

Researcher looks at why immunity sags with age

By Tom Beal

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West Nile virus is a very "unflattering disease," says UA researcher Janko Nikolich-Zugich. "It clearly tells you that you are old at 50."

Like many potentially fatal diseases, West Nile, spread by mosquitoes and now entering its peak season in Arizona, is especially dangerous for older people.

But unlike other ailments that trigger public-health warnings — food-borne illnesses such as salmonella and airborne outbreaks such as influenza — West Nile isn't particularly dangerous for the young.

"Children don't have to worry about it," said Nikolich, head of the department of immunobiology at the University of Arizona College of Medicine.

Nikolich said he wasn't suggesting that children shouldn't take precautions against mosquito bites, only that they are the least vulnerable population.

They can still get sick.

Patti Woodcock of the Pima County Health Department said her agency advises parents to make sure children are protected and advises use of insect repellent when they're out playing soccer and football at prime mosquito-feeding times.

At the UA, where Nikolich is co-director of the Center on Aging and head of its Biology of Aging Research Program, he is continuing his research into why the immune system is compromised as we grow older and how that phenomenon might be reversed.

West Nile is a particular interest for him because it targets the old.

Nobody knows how many people contract West Nile virus from mosquito bites each year, but blood serum studies suggest that at least 80 percent of those who come in contact with the disease don't get ill from it.

The Centers for Disease Control and Prevention compiled 3,630 reports of West Nile illness in 2007 — 1,227 of them serious. There were 117 deaths. Those who died ranged in age from 43 to 96. The median age was 57. Prime time was 50 to 59. Nikolich thinks he knows why.

His research into the vulnerability of older people, previously conducted at the Vaccine and Gene Therapy Institute at Oregon Health Sciences University in Portland, has pinpointed a culprit — a lack of "naive" T cells capable of recognizing a threat and mobilizing to fight it.

Naive T cells have not encountered a pathogen, and when they do, they become disease-fighting antibodies to that specific threat and multiply.

As we age, we add to this arsenal of naive cells that have become "memory" cells. This is good when we re-encounter the same pathogen. It is easily confronted and dispatched. This is how vaccines work.

But a lot of these memory cells will never be needed.

Nikolich said it is often compared to a misguided Department of Defense that is "prepared all the time for something that will never happen."

So while we have this army of T cells with specific roles, we have fewer naive cells, the ones we need to recognize and respond to a new threat.

It's even worse with West Nile, he said.

Those vulnerable to it have developed a specific defect in these cells.

This degradation in both quantity and quality makes West Nile a dangerous foe, he said.

"Fix it and you take care of all the problems. We can be as immune as we were in our younger age."

Janko Nikolich-Zugich, on need for added naive T cells

West Nile update

Pima County recorded its first confirmed case of West Nile virus in a human for this year in August, but health officials believe the 72-year-old woman contracted the disease elsewhere in Arizona.

She was hospitalized for six days with symptoms including fever, headache, neck pain, tremors, muscle weakness and pain, extreme fatigue and confusion.

His research is aimed at correcting the molecular defect in the cells and also finding some way to rejuvenate the thymus, which is important in production of new naive T cells.

By puberty, Nikolich said, we produce a tenth of the helpful naive cells we did as young children. By the time we reach 50, there is another tenfold decrease.

That's why old people have trouble fighting new diseases, and that's why vaccines don't work very well on them.

When influenza season rolls around this winter, old people will be urged to get a vaccination against the latest strains, even though health officials know the vaccine won't work for 65 percent of them.

Nikolich said he wants to develop a screening test. "Then we could say, 'OK, this vaccine works for you, but you guys over here, you need a thymus rejuvenation.' "

Nikolich is working to develop "targeted vaccines" for the needs of the aging population. "We don't have a single vaccine targeted for older people," he said.

He'd also like to find a way to rejuvenate production of robust naive T cells to protect against the "bazillions of bacteria and viruses and parasites" for which there is no specific protection.

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