

Lyme Vaccine Discovered

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In 1975, researchers investigated several cases of childhood arthritis in Old Lyme, Connecticut, and determined that they were caused by a tick-borne infection, known as Lyme disease. In 1982, National Institute of Health (NIH) researcher Willy Burgdorfer identified a corkscrew-shaped bacteria, subsequently named *Borrelia burgdorferi*, as the culprit. Ani-

mals such as deer, mice, rats, raccoons, and squirrels can harbor *Borrelia* in their blood without becoming ill. When ticks feed on these animals they ingest the germ, then pass it along to the next animal — or human — they bite.

Humans may develop a circular, red area around the bite. Initial symptoms can mimic a mild case of flu. If Lyme disease is left untreated, rashes, arthritis, abnormal heart rhythms, nerve damage, and memory loss can develop. If properly diagnosed, prompt treatment with antibiotics prevents these late effects.

Although avoiding the woods and wearing protective clothing reduces one's risk, a vaccine could provide long-term protection to

people and pets. Vaccine development, however, was hampered by the lack of a suitable animal model — most animals harbor the *Borrelia* germ without developing the disease. However, after a year of searching, a susceptible strain of mice was identified. Researchers also found that hamsters with suppressed immune systems could contract Lyme disease.

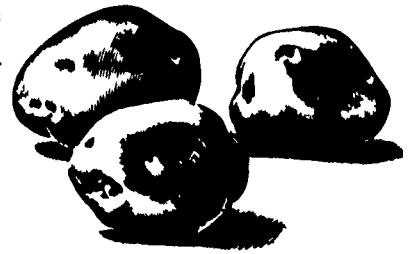
Using these animal models, a vaccine based on killed *Borrelia* was developed, and in 1990 it was approved to protect dogs. Recently, a vaccine using a genetically engineered *Borrelia* protein has been shown to be effective in animals. Preliminary human trials began in October, 1992, and if successful, the vaccine may

become available within three years.

A surprising, unprecedented benefit of the genetically engineered vaccine is that in addition to protecting the animal, the vaccine also kills the *Borrelia* within the carrier tick. This opens the possibility of widespread disease control by vaccinating animal hosts, with the long-term goal of elimination of the disease. If so, strollers through the woods one day may not have to worry about anything more threatening than bears and poison ivy.

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Ag Trade Helps U.S. Economy

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The United States is overwhelmingly an industrial nation; only 2 percent of the population works on farms. But U.S. farmers are so productive that agriculture still accounts for all U.S. exports. The production from one out of every 2.5 acres of cropland harvested is exported.

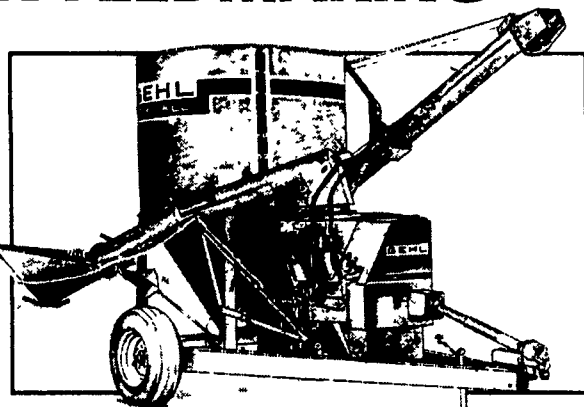
The great productivity of U.S. farms allows us to use all of the farm products we can inside the United States, and still be able to sell 69 percent of our wheat, 41 percent of our corn, 59 percent of our soybean products and more than 50 percent of our cotton to earn income in foreign countries.

U.S. farm productivity helps the nation hold strong market shares in the worldwide market for farm products. The U.S. shares of important crop markets are on the order of 37 percent of world wheat exports, 86 percent of world soybean exports and 21 percent of world rice exports.

Looking at it another way, U.S. farmers have developed their exports to a point where 25 percent of the income they generate to keep their operations going comes from foreign consumers instead of U.S. consumers. The huge export industry that U.S. farm productivity is able to keep supplied employs more than a million people in the United States. Each dollar's worth of U.S. farm commodities exported generates about \$1.59 in additional economic activity in finance; transportation; warehousing; and farm supply manufacturing, distribution and sales.

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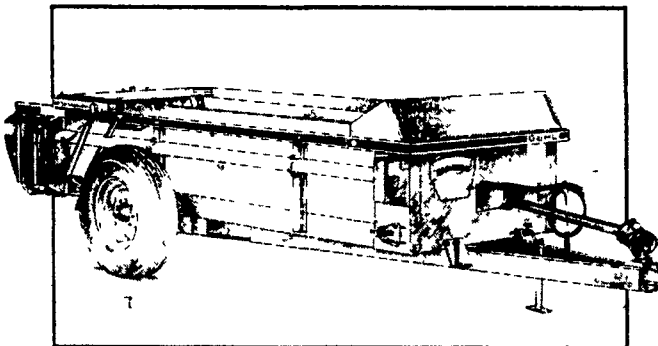
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