

Prevention of type 2 diabetes mellitus

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Introduction

Type 2 diabetes occurs in 7% of the US population and affects ~ 21 million individuals and is characterized by hyperglycemia, insulin resistance, and relative impairment in insulin secretion. Prediabetes is defined as an intermediate metabolic state between normoglycemia and diabetes and includes those with impaired fasting glucose (IFG) and impaired glucose tolerance (IGT). Although the lifetime risk of type 2 diabetes is high, our ability to predict and prevent type 2 diabetes in the general population is limited. However, individuals at high risk, including those with prediabetes, are appropriate candidates for preventive interventions.

Goals of diabetes prevention

The goals of diabetes prevention include: 1. Delaying the onset of diabetes, 2. Preserving beta cell function and 3. Preventing or delaying microvascular complications and perhaps cardiovascular complications.

Lifestyle Intervention

Lifestyle intervention (combined diet and exercise aimed at weight loss and increasing activity levels) can improve glucose tolerance and prevent progression from prodiabetes to type 2 diabetes, as illustrated by meta-analyses of trials comparing exercise plus diet with standard therapy.

The strongest evidence for diabetes prevention comes from the Diabetes Prevention Program (DPP). The DPP demonstrated that an intensive lifestyle intervention could reduce the incidence of type 2 diabetes by 58% over 3 years. Follow-up of three large studies of lifestyle intervention for diabetes prevention has shown sustained reduction in the rate of conversion to type 2 diabetes: 43% reduction of 20 years in the Da Qing study, 43% reduction at 7 years in the Finnish Diabetes Prevention Study (DPS) and 34% reduction at 10 years in the US Diabetes Prevention Program Outcomes Study (DPPOS).

Pharmacologic Interventions

Pharmacology agents including metformin, α -glucoside inhibitors, orlistat, glucagon-like peptide 1 (GLP-1) receptor agonists, thiazolidinediones and vitamin D, have each been shown to decrease incident diabetes to various degrees in those with prediabetes in research studies, though none are approved by the FDA and EMA specifically for diabetes prevention.