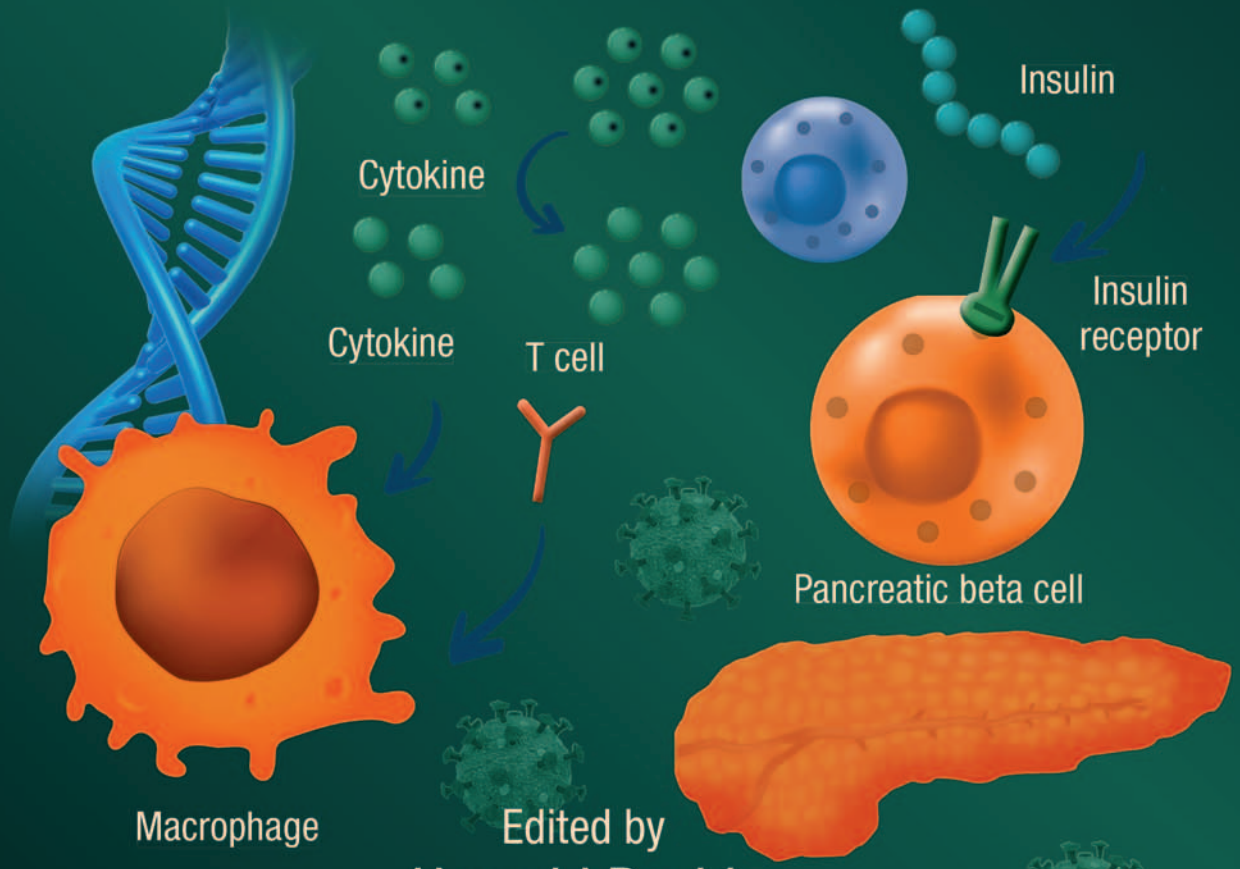
TYPE 2 DIABETES MELLITUS

EXPLORING IMMUNOGENETIC PATHWAYS



Edited by
Haamid Bashir
Shafat Ali
Yahya F. Jamous

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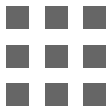

Type 2 Diabetes Mellitus

Exploring Immunogenetic Pathways

Edited by

Haamid Bashir

Department of Biochemistry, Government Medical College, Srinagar, Jammu & Kashmir, India

Shafat Ali

Department of Zoology, Hassan Khoyihami Memorial Degree College, Bandipora, Jammu & Kashmir, India

Yahya F. Jamous

Wellness and Preventive Medicine Institute, Health Sector, King Abdulaziz City for Science and Technology, Riyadh, Saudi Arabia

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5

Cytokines and insulin sensitivity

Fariya Khan[1], Salman Akhtar[2, 4] and Ajay Kumar[3]

[1]DEPARTMENT OF BIOTECHNOLOGY, KANPUR INSTITUTE OF TECHNOLOGY (KIT), KANPUR, UTTAR PRADESH, INDIA; [2]DEPARTMENT OF BIOENGINEERING, INTEGRAL UNIVERSITY, LUCKNOW, UTTAR PRADESH, INDIA; [3]DEPARTMENT OF BIOTECHNOLOGY, FACULTY OF ENGINEERING AND TECHNOLOGY RAMA UNIVERSITY, MANDHANA, KANPUR, UTTAR PRADESH, INDIA; [4]NOVEL GLOBAL COMMUNITY EDUCATIONAL FOUNDATION, HEBERSHAM, NSW, AUSTRALIA

1. Introduction

Cytokines are tiny proteins that are absolutely necessary for cell-to- cell communication, are especially crucial within the immunosystem, and are responsible for the fine-tuning of lots of physiological processes, especially inflammation, immune response, and cellular communication. Nowadays, their role in metabolic regulation has got much attention, especially on their effect on insulin sensitivity and insulin resistance (Shi et al., 2019). Insulin sensitivity is the degree of the cells' reaction to the insulin hormone, which regulates the levels of glucose in the blood. Thus, when cells are insulin-sensitive, they are able to absorb glucose from the bloodstream, thus energy balance is regulated, and high levels of blood sugar are prevented (Donath & Shoelson, 2011). On the contrary, insulin resistance is a cell's deficiency in reacting to insulin a condition that is very related to the development of type 2 diabetes and metabolic syndrome. The whole issue of cytokines and insulin sensitivity is not an easy one and it includes different mechanisms. Cytokines, such as tumor necrosis factor-alpha (TNF-α), interleukin-6 (IL-6) and interleukin-1 beta (IL-1β)), which play a crucial role in inflammatory processes, have been found to resist insulin signaling, which in turn makes insulin resistance (Rehman et al., 2017). These cytokines mess up the function of the insulin hormone by starting pathways that are inflammatory, such as the nuclear factor-kappa B (NF-κB) pathway. This pathway in turn causes insulin receptor substrates (IRS) to be phosphorylated, which in the end slows down the glucose uptake by cells and at the same time increases insulin resistance.

Additionally, IL-10 (interleukin-10) and adiponectin, both of which are categories of antiinflammatory cytokines, promote glucose-insulin sensitivity by neutralizing the harmful effects of proinflammatory cytokines and training the insulin signaling pathways (Lee et al., 2006). Optimally, the cytokine balance, which can be either proinflammatory or antiinflammatory, is the deciding factor as to whether a person has good

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