Type-1 diabetes induces depot-specific alterations in adipocyte diameter and mass of adipose tissues in the rat.

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Source

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Abstract

Type-1 diabetes (T1D) is a metabolic disorder associated with massive reduction in mass of adipose tissue. Measuring cell diameter, an index of fat metabolism, we determined depot-specific alterations in weight of adipose tissue, fat cell diameter and size heterogeneity and distribution at 5 depots in streptozotocin (STZ)-induced diabetic rats. T1D was induced by a single injection of STZ. Seven days after the injection, fat depots were isolated, weighted, washed and maintained in tissue culture medium. Using a microscope equipped with calibrated micrometer, cell diameter as well as size distribution pattern and heterogeneity of adipocytes were determined in fresh tissue slices of subcutaneous (SC), proximal epididymal (PE), distal epididymal (DE), perirenal (PR) and retroperitoneal (RP) fat depots. The T1D induced marked reductions in fat mass and mean of fat cell diameter at all depots. The most affected depot was the SC. With the exception of PE, adipocytes at all depots showed significant increases in size heterogeneity. The effect of the diabetes on mean fat cell diameter and size heterogeneity was minimal at PE depot. Depots with similar cell size distribution pattern exhibited similar fat mass reduction. However, the DE depot with a unique cell size distribution pattern showed a fat mass reduction similar to that of PE and PR depots. These data indicate that T1D induces a massive fat mass reduction in a reasonably depot-specific manner and that the fat depots close to survival organs are less vulnerable to fat mobilization. Moreover, peculiar disagreement between cell size distribution and heterogeneity as well as the level of fat mass reduction at DE and PE depots suggests that not only cell size and heterogeneity but also local factors may play roles in depot-specific fat mobilization.

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