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THE RELEVANCE OF SERUM
BETA-2-MICROGLOBULIN
ESTIMATION IN CLINICAL ONCOLOGY

A THESIS SUBMITTED AS PARTIAL FULFILMENT
FOR M.D. DEGREE IN GENERAL SURGERY

BY

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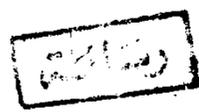
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REVIEW

B2-MICROGLOBULIN

B2-microglobulin is a small molecular weight protein produced by all the nucleated body cells. It was first isolated in 1964 and characterized in 1968 by "Berggard and Bearn".

The protein was initially isolated from the urine of patients with "Wilson's disease" or chronic cadmium poisoning. Information accumulated over the past 20 years in many laboratories and clinics over the world has led to the precise knowledge of B2-m. structure, distribution in various tissues, genetic control, synthesis, renal handling and variations in several pathological conditions.

Chemical structure of B2 microglobulin (B2-m.)

The B2-m. is a globular protein almost spherical in shape (Karlsson, 1974) [Figure 1]. It is composed of a single 100 amino-acid polypeptide chain with one interchain disulphide bridge involving the 2 half-cystine residues (Berggard and Bearn, 1968).

Analogues of human B2-m. have been characterized in several species including mouse, rat, guinea pig, rabbit, ox and dog. Amino-acid sequence analysis indicated that the molecules have a very similar structure (Revillard, 1979).

"Parker and Strominger (1982) reported that automated sequence analysis of human B2-m. showed that it is only formed of 99 amino-acid residues like the mouse and rabbit homologues, and that the previously

published sequence contains an error, an additional serine residue at position 67.

B2-m. has a small molecular weight. The molecular weight calculated from the amino-acid composition (11,815 Dalton) was close to that found by ultracentrifugation (11,600 D.) (Berggard and Bear, 1968).

B2-m. is devoid of carbohydrate. It is free from those carbohydrates characteristic of glycoproteins namely, total hexose, hexosamine and sialic acid (Berggard and Bear, 1968). The stokes molecular radius of B2-m. is 16 A. (Karlsson, 1974). No free sulfhydryl groups were detected. This suggests that the two half-cystine residues observed by amino-acid analysis are involved in a disulfide bond (Berggard and Bear, 1968).

Amino acid	Residues/molecule
Lysine	8
Histidine	4
Ammonia	9
Arginine	5
Aspartic acid	12
Threonine	5
Serine	10
Glutamic acid	11
Proline	5
Glycin	3
Alanine	2
Half-Cystine	2
Valine	7
Methionine	1
Isoleucine	5
Leucine	7
Tyrosine	6
Phenylalanine	5
Tryptophan	2
Total (excluding ammonia)	100

Table (1) AMINO ACID COMPOSITION OF B2-m.

(Berggard and Bearn, 1968)

Sedimentation Coefficient	1.6 S
Molecular weight	
Found	11,600
Calculated	11,815
Nitrogen content	
Experimental	16.3 %
Calculated	16.8 %
Free sulfhydryl groups	Nil
Carbohydrate	Nil

Table (2) PHYSICAL AND CHEMICAL PROPERTIES
OF B2-m. (Berggard and Bearn, 1968)