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Chronic hyperglycemia mediated physiological alteration and metabolic distortion leads to organ dysfunction, infection, cancer progression and other pathophysiological consequences: An update on glucose toxicity.

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Chronic exposure of glucose rich environment creates several physiological and pathophysiological changes. There are several pathways by which hyperglycemia exacerbate its toxic effect on cells, tissues and organ systems. Hyperglycemia can induce oxidative stress, upsurge polyol pathway, activate protein kinase C (PKC), enhance hexosamine biosynthetic pathway (HBP), promote the formation of advanced glycation end-products (AGEs) and finally alters gene expressions. Prolonged hyperglycemic condition leads to severe diabetic condition by damaging the pancreatic β -cell and inducing insulin resistance. Numerous complications have been associated with diabetes, thus it has become a major health issue in the 21st century and has received serious attention. Dysregulation in the cardiovascular and reproductive systems along with nephropathy, retinopathy, neuropathy, diabetic footulcer may arise in the advanced stages of diabetes. High glucose level also encourages proliferation of cancer cells, development of osteoarthritis and potentiates a suitable environment for infections. This review culminates how elevated glucose level carries out its toxicity in cells, metabolic distortion along with organ dysfunction and elucidates the complications associated with chronic hyperglycemia.