to see if the virus was better controlled without this inflammatory protein involved. The findings bore out this premise.

"What was particularly exciting for us was that if we blocked IL-10 at a late stage in the virus reactivation, we still saw better control of the virus," says Usherwood. "This leads us to think that targeting IL-10 might help patients who are suffering from these viruses."

Surprise: Finally, the group wanted to find out which cells were responsible for producing IL-10. To the researchers' surprise, they discovered that it was the CD8 T cells themselves. Since the publication of these findings in the *Journal of Immunology*, other researchers have reported the same phenomenon in other types of viral infections. "Even though the role of CD8 T cells in those infections is different, the fact that they make IL-10 is a common theme that has been underappreciated," says Usherwood.

Next, he and his collaborators plan to try to figure out what specifically may be present in a mouse without CD4 T cells that causes its CD8 T cells to produce IL-10, as that does not happen in mice with an intact immune system. "Ultimately," he says, "it would be nice to translate some of these studies into patients as well, to see if we can improve prognosis in patients by blocking IL-10." **LAUREN WARE**

Other researchers have since reported the same phenomenon.



JON OHBERT/FOX

Gerrard (left) and Gibbons began tracking almost 900 black families in 1995.

Teasing out the impact of race

Racial discrimination can affect more than a person's mental health. A recent study based on work by a pair of Dartmouth psychologists suggests it has an impact on physical health as well.

The study focused on 219 African-Americans age 17 to 25 who reported drug use in the previous six months. The researchers found that perceived racism increased the subjects' susceptibility to drug use, but that strong racial identity strengthened their resistance to racism's negative effects. The finding, published in the *Personality and Social Psychology Bulletin*, was based on years of work by DMS's Frederick Gibbons, Ph.D., and Meg Gerrard, Ph.D. Michelle Stock, Ph.D., of George Washington University led the latest analysis of the data.

Track: Gibbons and Gerrard (who are married to each other) began examining the behavior and health of almost 900 black families from Iowa and Georgia in 1995, and they continue to track about 78% of those families today. This group, called the Family And Community Health Study (FACHS), is the largest in-depth examination of African-American families in the U.S., says Gibbons.

In the latest study, they asked FACHS participants to imagine one of three scenarios, one of which included racial discrimination. Then they assessed the subjects' willingness to use drugs. Later, Stock did a separate experiment. She asked young African-American adults in Washington, D.C., to play an online game with players who, they were led to believe, were white; those who experienced discrimination during the game believed it was because of race.

The two approaches gave consistent results. Subjects who faced racial discrimination showed a higher willingness to use drugs and alcohol in both multiple-choice and open-ended questions. But subjects who identified closely with their race seemed to be protected from discrimination's effects.

Gibbons says the analysis controlled for stress levels, suggesting that discrimination "produces anger and hostility that translates into substance use" in a way other stressors do not. It is in this way that racism hurts minorities' physical health, says Stock. With this understanding, the researchers are now investigating how discrimination has an effect on other risky health behaviors. **CHRISTIANNAL. LEWIS**