Studies on Radioimmunoassay of Human Thyrotropin

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The radioimmunoassay of human thyrotropin (HTSH) was performed by the double antibody method and was evaluated for clinical application.

1) Specificity: ACTH, HGH, LH, FSH, LVP and B-TSH showed no or little cross reactivity by H-TSH radioimmunoassay.

2) Serum dilution and recovery: The dose response curve of multiple dilutions of hypothyroid serum was parallel with that of standard HTSH. Recovery of standard HTSH which was added to serum was 75–100% (94.8%).

3) Reproducibility: Coefficient variation was 5.6–9.0% (within assay) and 18.3–23.3% (inter assay).

4) Standard preparations: Dose response curves of HTSH 68/38 were parallel with those of HTSH-Res-Std-A. There were slight differences in immunological potency estimates for HTSH-68/38 in terms of HTSH-Res-Std-A when different labelled HTSH (National Pituitary Agency=NPA and Calbiochem) and antisera (NPA, Medical Research Council=MRC and Calbiochem) were used. Stability of immunological potency of these preparations was confirmed.

5) Correlation between bioassay and radioimmunoassay:
   a) Serum; A positive correlation was observed between bioassay (Mckenzies’ method) and radioimmunoassay potency estimates for HTSH in serum of patients with primary hypothyroidism. Administration of thyroid hormone to these patients resulted in decrease in serum levels of TSH determined by bioassay (B) and radioimmunoassay (I) without changes in B/I ratio. After the administration of TRH, elevation of serum HTSH was demonstrated by bioassay and radioimmunoassay. In radioimmunoassay as well as bioassay, multiple dilutions of sera obtained after TRH administration resulted in dose response curve which were parallel to that obtained for sera before TRH. The B/I ratio before TRH was 2.9±0.19 which was not statistically different from that after TRH (2.5±0.69).

b) Pituitary preparations; The standard preparation (HTSH 68/38), the starting material (human pituitary powder) and the intermediate fraction (glycoprotein precipitate) which were obtained from Dr. Hartree and MRC, were assayed for HTSH in terms of HTSH-Res-Std-A. The bioassay potency was nearly equal to radioimmunoassay potency (B/I≈1) in each preparations.