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Department of Clinical Pharmacy, College of Pharmacy, Jazan University, Jazan, Saudi Arabia

Nanotechnology is an interdisciplinary scientific field with a great number of applications, which are developed in order to improve the quality of life. Nanomedicine is a specialized branch of medicine that applies the fundamentals of nanotechnology to the prevention, diagnosis and treatment of various diseases, such as cancer, cardiovascular diseases and diabetes. Diabetes mellitus is considered to be among the major afflictions of modern western society. The common approach of this condition is a prescribed insulin replacement therapy, including injections of long acting insulin at mealtimes. Regarding the everyday routine, insulin injections and glucose tests can be painful and time consuming for diabetic patients. Many efforts are given to overcome the drawbacks of injection therapy, but there is the need for new safe and cost effective technologies for diagnosis and treatment. Nanotechnology has obtained increasing importance in the research of diabetes. Nanotechnology based tests can provide more accurate information for the diagnosis of diabetes mellitus. Several therapeutic methods have been proposed for non-invasive monitoring of blood glucose, based on nanotechnology. Some representative achievements include the molecular diagnosis of diabetes, the oral delivery of insulin with the use of nanospheres as biodegradable polymeric carriers, the development of artificial beta cells and artificial pancreas. The aim of this review is to provide insights into the role of nanotechnology in diabetes diagnosis and treatment, shedding light on the potential of nanotechnology in this field and discussing the future prospects.

Nanomedicine; Nanotechnology; Diabetes mellitus; Nanomaterials; Diagnosis; Treatment

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