GDF15

Growth/differentiation factor 15 (GDF15) was first identified as Macrophage inhibitory cytokine-1 or MIC-1.

It is a protein belonging to the transforming growth factor beta superfamily. Under normal conditions, GDF-15 is expressed in low concentrations in most organs and upregulated because of injury of organs such as liver, kidney, heart and lung.

The function of GDF-15 is not fully clear but it seems to have a role in regulating inflammatory pathways and to be involved in regulating apoptosis, cell repair and cell growth, which are biological processes observed in cardiovascular and neoplastic disorders. GDF-15 has shown to be a strong prognostic protein in patients with different diseases such as heart diseases and cancer.

Metformin was shown to cause increased levels of GDF-15. This increase mediates the effect of body weight loss by metformin.

A monoclonal antibody (mAB1) that neutralizes circulating GDF-15 is being tested in mice and nonhuman primates as a potential treatment for cancer-related cachexia.

GDF15 may be a potentialbiomarker for neurodegenerative diseases. Xue et al. aimed to quantitative analysis the levels of GDF15 in patients with neurological diseases and in health control, and then to determine its potential diagnostic utility.

Two researchers separately conducted a systematic search of the relevant studies up to January 2021 in Embase, PubMed, and Web of Science. Effect sizes were estimated to use the standardized mean difference (SMD) with 95% confidence interval (CI). Sensitivity and specificity were calculated by the summary receiver operating characteristics curve (SROC) method. The sensitivity analysis was performed by the "one-in/one-out" approach. Considering the considerable heterogeneity among studies, random-effects model was used for the meta-analysis investigation.

A total of eight articles were included in this meta-analysis and systematic review. The pooled results of the random effect model indicated GDF15 levels were significantly higher in patients with neurodegenerative disease than healthy people (SMD = 0.92, 95% CI: 0.44-1.40, Z = 3.75, p < 0.001). Sensitivity and specificity of biomarker of GDF15 were 0.90 (95% CI: 0.75-0.97), 0.77 (95% CI: 0.67-0.65), and AUC = 0.87 (95% CI: 0.84-0.90), respectively.

GDF15 levels were higher in patients with neurodegenerative disease than healthy people. And serum levels of GDF15 were a better marker for diagnostic utility of neurodegenerative disease ¹⁾.

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Xue XH, Tao LL, Su DQ, Guo CJ, Liu H. Diagnostic utility of GDF15 in neurodegenerative diseases: A systematic review and meta-analysis. Brain Behav. 2022 Jan 24:e2502. doi: 10.1002/brb3.2502. Epub ahead of print. PMID: 35068064.

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