Studies on Cellular Thyroxine- and Triiodothyronine-Binding Proteins

1. Paper Electrophoretic Studies on the Binding of the Thyroid Hormones to Rat and Human Liver Soluble Proteins and Rat Muscle Proteins

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Cellular thyroxine-binding protein is considered to participate in the cellular penetration as well as in the cellular metabolism of the thyroid hormones. It has been demonstrated in rat and rabbit skeletal muscle and brain extracts, but not detected in the liver which is known to play an important role in the metabolism of the hormones. The present report is concerned with demonstrating specific cellular proteins which are capable of binding the thyroid hormones in the liver, by using paper electrophoresis.

The liver soluble proteins, to which $^{131}$-labeled thyroid hormones were bound in vitro and in vivo, were fractionated by conventional and reverse-flow paper electrophoresis, and the evidence for the presence of both cellular thyroxine-binding protein and cellular triiodothyronine-binding protein in rat and human liver was obtained. The cellular thyroxine-binding protein from rat liver had a mobility intermediate between $\alpha_2$- and $\beta$-globulin in conventional electrophoresis, while it had the mobility of $\alpha$-globulin in reverse-flow electrophoresis. Almost the same results were obtained in human liver. The cellular triiodothyronine-binding protein from rat liver had the mobility of $\beta$-globulin in conventional electrophoresis, while it had a mobility intermediate between $\alpha$- and $\beta$-globulin in reverse-flow electrophoresis. Similar results were obtained in human liver.

The cellular thyroxine-binding protein from rat skeletal muscle, which seemed to bind triiodothyronine, had a mobility intermediate between $\beta$- and $\gamma$-globulin in conventional electrophoresis, while it had the mobility of $\alpha$-globulin in reverse-flow electrophoresis.

The serum thyroxine-binding protein of the rat, which seemed to bind triiodothyronine very loosely, had a mobility similar to that of albumin in conventional electrophoresis, while it had a mobility intermediate between albumin and $\alpha$-globulin in reverse-flow electrophoresis.

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