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# Researchers discover mechanism that could convert certain cells into insulin-making cells

April 29 2011

Simply put, people develop diabetes because they don't have enough pancreatic beta cells to produce the insulin necessary to regulate their blood sugar levels.

But what if other cells in the body could be coaxed into becoming pancreatic beta cells? Could we potentially cure diabetes?

Researchers from UCLA's Larry L. Hillblom Islet Research Center have taken an important step in that direction. They report in the April issue of the journal *Developmental Cell* that they may have discovered the underlying mechanism that could convert other cell types into pancreatic beta cells.

While the current standard of treatment for diabetes — insulin therapy — helps patients maintain sugar levels, it isn't perfect, and many patients remain at high risk of developing a variety of medical complications. Replenishing lost beta cells could serve as a more permanent solution, both for those who have lost such cells due to an immune assault (Type 1 diabetes) and those who acquire diabetes later in life due to insulin resistance (Type 2).

"Our work shows that beta cells and related endocrine cells can easily be converted into each other," said study co-author Dr. Anil Bhushan, an associate professor of medicine in the endocrinology division at the David Geffen School of Medicine at UCLA and in the UCLA Department of Molecular, Cell and Developmental Biology.

It had long been assumed that the identity of cells was "locked" into place and that they could not be switched into other cell types. But recent studies have shown that some types of cells can be coaxed into changing into others — findings that have intensified interest in understanding the mechanisms that maintain beta cell identity.

The UCLA researchers show that chemical tags called "methyl groups" that bind to DNA — where they act like a volume knob, turning up or down the activity of certain genes — are crucial to understanding how cells can be converted into insulin-secreting beta cells. They show that DNA methylation keeps ARX, a gene that triggers the formation of glucagon-secreting alpha cells in the embryonic pancreas, silent in beta cells.

Deletion of Dnmt1, the enzyme responsible for DNA methylation, from insulin-producing beta cells converts them into alpha cells.

These findings suggest that a defect in beta cells' DNA methylation process interferes with their ability to maintain their "identity." So if this "epigenetic mechanism," as the researchers call it, can produce alpha cells, there may be an analogous mechanism that can produce beta cells that would maintain blood sugar equilibrium.

"We show that the basis for this conversion depends not on genetic sequences but on modifications to the DNA that dictates how the DNA is wrapped within the cell," Bhushan said. "We think this is crucial to understanding how to convert a variety of cell types, including stem cells, into functional beta cells."

According to the American Diabetes Association, 25.8 million children and adults in the U.S. — 8.3 percent of the population — have diabetes.