CHAPTER - VI

SUMMARY AND CONCLUSION

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The present work includes the study of the metabolism of Vitamin A and its allied compounds in different disorders of the thyroid gland in human subjects and in experimental animals.

Carotene and Vitamin A were estimated in serum samples of hypothyroid and hyperthyroid subjects. Determinations of carotene and retinol levels were also performed in serum samples after administration of carotene retinoic acid and Vitamin A orally.

This study also involves the determination of the Vitamin A, carotene, retinoic acid, retinal and retinyl esters in different experimental conditions in serum as well as in tissues like liver, kidney, lungs, intestine testis etc. in experimental rats.

Besides the clinical cases of euthyroid, hyperthyroid and hypothyroid obtained from hospital, hypothyroidism was produced in animals by thyroidectomy or by administration of

propylthyrouracil in albino rats and hyperthyroidism was induced by administration of thyroxine by intraperitoneal injections.

The salient features of the present investigations are summarised below :

1. Carotenaemia occurs in hypothyroidism.
2. Absorption of carotene is altered in thyroid disorders.
3. Conversion of carotene to retinol is altered in thyroid disorders.
4. Absorption of retinol is altered in thyroid disorders.
5. Serum level of vitamin A is increased in hypothyroidism due to non-utilization and decreased in hyperthyroidism due to excess utilization.
6. Retinoic acid helps in growth in hypothyroidism both in body weight and brain weight.
7. Retinoic acid controls serum retinol level.
8. Retinal oxidase and reductase are increased in hyperthyroidism and decreased in hypothyroidism, thereby affecting the retinal metabolism in thyroid disorders.

CONCLUSIONS

1. Calorigenic metabolic function :

Thyroid works by activating the enzymes of the body which were already studied by several workers.

2. Non-calorigenic metabolic function :

Perhaps retinoic acid is the second messenger for the thyroid hormones. In the absence of the thyroid hormones the metabolism of carotene, retinol, retinaldehyde and retinoic acid are hampered severely.

There is carotenemia along with an increase in vitamin A in blood. The retinaldehyde formation and retinoic acid formation were reduced in hypothyroidism in experimental conditions. So the tissue suffers in plenty due to inadequate utilization of carotene and retinol. Besides retinoic acid is essential for normal skin and for the growth and development of animal including the development of the brain. This retinoic acid is not adequately produced in hypothyroidism.

Furthermore, it was observed in the present work that retinoic acid has got perhaps a feed-back control of plasma level of retinol.

Very recent observations are that retinoic acid and thyroid hormones acting through their respective receptors could control overlapping gene networks involved in the regulation of vertebrate morphogenesis and homeostasis.

But the present work partially proposes a new idea that thyroid hormone perhaps act not only through the direct action on this nucleus but by producing retinoic acid which act on the gene for growth and development.

Further, it may be suggested that retinoic acid administrations helps in the production of increased amount of growth hormone which may be responsible for better growth of the hypothyroid animals in comparison to hypothyroid animals without retinoic acid.

Recent evidences further indicate that retinoic acid acts through binding to a nuclear receptor which belongs to the steroid / thyroid hormone receptor superfamily. The present work also supports this impression.
