Measurement of Plasma Renin Activity by Radioimmunoassay of Angiotensin I

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Haber’s radioimmunoassay method of plasma renin activity (PRA) was modified, and more sensitive and reliable method was developed. Converting enzyme of angiotensin I (AT I) was blocked by adjusting pH to 5.5 and adding DFP, instead of using 8-hydroxyquinoline and BAL.

Method: Blood was taken at 9 am after recumbency for more than 30 minutes, and plasma obtained was frozen. After thawing, plasma was divided into two aliquots of 1 ml, pH was adjusted to 5.5 with HCl and acetate buffer, and DFP was added. One tube was incubated at 37°C for 3 hrs, and another was kept at 0°C. Twenty µl of the treated sample was added to the mixture of tris acetate buffer (pH=7.4), 125I-AT I and AT I antiserum, and was kept overnight at 4°C. Dextran-coated charcoal was used for separation of B & F, and their AT I equivalent was calculated by the reference curve of standard AT I. PRA was expressed by AT I of the incubated plasma minus AT I of the unincubated one.

Results: (1) AT I was produced in proportion to the incubation time within 3 hrs. (2) Reproducibility was fair; coefficients of variance of the same samples were 9-15%. PRA was reproducible within 30 days of taking blood. Addition of AT I to samples gave satisfactory recoveries. (3) Correlation coefficient of PRA by the present method and by the bioassay method reported previously was 0.89 (p<0.001). (4) PRA is dependent on sodium intake. However, when urinary sodium excretion was above 40-50 mEq per day, PRA was relatively unrelated to sodium excretion, averaging 1.10 ng/ml/hr (SD=0.64). The value was similar to Haber’s. PRA was doubly increased by IV injection of 20 mg of furosemide or keeping upright posture for an hour.

Summary: The modified technique of Haber’s radioimmunoassay of PRA was presented, and was proved to be reliable and useful procedure for the clinical examination (125I-AT I and antiserum were kindly supplied by Dainabot RI Laboratories.)

Studies on Radioimmunoassay of Plasma Renin Activity

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According to the development of radioimmunoassay of plasma renin activity (PRA), physiology of renin-angiotensin-aldosterone system and roles of renin in hypertension have exten-