Table I.–LH Content of Date Palm Pollen Grains

Treatment	Body Weight	Average No. of Corpora Hemorrhagica
20 I. U. PMS . . .	8·80	0·40±0·11
1 I. U. HCG . . .	9·80	0·60±0·03
10 I. U. HCG . . .	8·50	4·00±0·35
100 I. U. HCG . . .	9·00	7·60±0·06
1 g Pollen	11·50	1·33±0·09
2 g Pollen	8·80	1·67±0·60

Each group contained 5 animals. ± Standard error.
* All mice given HCG were previously treated with 20 I. U. PMS.
$b \equiv 3{\cdot}50$.

follicles become mature, the mice were divided into six groups of five animals each. Three groups were injected with 1, 10, and 100 I.U. of HCG. One group was injected with extract from 1 g pollen, another with extract from 2 g pollen. The last group was left without any further treatment. Two days later the animals were killed with ether and the number of corpora hemorrhagica formed were used as an index of LH content.

The follicle-stimulating activity of pollens was compared with a standard curve established under the same conditions. The LH augmentation method of STEELMAN and POHLY[8] was used. Twenty-eight immature female rats were divided into 7 groups and injected with graded doses of PMS to which 20 I.U. of HCG were added. A group of rats was injected with extract from 2 g pollen, and another group with extract from 2 g pollen plus 20 I.U. of HCG. The animals were killed with ether on the fourth day and their body weights and ovary weights were recorded. The data were analyzed statistically.

Table II.–FSH Content of Date Palm Pollen Grains

Treatment	Body Weight	Ovary Weight in mg/100 g Body Weight
Control.	30·25	24·90±1·43
20 I. U. HCG. . .	27·00	41·62±0·50
1 I. U. PMS*. . .	24·67	44·62±0·03
10 I. U. PMS . . .	27·67	241·90±4·98
100 I. U. PMS*. . .	25·00	412·03±7·80
2 g Pollen	29·25	45·15±1·76
2 g Pollen*	32·00	60·22±3·10

Each group contained 4 rats. ± Standard error.
* Twenty I. U. were added to the injected material.
$b \equiv 218$.

When compared with the respective standard curves and by using the formula $\overline{Y}_x = \overline{Y} - b\ (X - \overline{X})$, where $\overline{Y}_x$ represents the average value of response, $\overline{Y}$ the total average response values, b the measure of slope and $\overline{X}$ the total average of the logarithm of the doses used. It was found that 1 g pollen contains 1·05 and 2 g contained 2·06 I.U. of LH activity. The FSH activity was calculated by the same method. It was found that 2 g pollen contained about 1·61 I.U. of PMS. A look at the ovarian weights of rats treated with 2 g pollen (Table II) shows that it is comparable with that of rats treated with 20 I.U. of HCG alone. This shows that the two fractions of LH and FSH are present in a ratio which resulted in the augmentation of their effects. The combined activity of the two fractions of hormones present in 1 g pollen is close from 10 I.U. of HCG.

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Résumé

La principale substance gonadotrophique des grains de pollen des palmiers-dattiers est extraite avec de l'acétone. On a constaté qu'un g de pollen contient 1,05 I.U. de LH et 0,80 I.U. de FSH. L'activité combinée des deux fractions augmente leur effet qui atteint jusqu'à 10 I.U. HCG par g.

[8] S. L. STEELMAN and F. M. POHLY, Endocrinology *53*, 604 (1953).

DISPUTANDA

Der respiratorische Quotient von Tabakblättern

Der Atmungsquotient (RQ) von grünen Tabakblättern ist bis heute schon von verschiedenen Autoren untersucht worden. So hat EICHENBERGER[1] gefunden, dass die Blätter der schweizerischen Tabaksorte Mt. Calme brun während des Tages einen RQ aufweisen, der zwischen 1,15 und 1,35 liegt. FREY-WYSSLING und WALTZ[2] stellten daraufhin eine umfassende Studie über dieses Problem an und untersuchten alle in der Schweiz angebauten Tabaksorten. Sie fanden dabei zum Beispiel für die Sorte Paesana einen RQ von 1,26. Da der Tabak eine Stärkepflanze ist[3], sind vor allem Kohlehydrate als Atmungssubstrate zu erwarten. Das würde einen RQ von ungefähr 1 bedingen. Die beiden Tatsachen, dass das Tabakblatt reich an organischen Säuren ist[3] und dass der RQ auch während der Nacht nie unter 1 sinkt, bewogen FREY-WYSSLING und WALTZ, eine vom Sukkulententypus[4] verschiedene Atmung für den Tabak zu postulieren. WALTZ[5] versuchte darauf, eine Korrelation dieses neuen Atmungstypus mit dem Nitratstoffwechsel erwachsener Pflanzen nachzuweisen. Es gelang ihm dies aber nicht. Auf der andern Seite hatte ROBERTS[6] schon 1941 den Tabak-RQ untersucht. Er fand ebenfalls hohe Werte bei *Luftfüllung* des Gasraumes der Warburggefässe; bei *Sauerstoffüllung* hingegen erhielt er einen RQ von 1,01. Wir untersuchten die Sorte Paesana, bei der WALTZ[5] nach sechsstündigem Aufenthalt im Dunkeln noch einen RQ von etwa 1,27 fand. Die Messungen wurden am Blatt Nr. 18 (vom untersten sichtbaren Blatt an gezählt) von Freilandpflanzen ausgeführt. Um eine Kohlendioxyd-Dunkelfixierung[7], die die Messung eventuell hätte stören können, abklingen zu lassen, wurden die Blätter nach dem Pflücken vorerst 6 h im Dunkeln gelassen. Nachher gingen wir nach der Methode von WALTZ[5] vor.

