ABSTRACT

Because of the fact that serum hTSH is very low in concentration a very sensitive and specific radioimmunoassay was needed and hence developed. In practice, the sensitivity of radioimmunoassay depends upon many factors such as a high specific activity of labelled hormone, optimal dilution of specific antiserum and appropriate incubation conditions for the antigen-antibody reaction. In the present study, chloramine-T method was modified and a highly purified hTSH (NPA preparation) was used. A high specific activity of 140-180 μCi/μg of $^{125}$I-TSH with little, if any, damage was obtained. The fraction of undamaged $^{125}$I-TSH peak gave the maximum binding with the anti-hTSH antiserum of about 30-40 % ($B_0/T$ value). The $^{125}$I-TSH should be used within 4 weeks after the iodination since deterioration of labelled hormone after one month caused a sharp drop in binding capacity from original levels. The NPA anti-hTSH antiserum at the dilution of 1:150,000 was found to be optimal and adequate for the sensitivity of hTSH radioimmunoassay. No cross-reaction between hCG and anti-hTSH antiserum was found but low cross-reactivity for hLH and o-FSH was present at a level less than 0.001 and 0.22 % respectively. Decrease of incubation time from the usual 5 days at 4°C to 3 days at room temperature (23-25°C) was found to be optimal for performing this sensitive hTSH radioimmunoassay.

Sera of euthyroid (n=500), endemic goitre (n=31), euthyroid pregnancy (n=107), hypothyroidism (n=21), hyperthyroidism (n=44) and
mother & cord blood (n=18) samples were subjected to the assay. The mean hTSH concentration levels of endemic goitre and euthyroid-pregnancy were within the normal range (0-3 μIU/ml). In hypothyroidism, there was definite evidence of elevated circulating TSH. In contrast, the sera of hyperthyroidism showed almost undetectable levels of TSH. In cord blood of both first and second dizygotic twin, the hTSH levels were higher than in maternal blood.

A sensitive radioimmunoassay for determination of TSH which is present at low concentration in human serum has been developed and proved useful in demonstrating high levels in hypothyroidism. The assay has been applied to give normal values the range of which covers those of endemic goitre and euthyroid-pregnancy and discriminatively the differentiation of primary from secondary hypothyroidism.
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