

Original Article**Serum Level of Heat Shock Protein 70 in Patients with Type 2 Diabetes Mellitus in Basrah, Iraq****Al-Zuhaeri, A. A^{1*}, Al-Shakour, A. A¹, Ali Mansour, A²***1. Department of Biochemistry, Basrah Medical College, Basrah, Iraq**2. Department of Medicine, Basrah Medical College, Basrah Iraq*

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Abstract

Diabetes mellitus is a chronic metabolic disease with an increasing prevalence, caused by a defect in insulin production, insulin action, or both, and can increase the risk for the development of microvascular as well as macrovascular complications. Heat shock protein70 is considered a family of a larger group of proteins known as heat shock proteins, which their expression is induced when the cells are subjected to environmental stress. They are believed to keep the native folding of proteins in cells under stressful conditions and their therapeutic role. Therefore, this study aimed to investigate the serum level of HSP70 in patients with type 2 diabetes mellitus (T2DM) to assess if there is an association of HSP70 with T2DM and to evaluate the effect of age and duration of disease on the serum level of HSP70. Ninety-one patients with T2DM were recruited, and 85 individuals with the same age range and sex as healthy controls. Serum HSP70, fasting blood sugar, and HbA1c were measured. The results revealed that the level of HSP70 was significantly higher in the diabetic group compared to the control group (P value<0.05). The level of HSP70 showed a significant positive correlation with age and duration of disease as well as with fasting blood sugar and HbA1c. The study suggested that HSP70 may have the potential to be used as an indicator of metabolic derangement and a prognostic biomarker in diabetes.

Keywords: Type 2 diabetes mellitus, HSP70, Fasting blood sugar, Glycated hemoglobin, Duration of DM**1. Introduction**

Diabetes Mellitus (DM) refers to a group of various metabolic disorders characterized by elevated blood glucose levels caused by insufficient insulin release, resistance to insulin action, or both (1). Type 2 diabetes mellitus (T2DM) is the most common type of diabetes worldwide. It is caused by ineffective use of insulin by the body combined with a gradual progressive loss of β -cells in the pancreas (2). In 2019 the global prevalence of DM in the adult population was estimated to be 9.3 percent, rising to 10.2 percent by 2030 and 10.9 percent by 2045 (3). In Iraq, around 1.4 million have diabetes, and the prevalence ranges from 8.5-13.9%. Basrah's age-adjusted prevalence of

diabetes in individuals aged 19-94 is 19.7 percent (4). Heat shock proteins (HSPs) are ubiquitous and well-described proteins, with molecular masses ranging from 15 to 110 kDa (5). They are classified into six major families based on their molecular weight (kDa): HSP110 (or HSPH), HSP90 (or HSPC), HSP70 (or HSPA), HSP60 (or HSPD1), HSP40 (or DNAJ), and other small HSP families (HSPB) (6). They are thought to be protective molecules that play various roles and can be expressed in response to various cellular stresses (7) such as ischemic, thermal, and oxidative stress (8). Heat shock proteins act as chaperone proteins and can assist denatured proteins in refolding (9). Moreover, they have anti-apoptotic and anti-inflammatory