

Resistance to type 2 diabetes mellitus: a matter of hormesis?

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Kolb H, Eizirik DL.

Source

Immunobiology Research Group, Institute of Molecular Medicine,
University of Düsseldorf, D-40001 Düsseldorf, Germany.

hubert.kolb@uni-duesseldorf.de

Abstract

Type 2 diabetes mellitus is characterized by subclinical systemic inflammation and impaired regulation of blood glucose levels. Interestingly, impairment of glycemic control occurs despite substantial insulin secretion early in the course of this disease. Dysfunction of several organs (including pancreatic islets, liver, skeletal muscle, adipose tissue, gut, hypothalamus and the immune system) has been implicated in the pathogenesis of type 2 diabetes mellitus. However, diabetes-promoting lifestyle factors do not inevitably cause disease in all persons exposed. Hence, defense mechanisms must exist that can keep the detrimental influence of these risk factors at bay. Hormesis describes the phenomenon that exposure to a mild stressor confers resistance to subsequent, otherwise harmful, conditions of increased stress. This Review discusses the emerging concept that the effectiveness of an adaptive (hormetic) response to detrimental lifestyle factors determines the extent of protection from progression to type 2 diabetes mellitus. Further analysis of these protective hormetic responses at the molecular level should help to identify novel targets for preventive or therapeutic intervention in patients at risk of developing type 2 diabetes mellitus or those with overt disease.