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Clinical utility of the interaction between lectin and serum prostate specific antigen in prostate cancer

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The present investigation was a lectin-based diagnosis of malignant prostate cancer (PC) by the interaction of phytohemagglutinin (PHA lectin) from *Phaseolus vulgaris* with the glycan part of serum prostate specific antigen (PSA) of patients with prostatic disorder. This was confirmed by the interaction between PHA and purified PSA obtained from serum by electrophoretic separation and finally by HPLC chromatography. The precipitate of carbohydrate content after binding of PHA with purified PSA of PC was significantly higher than that of benign prostate hyperplasia (BPH) and/or normal serum PSA. The results suggest that there may be a striking difference in glycosylation pattern of PSA between BPH and PC. The cut off value ≥ 10 μg/ml of the carbohydrate content of PHA-PSA precipitate indicates strong suspicion for PC irrespective of total serum PSA cut off level ≥ 4.0ng/ml by conventional immunoassay method and this may be taken as a guideline in differentiating PC and BPH.

Key words: prostate cancer, BPH, PSA, lectin.

The interest of the sugar specific proteins, lectins, have greatly intensified with the realization that they react with a variety of glycoproteins [1, 2]. The interaction takes place between the glycan moiety of glycoproteins and the carbohydrate binding receptors of lectins. The reactions of biomedical glycoprotein markers with lectins were studied as valuable tools for clinical diagnosis [3]. It was observed that PHA lectin (*Phaseolus vulgaris*), reacts with different serum proteins and glycoproteins [4]. Estimation of serum prostate specific antigen (PSA) for detection of prostate cancer (PC) is determined by the sensitive immunoassay method. A low serum PSA cut-off level of 4.0 ng/ml is used during screening procedure to detect PC at an early stage but an appreciable risk of false positive results was observed with this low cut off value resulting in unnecessary biopsies for those with BPH [5]. Some serum PSA samples of patients with clinically proven benign prostate hyperplasia (BPH) showed higher value than 4ng/ml [6] and a few histologically proven PC patients indicated normal serum PSA level [7] in immunoassay method. The techniques currently used in immunodetection of serum PSA concentration are of limited clinical value in the early detection of PC and its distinction from BPH had already been reported by us [8]. PSA is known to be a glycoprotein and preliminary observations indicate that PSA binds with PHA.Further,a few studies have discussed the changes in sugar-chain structure of PSA associated with malignant transformation [9].Therefore, the present investigation was designed to quick identification of suspected PC by interaction of PHA lectin with the glycan part of serum PSA glycoprotein and differentiation of PC from BPH.

Patients and methods

Chemicals. PHA lectin (Phaseolus vulgaris) was purchased from Sigma Chemical Co. All other chemicals were of analytical grade.

Samples. Serum samples of 22 male histologically proven prostate cancer (PC) patients (age between 42-75 yr) and 24 benign prostatic hyperplasia (BPH)(age between 40-70yr) were collected from Urology Clinic of B.R.Sing Railway

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