Editorial
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Is GDF15 a Novel Biomarker to Predict the Development of Prediabetes or Diabetes?

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Growth differentiation factor 15 (GDF15) was discovered as a divergent member of the transforming growth factor β (TGF-β) superfamily. GDF15 was cloned independently in different laboratories and is therefore also known as different names including macrophage inhibitory cytokine-1 [1], nonsteroidal anti-inflammatory drug-activated gene-1 [2], placental bone morphogenetic protein B [3], and placental transforming growth factor β [4]. It is expressed in various cells including macrophages, cardiomyocytes, adipocytes, smooth muscle cells, and endothelial cells.

In terms of inflammation, GDF15 has anti-inflammatory characteristics. Proinflammatory cytokines like interleukin 1β (IL-1β) and TNF-α stimulates GDF15 [1], which in turn stimulates adiponectin. Adiponectin is a well-known anti-inflammatory protein whose circulating levels are decreased before type 2 diabetes [5]. This finding suggests that GDF15 may also play a role in compensatory anti-inflammatory response in type 2 diabetes.

GDF15 showed some conflicting results in obesity and weight loss. Circulating levels of GDF15 showed a positive correlation with obesity or body mass index (BMI) in several previous studies [6,7]. However, Framingham Offspring study reported that GDF15 had no association with BMI [8], and other studies even demonstrated that increased levels of GDF15 was in parallel with weight loss after bariatric surgery [9].

In glucose metabolism, GDF15 had similar characteristics to IL-1 receptor antagonist and TGF-β1 rather than adiponectin. Previous representative studies, such as Whitehall II cohort study [6] and the XENical in the prevention of Diabetes in Obese Subjects study [7] showed that higher circulating levels of GDF15 were associated with higher risk of type 2 diabetes.

Hong et al. [10] showed that GDF15 had a positive correlation with insulin resistance independent of age and BMI, and the serum level of GDF15 had a positive correlation with impaired fasting glucose and type 2 diabetes and insisted that GDF15 may be a novel biomarker for detecting impaired fasting glucose. However, this is a cross-sectional study, not a prospective study. So the efficacy of GDF15 as a biomarker to detect prediabetes instead of oral glucose tolerance test or hemoglobin A1c should be confirmed in a prospective study using oral glucose tolerance test.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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