Increased interleukin (IL)-1beta messenger ribonucleic acid expression in beta-cells of individuals with type 2 diabetes and regulation of IL-1beta in human islets by glucose and autostimulation

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Abstract

CONTEXT: Elevated glucose levels impair islet function and survival, and it has been proposed that intraislet expression of IL-1beta contributes to glucotoxicity. OBJECTIVE: The objective was to investigate IL-1beta mRNA expression in near-pure beta-cells of patients with type 2 diabetes (T2DM) and study the regulation of IL-1beta by glucose in isolated human islets. METHODS: Laser capture microdissection was performed to isolate beta-cells from pancreas sections of 10 type 2 diabetic donors and nine controls, and IL-1beta mRNA expression was analyzed using gene arrays and PCR. Cultured human islets and fluorescence-activated cell sorter-purified human beta-cells were used to study the regulation of IL-1beta expression by glucose and IL-1beta. RESULTS: Gene array analysis of RNA from beta-cells of individuals with T2DM revealed increased expression of IL-1beta mRNA. Real-time PCR confirmed increased IL-1beta expression in six of 10 T2DM samples, with minimal or no expression in nine control samples. In cultured human islets, IL-1beta mRNA and protein expression was induced by high glucose and IL-1beta autostimulation and [...]
Supplemental figure 2

$\text{r}^2 = 0.856. \ p < 0.0001$