

# A remarkable mouse

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## Abstract

In the wild, few mice ever have to deal with cancer before they die of other causes. However, in the laboratory, mice live 2-3 times longer than in the wild and 80% of mice in the laboratory die of cancers. In contrast, only 25% of human deaths are caused by cancer. Are we just lucky because we never have cancer cells form in our body or are we somehow naturally protected against cancers that form frequently? When laboratory mice are challenged with lethal transplantable cancer cells, such as S180 or EL4, they uniformly die within a few weeks. However, a single mouse that unexpectedly survived many challenges of lethal cancer cells in 1999 at Wake Forest University may have demonstrated for the first time the existence of such a natural protection at a meaningful level in a mammal. Seven years and 15 generations later, the descendents (SR/CR mice) of this remarkable mouse continue to fascinate investigators with their powerful resistance against cancers, and continue to thrive at Wake Forest University and a rapidly growing number of other places around the world as subjects of collaborative investigations. This powerful resistance is determined by inheritance, is mediated entirely by the leukocytes of innate immunity and is transferable to other mice for prevention and treatment of cancers.

The challenges to us now are how we can best take advantage of the information generated from studying these mice. I will update the audience with the latest information about these mice:

1. How many other lethal transplantable cancers can SR/CR mice resist?
2. Can adoptive transfer of leukocytes from SR/CR mice cure endogenous cancers in other non-cancer-resistant mice?
3. What immune components are important for this cancer-killing ability?
4. Why leukocytes of SR/CR mice are able to find cancer cells at distant site?

From these studies, it is tantalizing to ask the question where humans stand in comparison to the mouse. Are we similar to ordinary mice or SR/CR mice? Hopefully, the future can bring us a definitive answer to this question.