# Scientists turn human skin cells into insulin-producing cells

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(PhysOrg.com) -- Researchers at the University of North Carolina at Chapel Hill School of Medicine have transformed cells from human skin into cells that produce insulin, the hormone used to treat diabetes.

The breakthrough may one day lead to new treatments or even a cure for the millions of people affected by the disease, researchers say.

The approach involves reprogramming skin cells into pluripotent stem cells, or cells that can give rise to any other fetal or adult cell type, and then inducing them to differentiate, or transform, into cells that perform a particular function – in this case, secreting insulin.

Several recent studies have shown that cells can be returned to pluripotent state using "defined factors" (specific proteins that control which genes are active in a cell), a technique pioneered by Dr. Shinya Yamanaka, a professor at Kyoto University in Japan.

However, the UNC study is the first to demonstrate that cells reprogrammed in this way can be coaxed to differentiate into insulin-secreting cells. Results of the study are published online in the *Journal of Biological Chemistry*.

"Not only have we shown that we can reprogram skin cells, but we have also demonstrated that these reprogrammed cells can be differentiated into insulin-producing cells which hold great therapeutic potential for diabetes," said study lead author Yi Zhang, Ph.D., Howard Hughes

Medical Institute investigator, professor of biochemistry and biophysics at UNC and member of the Lineberger Comprehensive Cancer Center.

"Of course, there are many years of additional studies that are required first, but this study provides hope for a cure for all patients with diabetes," said John Buse, M.D., Ph.D., president of the American Diabetes Association and professor and chief of the endocrinology division in the UNC School of Medicine's department of medicine.

About 24 million Americans suffer from diabetes, a disease that occurs when the body is unable to produce or use insulin properly. Virtually all patients with type I diabetes, the more severe of the two types, must rely on daily injections of insulin to maintain their blood sugar levels.

Recent research exploring a possible long-term treatment – the transplantation of insulin-producing beta cells into patients – has yielded promising results. But this approach faces its own challenges, given the extreme shortage of matched organ donors and the need to suppress patients' immune systems.

The work by Zhang and other researchers could potentially address those problems, since insulin-producing cells could be made from diabetic patients' own reprogrammed cells.

Zhang is collaborating with Buse to obtain skin samples from diabetes patients. He said he hoped his current experiments will take this approach one step closer to a new treatment or even a cure for diabetes.

Source: University of North Carolina

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