Medicine. — *Is thyrotropic hormone consumed, when acting upon the thyroid gland?* By F. GLASER and J. A. COHEN. (Communicated by Prof. J. VAN DER HOEVE.)

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Concerning the nature of hormonal activity great uncertainty still prevails. There are data which are indicative of a *consumption* (decay, chemical linking, adsorption, accumulation) at the seat of activity (e.g. the observations of GAILLARD and DE JONGH on the uterus explantates in vitro) (1).

Other experiments would seem to point rather in the direction of a hormonal activity, solely dependent upon the *concentration* of the hormones in the tissue fluids and thus independent of the quantity of reacting tissue. A certain quantity of testosterone, for instance, has the same effect on the *intact* male genital tract as upon the remainder after partial removal. The same holds good for the effect of oestrone upon the female tractus (HERZ c.s.) (2).

We endeavoured to solve this problem by an investigation upon adult hypophysectomized rats, a number of which also underwent extirpation of one thyroid, in order to ascertain in how far there was any difference in both groups in the activity of the thyroid gland (judged from the histological aspect) after injection of a certain dose of thyrotropic hormone. Thyrotropic hormone was chosen, since apart from the thyroid gland, few seats of activity are known. (This not being the case for the influence of oestrone and testosterone on the female and male genital tract respectively, the correctness of HERZ' conclusion, quoted above, might be questioned.)

Technique:

The hypophysis of adult male rats was removed. In some animals of each series, simultaneously experimented upon, unilateral thyroidectomy was performed at the same time. Six days later subcutaneous injections with thyrotropic hormone were begun (10 U Ambinon Organon per rat daily). The day after the last injection, the animals were autopsied and the activity of the thyroid gland (or glands) was estimated histologically according to the criteria of HEYL and LAQUEUR (3). Only those animals are recorded below, the sellae of which had proved to contain no pituitary remainders.

Results:

Group I (Control group, not injected, autopsy 7 days after the operation).

Number of animal	Weight at operation	Weight at autopsy	Thyroid activity
A. *Hypophysectomy.*			
B 6122	169	160	P
B 6123	150	143	P
B 6124	163	154	P
B. *Hypophysectomy and unilateral thyroidectomy.*			
B 6125	167	160	P
B 6126	153	152	P
B 6127	146	141	P

No difference between groups A and B.

Group II. Six days after the operation the animals were injected subcutaneously with 10 U thyr. hormone daily, on the 6th and 7th day after operation. Autopsy the 8th day.

Number of animal	Weight at operation	Weight at autopsy	Thyroid activity
A. *Hypophysectomy.*			
B 6110	136	124	r
B 6111	161	148	s
B 6112	156	154	s
B 6114	176	170	r—s
B 6115	183	171	r—s
B. *Hypophysectomy and unilateral thyroidectomy.*			
B 6116	160	147	r
B 6117	154	152	r—s
B 6118	176	156	r—s
B 6119	161	150	s—t
B 6120	171	158	r—s
B 6121	143	116	r—s

No significant difference between groups A and B.

Group III. From at least 6 days after the operation daily subcutaneous injection with 10 U thyrotropic hormone, for 7 days.

Number of animal	Weight at operation	Weight at autopsy	Thyroid activity
A. *Hypophysectomy.*			
6891	190	158	r
6892	150	130	r
6893	170	142	r
6895	156	148	s
6898	175	164	q
5411	263	220	q
5418	222	190	r
5419	182	165	s
B. *Hypophysectomy and unilateral thyroidectomy.*			
B 6889	168	138	r
B 6890	150	150	q—r
B 6896	154	134	q—s
B 6897	152	124	q—r ?
B 6899	170	146	q—r
B 6900	194	161	q
B 6901	188	254	r
B 5410	219	200	r—s
B 5413	245	235	r
B 5415	206	184	s
B 5416	194	180	r—s

Again no difference of any importance was observed.

An unequal inhibition of the thyroids by the forming of thyroxine in different quantities, of itself a conceivable source of error, would only have caused difficulty in the event of shown differences; we may therefore pass over this knotty point without comment.

Summary and Conclusions.

The effect of injections of thyrotropic hormone in hypophysectomized adult rats upon the histologically judged activity of the thyroid gland is no greater when one of both thyroids has also been previously extirpated, than in animals in which both glands are present, by a treatment with

thyroid hormone of short duration no more than with one of longer duration.

From this it follows that it is solely the concentration of this hormone in the body which is of importance for its function, and that there is no consumption.

After terminating the above investigation we received the publication of SELYE (4), who, in a similar research as our own came to the same conclusion as regards the action of gonadotropic hormone upon the ovarium.

LITERATURE.

1. Acta Brevia Neerl. IX, 159 (1939).
2. Am. J. Physiol. **124**, 259 (1938).
3. Archives Intern. de Pharmacodynamie et de Thérapie XLIX, 338 (1935).
4. Proceedings of Soc. of Exp. Biol. and Med. **43**, 404 (1940).