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The Role of Catestatin in sickle cell anaemia

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Abstract

Catestatin is a bioactive peptide derived from the chromogranin A protein. It is primarily known for its role as a neuropeptide that exhibits effects on the cardiovascular system and is involved in the regulation of catecholamine secretion from adrenal medullary cells in sickle cell anaemia. Catestatin has been found to have inhibitory effects on the release of catecholamines such as epinephrine and norepinephrine, which are crucial for the body's stress response. catestatin may have other physiological roles in sickle cell anaemia, including involvement in modulating blood pressure and cardiovascular functions, as well as potential implications in metabolic diseases and stress-related disorders.

Keywords: Role, Catestatin, sickle cell anaemia

Introduction

The peptide known as cetestatin, which is generated from the human chromogranin A protein, has garnered interest because of its possible involvement in a number of physiological and pathological processes. The neuroendocrine pro-hormone chromogranin A, a member of the granin protein family, is the source of the 21-amino acid peptide known as cetestatin. Numerous endocrine, neuronal, and immunological cells' secretory vesicles include proteins belonging to the granin family. Several endogenous antimicrobial peptides (AMPs) produced from chromogranin A are secreted by these cells when they are under stress. In human skin, beta-acid glycoprotein (AMP) called cetestatin functions as a barrier against several skin pathogens, including fungus, yeast, and gram-positive and gram-negative bacteria. It is also increased in reaction to skin damage.Catestatin has also been demonstrated to trigger human mast cell migration, degranulation, and release of pro-inflammatory cytokines and chemokines.These pro-inflammatory chemokines and cytokines include macrophage inflammatory protein-1α/CCL3, monocyte chemotactic protein-1 (MCP-1)/CCL2, granulocyte-macrophage colony-stimulating factor, and macrophage inflammatory protein-1β/CCL4. [1]

Regarding sickle cell anemia (SCA), catestatin may have a variety of functions. Blood Pressure Regulation and Vascular Function: Catestatin is known to moderate blood pressure and have vasodilatory effects. Catestatin may affect blood flow and endothelial function in sickle cell anemia, a disease where vaso-occlusive crises and vascular consequences are common. This could potentially relieve some of the vascular problems related to the illness.Inflammation and Stress Reaction: Oxidative stress and persistent inflammation are hallmarks of sickle cell anemia. Catestatin may be able to reduce inflammation in SCA patients by having anti-inflammatory qualities or by modifying the stress response [2].

Effect on Hemoglobin and Erythrocyte Dynamics: According to certain research, catestatin may have an impact on hemoglobin levels, erythropoiesis, and the behavior of sickled red blood cells. This relationship may be important given the pathophysiology of sickled red blood cells (SCA), which is caused by aberrant haemoglobin[3,4].

Possibility as a Biomarker: Catestatin levels may be investigated as a biomarker for sickle cell anemia complications or disease severity because of its functions in immune response and stress [5].

Conclusion:

Human peptide catestatin (CST) is made from chromogranin. an immunological, neurological, and endocrine system cleavage. Histamine release is stimulated whereas catecholamine production is inhibited by CST, an endogenous nicotinic cholinergic receptor inhibitor. In multiresistant bacterial and fungal infections, CST's biological effects include the control of inflammation, the activation of polymorphonuclear white blood cells, and the inhibition of microbiological activity. In numerous therapeutic contexts, CST may also be the focus of anti-inflammatory therapy or have a role in the regulation of inflammation in sickle cell anemia.

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