

Clinical Significance of Serum and Urine β_2 -Micro-Globulin Determination in Renal Diseases

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Serum and urinary β_2 -microglobulin levels were measured using Phadebas β_2 -micro test (Pharmacia, Sweden) in various renal diseases.

1. The following coefficients of variation were obtained at various concentrations of β_2 -m., intraassays: $10.6 \pm 3.0\%$ and interassays: $8.3 \pm 4.7\%$, respectively.
2. The average serum value was 0.94 ± 0.37 (S.D.) (range: 0.48–2.30) mg/L and the average urine concentration was 59.4 ± 62.3 , (8–230) $\mu\text{g/L}$ in 38 control subjects.
3. Serum β_2 -m. levels were well correlated to serum creatinine levels and also linearly related to

creatinine clearance ($r = -0.74$) on logarithmic scales.

4. Serum and urinary concentrations of β_2 -m. were also well correlated in slowly progressive glomerulonephritis, but urine levels were unproportionately high in cases with renal tubular acidosis, interstitial nephritis and certain cases with acute myelogenous leukemia. Comparing serum and urine lysozyme levels, β_2 -m. determination appeared to be more sensitive and useful for the detection of renal tubular dysfunction.

Fundamental and Clinical Studies of Radioimmunoassay for β_2 -Microglobulin (Phadebas β_2 -Micro Test)

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Fundamental evaluation of Phadebas β_2 -micro Test was performed, and serum β_2 -microglobulin levels were measured in healthy subjects and in patients with various disorders by using the kit.

Fundamental studies on the kit: The incubation at room temperature for 3 hrs. seemed optimal. Anti- β_2 -microglobulin did not cross react against human serum albumin, γ -globulin and IgG. The dilution curve of control serum using the buffer

of this kit was parallel to the standard curve. The average recovery of added β_2 -microglobulin in the range of 1.5–48 $\mu\text{g/l}$ was 101.3%. The reproducibility of this kit was tested by measuring three sera of different β_2 -microglobulin concentration ranging from 6 to 90 $\mu\text{g/l}$. Variability in the same kit and among the different kits were 4.4–8.3% and 7.1–15%, respectively.

These findings indicated that this kit was

clinically applicable for measuring serum β_2 -microglobulin concentration.

Clinical studies: In 25 normal subjects, serum β_2 -microglobulin concentration was within a fairly narrow range of 0.7–2.1 $\mu\text{g/ml}$ with the mean value of 1.3 ± 0.3 (S.D.). Serum β_2 -microglobulin concentration in 22 patients with chronic nephritis, 30 patients with renal insufficiency was 3.3 ± 2.8 $\mu\text{g/ml}$ (mean \pm S.D.) and 49.2 ± 23.0 $\mu\text{g/ml}$, respectively. All patients with renal insufficiency showed extremely high value in the range of 14–113 $\mu\text{g/ml}$. Most patients with various thyroid disorders showed normal values.

A tendency toward high values was observed in patients with systemic lupus erythematosus and

rheumatoid arthritis ranging from 1.3 to 49 $\mu\text{g/ml}$. In eighteen of the 45 subjects with malignant disorders such as lung cancer, stomach cancer and colon cancer, serum β_2 -microglobulin concentration was found to be higher than normal. In patients with chronic nephritis, a significant positive correlation was observed between the serum concentration of β_2 -microglobulin and that of creatinine ($r=0.96$, $F=223.3 < F(0.001)$). On the other hand, the serum concentration of β_2 -microglobulin was found to be correlated with serum concentration of carcinoembryonic antigen in 9 patients with colon cancer ($r=0.74$, $F=8.5 < F(0.025)$).