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Research Summary:

My laboratory is using stem cells to better understand human diabetes and obesity. Stem cells allow the generation of disease relevant cell types, including insulin producing beta cells of the pancreas, and neurons of the hypothalamus. Below are published examples how we made those cells and how we used them to study human disease.

Selected Publications:


2.) Yamada, M., Johannesson, B., Sagi, I., Burnett, L.C., Kort, D.H., Prosser, R.W., Paull, D., Nestor, M.W., Freeby, M., Greenberg, E., Goland, R.S., Leibel, R.L., Solomon, S.L., Benvenisty, N., Sauer, M.V., and Egli, D. (2014), Human oocytes reprogram adult somatic nuclei of a type 1 diabetic to diploid pluripotent stem cells. Nature, doi:10.1038/nature13287, Jun 26, 2014, 510(7506), pp. 533-6. Here we have shown that diploid pluripotent stem cells can be derived after somatic cell nuclear transfer. This method uses human oocytes to turn an adult cell to a stem cell. A more commonly used path is to turn adult cells into stem cells using genes or chemicals. Both methods result in cells that are pluripotent (meaning they can give rise to all cell types of the body). It is possible that there are differences between the two methods that would affect their use in therapeutic applications.

3.) Shang, L., Hua, H., Foo, K., Martinez, H., Watanabe, K., Zimmer, M., Kahler, D., Freeby, M., Chung, W., LeDuc, C., Goland, R., Leibel, R., and Egli, D., Beta cell dysfunction due to increased ER stress in a stem cell model of Wolfram syndrome. Diabetes, Nov. 13, 2013. This study showed that stem cell derived beta cells can reflect disease relevant phenotypes. In this study, beta cells were made from subjects with Wolfram syndrome, a lethal disorder that often first starts with diabetes symptoms. The beta cells in this disorder are less resistant to protein folding stress than normal cells, but a drug that can help to reduce this stress improved beta cell function.
and might be useful for clinical application.


This study showed that the mitochondria of human oocytes can be replaced by transferring the nucleus from one oocyte to another. This method should be useful to prevent the transmission of mitochondrial disease from one generation to the next. Mitochondrial diseases are currently incurable and can be lethal.

More about Dieter Egli, PhD:

CV

http://www.nbdiabetes.org/our-research-faculty