SCIENCE NEWS

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Cancer Resistance Found to Be Transferable in Mice

In 1999, scientists discovered a mutant mouse with the ability to ward off aggressive cancers. Bred with a female, this mighty mouse passed on his cancer resistance to roughly 40 percent of his offspring. No matter how many times the researchers challenged this immune systems of these mice with levels of cancer cells millions of times stronger than those lethal to regular mice, they proved incapable of developing cancer. Now investigators have found that normal mice injected with white blood cells from cancer-resistant mice become resistant themselves.

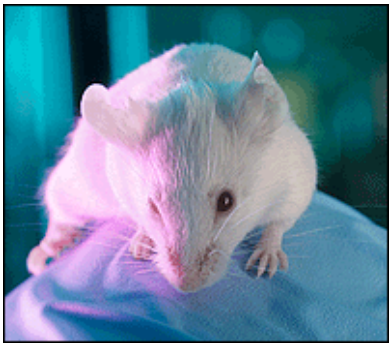

Image: COURTESY OF WAKE FOREST UNIVERSITY

"The white blood cells alone were the cause of the cancer resistance," says Mark Willingham of Wake Forest University. "Not only could they kill cancer when injected together [with malignant cells], but these white blood cells could successfully be used to treat advanced tumors."

Willingham, fellow pathologist Zheng Cui of Wake Forest University and a team of colleagues subjected the various types of white blood cells of the cancer-resistant mice to a battery of tests in an attempt to determine the precise mechanism at work. Contrary to their initial expectations, the cells involved appear to be the basic cleaners of the immune system--macrophages, natural killer cells and neutrophils--rather than the T cells, which must first be exposed to a pathogen in order to know to attack it. "These are the cells normally known to fight bacteria," Cui explains. "If these cells are involved, that's a very obvious indication that these systems are an innate immune response; if you have it, you should have it from the beginning."

But by injecting purified solutions of these white blood cells, the researchers killed cancer *in vitro* and in mice. Neither did it matter which specific type of innate white blood cell was injected nor where--normal mice with tumors on their backs experienced remission after injections in their bellies.

In fact, a single injection of these cancer-fighting white blood cells conferred long-lasting immunity in the normal mice. "Mice with complete regression remained healthy and tumor-free at the time of publication, 10 months after the experiment," the researchers write in the paper presenting the findings in this week's *Proceedings of the National Academies of Science.*

Continued research is needed to find the genetic root of this resistance, which has eluded discovery because it seems to be located in different chromosomes depending on the mouse in question. Scientists also need to identify the molecular pathways involved and replicate the results in other labs. But the findings are understood enough to have inspired the scientists to begin searching for cancer-resistant humans. "From early studies with healthy individuals, some humans are much more resistant than we thought," Cui says. "Human resistance is much, much stronger than [that of] mice." *--David Biello*

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