

TGFB1 Human

Transforming Growth Factor-beta 1 Human

GRF0387

Product Overview

Name	TGFB1 Human
Accession(Primary)	P01137
Description	Transforming Growth Factor-beta 1 Human

Target information (P01137)

Gene Name

About Gene Symbol

TGFB1 (Transforming Growth Factor Beta 1) is a formin actin nucleator involved in TGF- β signaling. It is an important research target in immunology, inflammation, and cancer research and is widely studied to elucidate cellular mechanisms and identify therapeutic targets.

Background

Title: Transforming Growth Factor-Beta 1 Human: An Insight into its Role in Cellular Regulation Abstract: Transforming Growth Factor-Beta 1 (TGF- β 1) is a multifunctional cytokine that plays a critical role in various cellular processes, including cell growth, differentiation, apoptosis, and immune regulation. This research paper aims to provide a comprehensive overview of the structure, synthesis, signaling pathways, and biological functions of TGF- β 1 in human cells. Additionally, this article highlights the relevance of TGF- β 1 in various physiological and pathological conditions, including cancer, fibrosis, and immune disorders. Furthermore, potential therapeutic strategies targeting TGF- β 1 signaling are also discussed. The information presented in this paper consolidates the current understanding of TGF- β 1 and its significance in cellular regulation. Introduction: Transforming Growth Factor-Beta 1 (TGF- β 1) belongs to a superfamily of growth factors that regulate various cellular processes. It is synthesized as a

precursor protein and undergoes proteolytic cleavage to generate the biologically active form. TGF- β 1 exerts its effects by binding to specific cell surface receptors, leading to the activation of downstream signaling cascades. These signaling pathways involve Smad-dependent and Smad-independent mechanisms, which ultimately regulate gene expression and cellular responses. Biological Functions: TGF- β 1 regulates cell proliferation by exerting both stimulatory and inhibitory effects, depending on the cellular context. It plays a crucial role in tissue development, wound healing, and tissue repair by promoting extracellular matrix synthesis and modulating the immune response. TGF- β 1 also has immunomodulatory functions, influencing the differentiation and function of immune cells. However, dysregulation of TGF- β 1 signaling is associated with various pathologies, including cancer progression, fibrosis, and autoimmune disorders. Role in Cancer: TGF- β 1 acts as a tumor suppressor in early stages of cancer by inhibiting cell proliferation and inducing apoptosis. However, in advanced stages, it promotes tumor progression by enhancing tumor cell migration, invasion, and angiogenesis. The dual role of TGF- β 1 in cancer highlights its complex involvement in tumorigenesis. Therapeutic Implications: Given the significant role of TGF- β 1 in various diseases, targeting its signaling pathways has emerged as a potential therapeutic strategy. Several approaches, including small molecule inhibitors, antibodies, and gene therapies, are being explored to modulate TGF- β 1 activity in a controlled manner. These interventions hold promise in the treatment of cancer, fibrosis, and other TGF- β 1-related disorders. Conclusion: Transforming Growth Factor-Beta 1 is a versatile cytokine with diverse functions in cellular regulation. Its role in physiological processes and disease pathogenesis underscores its importance as a therapeutic target. Further investigations into the precise mechanisms and downstream effects of TGF- β 1 signaling will contribute to the development of novel therapies for various human disorders.

References for protein:

Bibliography: Massagué, J. (2012). TGF β signalling in context. *Nature Reviews Molecular Cell Biology*, 13(10), 616-630. Derynck, R., & Budi, E. H. (2019). Specificity, versatility, and control of TGF- β family signaling. *Science*, 361(6403), eaay5355. Batlle, E., & Massagué, J. (2019). Transforming growth factor- β signaling in immunity and cancer. *Immunity*, 50(4), 924-940. Pickup, M. W., Mouw, J. K., & Weaver, V. M. (2014). The extracellular matrix modulates the hallmarks of cancer. *EMBO Reports*, 15(12), 1243-1253. Akhurst, R. J., & Hata, A. (2012). Targeting the TGF β signalling pathway in disease. *Nature Reviews Drug Discovery*, 11(10), 790-811.