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The Purinergic landscape of type 2 diabetes mellitus

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Type 2 Diabetes Mellitus (T2DM) is a disease of great importance worldwide, due to its fast increase in the population. This disease is characterized by peripheral insulin resistance and impairment of insulin production from pancreatic ß-cells in a landscape of systemic inflammation. Although several hypoglycemic drugs are currently available, there is no effective treatment for T2DM and its complications. However, reducing systemic inflammation is expected to be beneficial. Adenosine triphosphate (ATP), in addition to playing an important role as an energy intermediary in cellular metabolic processes, is a messenger. Extracellular ATP (eATP), as an extracellular messenger, acts on the plasma membrane P2 receptor (P2R). Elevated levels of eATP have been found in chronic inflammatory diseases, including DM2, and are considered a pathogenic factor. Indeed, it is understood that the increase in eATP postulated in DM2 is a driver of inflammation through the activation of the P2X7 receptor (P2X7R) and subsequent release of inflammatory cytokines. Activation of P2X7R by eATP is reflected in intracellular energy metabolism, where decreased stimulation contributes to mitochondrial oxidative phosphorylation, while increased stimulation precipitates a "mitochondrial catastrophe" highlighted by Ca2+ flooding of the mitochondrial matrix, uncoupling of the respiratory chain and mitochondrial fragmentation (Figure 1). In addition, P2X7R stimulation is thought to trigger pancreatic ß-cell apoptosis, further aggravating hyperglycemia. Targeting eATP and P2X7R could be an attractive new approach for T2DM therapy

Biography

Garcia- Jacobo RE has a passion by the investigation, she has work in the type 2 diabetes investigation since 2014, she has been focused on the molecular and genetics mechanism that may contribute to the development of type 2 diabetes in order to clarify these mechanisms and find therapeutic targets of this disease. Garcia-Jacobo is currently in the research group of Dr. Francesco Di Virgilio that works with the P2X7 receptor