PVF Sponge as an Adsorbant of Thyroid Hormones

K. Inagaki, H. Matsuzaki, T. Maeda, T. Yanagisawa,
M. Takase and T. Hirano
Tokyo Metroplice Hospital, Tokyo

PVF (Acetalized polyvinyl alcohol) sponge already been introduced as more useful than the Triosorb resin sponge for determination of T_3 uptake rate, and moreover, it has the advantage of adsorbing T_3 and T_4 strongly with no adsorption of inorganic iodine.

This report deals with the mechanism of why the PVF sponge adsorbs T_3 and T_4.

The results were as follows:

1) The binding of T_3 to the PVF sponge is thought to be hydrophobic, because non polar solvents eluate T_3 far beter than polar solvents.

2) The fact that pH and ionic stregth had no influence showed the binding to be non ionic.

3) High concentrations of urea or guanidine solutions have no effect upon T_3 release. Therefore, it is assumed that a hydrogen bond is not involved in the binding.

4) On the basis of the potency of octyl alcohol to eluate T_3 from the T_3 bound PVF sponge under various conditions of temperature and elution time about 10% of the bound T_3 was rapidly eluated from the sponge within the first minute, followed by the second phase of slow elution.

The latter phase showed a linear curve by the Arrhenius' plot, which proved the binding mechanism to be thermodynamically uniform.

5) The elution rates of T_3 from the T_3 bound sponge were determined with alcohols having 1~9 carbons. Judging from the releasing rate per mol of solvent, butyl alcohol was believed to be the best eluating reagent. The facts above mentioned showed that hydrophobic bonds contributes to binding of thyroid hormones to the PVF sponge, which suggests the availability of the PVF sponge for separation and determination of non polar substances found in biological materials.

Radioimmunoassay for Triiodothyronine (T_3) and Thyroxine (T_4)

M. Fukuchi, T. Inoue, S. Hirafumi, T. Matsuoka and H. Nakanishi
First Department of Medicine
Y. Kumahara
Central Laboratory for Clinical Investigation Osaka University Medical School, Osaka

The concentration of thyroid hormone (T_3 and T_4) in unextracted serum was determined by double antibody method of radioimmunoassay. Antiserum to T_3 and T_4 was produced in rabbits by injection of human thyroglobulin (TG) and T_3-Sepharose 4B with complete Freund's adjuvant. In studies of cross reaction between T_4 and a specific T_3 antiserum or between T_3 and a specific T_4 antiserum was showed 500 ng T_4 produces the same displacement of label as 0.1 ng T_3, and 500 ng T_3 produces the same displacement of label as 4 ng T_3. No effects was observed when MIT and DIT were assayed. Dilutions of plasma from patient with Graves' disease resulted in parallel curves to that obtained for the Standard T_3 or T_4 in the two assay

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