

Cow's milk protein surfaces as disease detector

PHILADELPHIA — Research currently underway on a protein found in cow's milk and human body fluids may lead to better understanding of how animals and humans fight disease. The protein, beta₂ - microglobulin, may also have potential as a marker for early detection of certain diseases.

Knowledge obtained in the beta₂ - microglobulin studies will be return on an investment in basic research that began 18 years ago with a study of the fundamental properties and components of milk.

In 1963, M.L. Groves, a Science and Education Administration dairy scientist, and his colleagues here at the Eastern Regional Research Center, discovered a new protein in cow's milk. Named lactollin, meaning a proteinaceous substance derived from milk, it was isolated in a very pure form,

crystallized, and characterized in terms of composition.

Although samples were made available to scientists who wished to conduct experiments with this new protein, no new information concerning lactollin, it turned out, would be forthcoming for many years.

"A discovery has been made, but its relevance had not yet been realized or appreciated," says Groves.

Then in 1968, two scientists from the Institute of Medical Chemistry in Sweden discovered beta₂-microglobulin in the urine of cadmium-poisoned people. This protein received a great deal of attention from medical research scientists because of its relationship to proteins involved in the body's defense against disease.

Studies on beta₂-microglobulin isolated from several mammalian

species were reported in 1976. After reading those reports, Groves realized that in composition, beta₂-microglobulin resembled the protein lactollin, which he had discovered 13 years earlier.

Further research in collaboration with Rae Greenberg, dairy scientist at the ERRC Food Science Laboratory, established that lactollin was the bovine form of beta₂-microglobulin. This discovery has led to a readily available supply of beta₂-microglobulin that can easily be crystallized for further examination. Bovine beta₂-microglobulin is the only type that has been crystallized.

Researchers hope eventually to learn how certain cell-surface proteins recognize foreign substances in the body, the first step in a series of events leading to destruction of the invaders.

Scientists do know that beta₂-microglobulin is present in elevated amounts in mammals with certain diseases. For example, in the urine of mammals with kidney damage it is secreted at levels 1,000 times normal. These findings suggest that the protein may have potential for early detection of certain diseases.

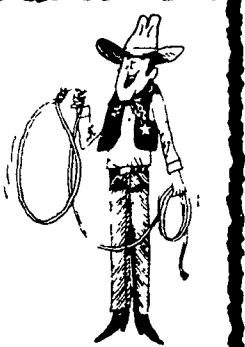


Biochemist M.L. Groves isolates a disease-detecting protein found in cow's milk and in body fluids through a technique called column chromatography. Groves and colleagues at the Eastern Regional Research Center in Philadelphia discovered the protein in 1963.

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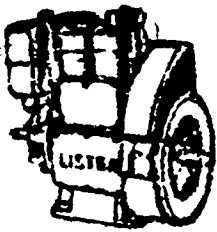


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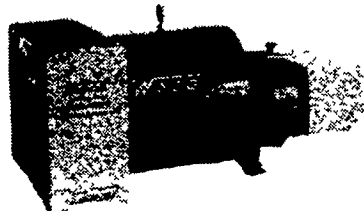
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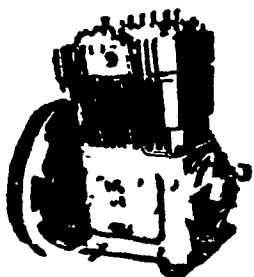


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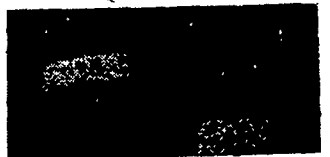
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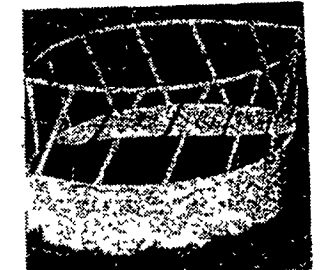


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