

SOUTHWESTERN NEWS

Contact: Reyes Abila
(214) 648-3404

UT SOUTHWESTERN RESEARCHERS CLOSER TO KEY TO LACTOSE INTOLERANCE

DALLAS — Sept. 21, 1993 — Researchers at The University of Texas Southwestern Medical Center at Dallas are redefining the cause of lactose intolerance.

Research by Dr. Stephen W. Lacey, assistant professor of gastroenterology at UT Southwestern, has found that a deficiency in lactase production is at the root of lactose intolerance, a condition in which adult humans cannot digest lactose adequately. Lactose is a complex sugar found in milk products.

Lacey's findings are contrary to existing theory which states that the breakdown of lactose-digesting enzymes is the cause of lactose intolerance. According to this theory, lactose intolerance is the end-result of the lactase enzymes being degraded as they pass through the cell's membrane structures. "That's certainly possible, but it is an uncommon way to regulate proteins. Our research shows it is more likely that there is insufficient lactase production," Lacey said.

"There is currently no cure for lactose intolerance, but we hope that understanding the mechanisms that generate this condition will push us ever closer to a treatment," he said. He presented his findings to the American Gastroenterological Association in Boston in May and at an international meeting of gastroenterologists in Konigswinter, Germany, in March.

About 35 million Americans suffer from lactose intolerance, a condition that occurs when a person is missing or has low levels of lactase, an enzyme expressed on the surface of cells in the small intestine that breaks lactose into its simple sugar compounds.

Lacey has found strong evidence that regulation of lactase messenger ribonucleic acid (mRNA) plays a much larger role in lactose digestion than previously believed.

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His research has identified production of mRNA as a major factor controlling the amount of lactase present in the digestive tract. The level of production of the lactase enzyme ultimately dictates whether a person can tolerate lactose, he said.

In a 20-patient study, small bowel biopsies were performed and tissue samples were examined for lactase mRNA, lactase activity, sucrose digestion and lactase protein.

"All patients were also examined quantitatively for lactose tolerance by measuring breath hydrogen production after 25 grams of lactose was ingested," Lacey said. Lactose intolerant individuals usually produce high levels of breath hydrogen.

The study produced three major findings, which support Lacey's conclusion that lactose digestion is controlled by lactase mRNA.

First, Lacey found patients' histories of lactose tolerance correlated with the level of lactose tolerance measured by the breath hydrogen test. Also, patients able to digest lactose had easily detectable levels of lactase mRNA, lactase activity and lactase protein. Finally, study subjects who were lactose intolerant were found to have low levels of lactase mRNA, lactase activity and low or undetectable levels of lactase protein.

"Our findings are strengthened further by the establishment of a definitive straight line relationship between lactase mRNA activity among subjects expressing lactase," Lacey said.

In studying the genetics behind lactose digestion, Lacey said that people unable to digest lactose manifested a recessive trait. On the contrary, people with a dominant lactase trait were able to produce lactase and digest lactose. "The genetics of this are fascinating," he said.

Lacey said that most people who are lactose intolerant are not truly lactase deficient, but rather lose the ability to produce lactase as they age. "In humans, lactase declines over a three- to four-year period," he said. "In

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some individuals it is abrupt; however, most people who are destined to lose their lactase do so by the time they are 5 or 6 years old."

For those uncertain if they are lactose intolerant, Lacey recommends keeping a daily diary outlining food consumption and any accompanying reactions to help pinpoint the cause of symptoms associated with lactose intolerance. Lactose intolerance is most commonly characterized by cramps, diarrhea and excess gas production. "Those three things are the hallmarks of lactose malabsorption," Lacey said.

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