

# Electrophoretic Pattern of Alkaline Phosphatase Isoenzymes in Diabetes Mellitus

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## ABSTRACT

Fifty subjects were selected for the present study. These were divided into two groups. Group A included 20 normal controls and Group B included 30 subjects with diabetes mellitus. Qualitative detection of Isoenzymes of alkaline phosphatase were done by electrophoretic method. **Results:** Predominant Intense, deep blue bands of hepatic isoenzymes of alkaline phosphatase were present in patients with diabetes mellitus by electrophoretic method.

**Keywords:** Diabetes Mellitus, Excretory functions, Alkaline Phosphatase isoenzymes.

## INTRODUCTION

Type 2 diabetes mellitus is characterized by hyperglycemia. It is a major global health problem that affects nearly 5.3% population of the world with devastating consequences in the context of healthcare cost. T2DM causes long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels<sup>1,2,3</sup>. Type 2 diabetes mellitus is a major global health problem that affected 387 million people in 2014 and cost 612 billion US dollars<sup>2</sup>. Etiologically, various factors have been postulated to be involved in the development of T2DM, such as autoimmunity, the metabolic syndrome, diets, obesity, infection, ethnicity, genetic polymorphism and predisposition, drugs, stress, sedentary lifestyle, pregnancy, etc<sup>4</sup>. In our previous work, we have shown that mice deficient in the brush-border enzyme intestinal alkaline phosphatase develop T2DM<sup>5</sup>.

## METHODOLOGY

Fifty subjects, male and female (30 diagnosed patients of diabetes mellitus and 20 non diabetic healthy controls) were included in the study. Patients suffering from hepatic disorders, significant alcoholism or other substance abuse, pregnancy or use of oral contraceptives (in cases of female subjects) were excluded from study. Seven ml of blood was drawn. Five ml of blood was immediately shifted to clean dried centrifuge tubes, allowed to clot and the tubes were centrifuged at 3000 rpm for ten minutes. The serum was separated and analyzed.

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## RESULTS

The detail of results was given in table 1

Table 2: Electrophoretic Patterns of alkaline phosphatase isoenzymes in subject with diabetes mellitus

Alkaline Phosphatase Isoenzyme	n	%age
Hepatic only	25	83.3
Predominantly hepatic & faint intestinal	05	16.7
Total Subjects	30	100

## DISCUSSION

Diabetes mellitus is frequently associated with hepatomegaly which in type 1 is related with increase in the glycogen content (Hildes et al 1949)<sup>6</sup> while in the type II it is associated with fatty change of large droplet type (Creutzfeldt et al, 1998)<sup>7</sup>.

Serum alkaline phosphatase isoenzymes were analysed by agarose gel electrophoresis technique. Twenty five patients revealed a sharp, compact and intense blue band of hepatic isoenzyme as identified in comparison to the control serum. The liver isoenzyme was the fastest moving isoenzyme towards the anode. Five patients revealed a second band with mobility faster than placental but much slower than liver isoenzyme bands. These bands were too faint to be photographed and were in the region of intestinal isoenzyme<sup>8</sup>.

Other study showed alkaline phosphatase isoenzymes in seven patients (all with raised serum alkaline phosphatase and gamma glutamyl transferase), with three patients of liver and three with bone isoenzymes only whereas the remaining one patient had both the liver and bone isoenzymes and was suffering from diabetes mellitus<sup>9</sup>.

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