Animal diseases

For years immunologists have worked unsuccessfully to develop vaccines that might be effective against parasitic diseases in livestock. The need is urgent. These diseases alone account for a major portion of all animal losses from disease. In developing countries in particular, only preventive medicine through vaccines is considered economically feasible and effective. Chemical treatment may eliminate the infection, but it will not prevent reinfestation. Conventional methods of producing parasite vaccines have failed, but radiation techniques are now showing real signs of success and indicate an important medical breakthrough in the making.

For inoculations against parasite bronchitis, caused by a lung worm, larvae from infected cattle and sheep are incubated, irradiated, and become a vaccine that is administered orally to young calves. Irradiation suppresses the pathogenicity and reproductive capacity of the parasite. Because the parasite is still living and is mobile enough to reach the lungs as normal larvae do, the host animal can build up an immunity. This vaccine, also effective for sheep, is available commercially in the United Kingdom, Continental Europe, and Yugoslavia.

A U. S. firm is now working on a vaccine against hookworm in dogs, which showed promise in studies at Glasgow University. Scientists foresee human applications. Vaccines against still other animal parasites, including the poultry tapeworm, are being developed as are systems to tag parasites with radioisotopes to trace their migrations through the host tissue and to study the fundamental mechanisms of immunity.

The announcement that AEC and Department of Agriculture scientists achieved preliminary success in controlling foot-and-mouth disease in mice caused considerable excitement a few months ago. This highly infectious disease causes the death or destruction of millions of dollars worth of cattle each year.

The success in mice was achieved by stimulating the animal's natural virus-fighting defense— a substance called interferon—by injecting synthetic double-stranded RNA (ribonucleic acid). The interferon response literally stops the spread of virus by interfering with the transfer of infection from one cell to another. The RNA–interferon experiments came as a spin-off from nuclear energy research at the AEC's Brookhaven National Laboratory. The developers, Dr. Leonard Hamilton of Brookhaven and Dr. Jonathan Richmond of the U. S.