

news

THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT DALLAS

southwestern medical school • graduate school of biomedical sciences • school of allied health sciences

Contact: John Weeks

DALLAS--An experimental technique developed in Dallas is being put to work halfway around the world to help physicians in Israel diagnose diabetes among immigrant Yemenite Jews.

Collaborating in the unusual long-distance effort are Dr. Marvin D. Siperstein of The University of Texas Health Science Center at Dallas, and Dr. David Rabin of the Hadassah Medical Organization in Jerusalem.

The project's purpose, say the participants, is twofold: to help Israeli doctors solve a difficult diagnostic problem, and to generate valuable data bearing on the basic cause of diabetes.

Dr. Siperstein, professor of internal medicine at UT's Southwestern Medical School, is developer of a promising method of detecting a condition known as diabetic microangiopathy--a minute thickening of tiny blood-vessel walls which apparently takes place before clinical symptoms of diabetes appear.

The procedure involves examination of bits of thigh-muscle tissue under an electron microscope. At 8400 magnification, capillary membranes of some patients are found to be abnormally thickened--usually about double the normal of about 1,100 angstroms (one angstrom equals one hundred-millionth of a centimeter).

--more--

first add diabetes

This thickening, Dr. Siperstein says, has proved to be "a sensitive early indicator" that the disease process of diabetes mellitus, involving breakdown of the body's metabolic apparatus for making and utilizing glucose, is under way.

A basic problem in detecting diabetes, Dr. Siperstein explains, is that other less serious problems--obesity and even simple physical inactivity, for example--can cause the same carbohydrate abnormalities and thus mimic the disease.

"Obese people tend to process glucose a little more slowly than non-obese people," he noted, "but that is not diabetes"--even though in glucose tolerance tests, a traditional measure of this processing ability, the findings often are confused with diabetes.

As a result, he said, "many patients have been diagnosed as diabetic who are not."

This problem has been encountered by Israeli physicians, who have discovered decreased glucose "tolerance" among abnormal numbers of Yemenites, who have migrated in increasing numbers to the new Jewish state during the past 20 years.

Long isolated in Southern Yemen, these Jewish migrants have undergone a complete change of lifestyle--including diet--since coming to Israel.

--more--

second add diabetes

"They are eating more refined foods, and it has been suggested that for this reason they are developing decreases in carbohydrate tolerance," said Dr. Siperstein, professor of internal medicine at UT Southwestern Medical School.

"And the question the physicians in Israel want to answer is, is this diabetes? Does this have any pathologic significance? Or is it just another example of decreasing glucose tolerance that we see in patients undergoing metabolic changes--increase in weight, decrease in activity, and the like."

To help answer this question, physicians and technicians have arranged an aerial exchange of clinical samples, with muscle biopsies performed in Israel, then tissue samples shipped to Dallas where intricate microscopic measurements of the capillaries' protein coating--called "basement" membranes--are made in laboratories at the medical school.

Some 30 such tissue samples have been received from Israel so far and are in the process of being evaluated. Some 200 to 300 Yemenite patients will be included during the two-year study.

Israel medical scientists requested use of Dr. Siperstein's test procedure even though it is still in an investigational stage because, he said, they believed it would provide a more specific means of pinpointing true diabetics than other laboratory tests currently in use.

--more--

third add diabetes

And the Dallas researcher regards the tissue samples as valuable in his continuing studies of the physiologic properties of capillary "basement" membranes and any relationship between the changes they undergo and other known factors in the mysterious diabetes process, such as insulin production.

"We will try to see whether this thickening causes any decrease in sensitivity to insulin," Dr. Siperstein said, pointing out that Dr. Rabin is a recognized authority on measuring insulin response in muscles.

Because of their long cultural isolation, the Yemenites offer researchers a rare opportunity to compare any effects of altered diet and other living habits on the incidence of diabetes, he added.

On January 1, Dr. Siperstein took his laboratory efforts to Switzerland for eight months of intensified diabetes research that will include efforts to "grow" human capillaries in a test tube.

As visiting professor of medicine at The University of Geneva during the spring and summer, he also will continue to monitor the ongoing studies of the Yemenites, traveling to Jerusalem for periodic consultation. He will keep tab on the microscopic measurements which will continue at Southwestern in Dallas.

In his Geneva experiments, Dr. Siperstein will seek to duplicate in the laboratory the blood-vessel changes that accompany diabetes--changes he sees as possibly triggering the loss of insulin output that has long been recognized as causing diabetes.

--more--

fourth add diabetes

"I think it's possible that the rate at which the basement membrane is synthesized, or broken down, is defective in the diabetic," he said before leaving for Geneva. "And that's why they accumulate basement membrane in excess of normal."

Taking tissue samples from normal and diabetic humans (no animal is known to develop the full disease), the scientist will seek to grow capillaries from them in the laboratory.

"We will see if we can find the diabetic lesion in the test tube," he said--"whether we can take normal capillaries and change them chemically into diabetic capillaries, and more important, try to find out if there is a way of converting a diabetic capillary back into the range of normal that would be therapeutic."

That, if achieved, could lead to a possible new means of treating the disease by medication.

"Basically," he said, "the question is whether we can get to the bottom of what causes diabetic microangiopathy. And I think the best way to do that is to move the whole thing into the test tube where we can study it."

Dr. Siperstein was accompanied to Geneva by his wife, Dr. Eleanor Siperstein--herself also a Southwestern faculty member as adjunct assistant professor of cell biology--and their children, Linda, 6; Laurie, 14; and Allan, 16. They will return to Dallas next September.

JANUARY 10, 1973