[1] E. EICHENBERGER, Ber. schweiz. bot. Ges. *62*, 123 (1952).
[2] A. FREY-WYSSLING und P. WALTZ, Exper. *11*, 178 (1955).
[3] A. I. SMIRNOW, *Biochemie des Tabaks* (Den Haag 1940).
[4] T. A. BENNET-CLARK, Sci. Proc. R. Dublin Soc. *20*, 293 (1932).
[5] P. WALTZ, Ber. schweiz. bot. Ges. *67*, 55 (1957).
[6] E. A. H. ROBERTS, Biochem. J. *35*, 1289 (1941).
[7] R. E. STUTZ und R. H. BURRIS, Plant Physiol. *26*, 226 (1951).

Wir erhielten so die folgenden Werte:

Atmosphäre	Verbrauchter O_2 in mm^3 pro 200 mg Tabakblatt-Frischgewicht und 15 min	Produziertes CO_2 in mm^3 pro 200 mg Tabakblatt-Frischgewicht und 15 min	RQ
Luft	43,2	52,6	1,22
Sauerstoff . .	51,2	51,2	1,00
		(Mittlerer Fehler der Resultate: 5%)	

Diese Messungen zeigen, dass der hohe RQ nur auftritt, weil der Sauerstoff nicht genügend in das Innere des Gewebes diffundieren kann, um einen Sauerstoff-Partialdruck aufrechtzuerhalten, der die aerobe Oxydation der Kohlehydrate erlaubt. Über die Muttersubstanz des Kohlendioxydes der ungenügend mit Sauerstoff versorgten Zellen steht die Diskussion noch offen.

Aus den oben erhaltenen Daten berechneten wir die Grenzschnittdicke d, die nötig ist, um die Gewebestückchen mit Sauerstoff zu versorgen, nach der Formel von WARBURG[8].

$$d = \sqrt{8 \cdot C_0 \frac{D}{A}}$$

Wobei: D = Diffusionskonstante. Wir verwendeten hier den einzigen uns bekannten Wert für pflanzliches Material, der von WANNER[9] an Keimlingswurzeln von *Allium cepa* gemessen wurde. A = Sauerstoffverbrauch des Gewebes pro Volumen- und Zeiteinheit. C_0 = Sauerstoffkonzentration an der Schnittgrenze.

Man findet so: Sauerstoffüllung der Gefässe: d = 0,35 mm, Luftfüllung der Gefässe: d = 0,16 mm.

Als kleinste Dimension unserer Gewebestückchen können wir die Blattdicke zu etwa ⅓ mm annehmen.

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Zürich, Spyristeig 35, 30. Oktober 1957.

Summary

It is demonstrated that the abnormally high respiratory quotient of the green tobacco leaf as described by various authors is due to an insufficient supply of oxygen to the tissues. In pure oxygen the quotient is 1·0.

[8] O. WARBURG, *Über den Stoffwechsel der Tumoren* (Berlin 1926).
[9] H. WANNER, Vjschr. naturf. Ges. Zürich *90*, 98 (1945).

4-Chlorotestosterone Acetate and Gonadotrophins

It has been shown that 4-chlorotestosterone acetate is a new steroid which presents high anabolic and low androgenic activity[1,2]; the new compound is devoid of progestative or estrogenic properties[1].

Owing to the possible relations, both chemical and biological, between 4-chlorotestosterone and sexual hormones, it seemed of interest to ascertain its effect on the gonadotrophic secretion.

For this purpose the parabiotic rat technique described by HERTZ and MEYER[3] has been followed. The castration of the male partner causes an increased secretion of gonadotrophins which pass across the 'parabiotic barrier' and stimulate the accessory sexual organs of the female partner.

Male and female rats avcraging 100 g of body weight of the Long Evans strain were joined in parabiosis. The male partner was castrated on the day of operation. The steroid was injected into the castrated male subcutaneously in dose of 30 γ daily for 11 days.

At sacrifice, the weight of the prostate and seminal vesicles in the male and the weight of the uterus and ovaries in the female were recorded.

The results, summarized in the Table show: (1) 4-chlorotestosterone acetate does not significantly increase the weight of the prostate and seminal vesicles of the castrated male rat, while testosterone propionate at the same dosage level causes a significant rise of these organs; (2) 4-chlorotestosterone acetate does not inhibit the sharp increase of the weight of the uterus and ovaries of the parabiotic female rat. On the contrary, testosterone propionate completely inhibits the weight increase of the uterus and ovaries of the female rat: these organs in fact present the same weight as the organs of normal female rats of the same weight and age.

In order to reject the possibility of a preferential transfer of one steroid across the 'parabiotic barrier', we joined two male castrated rats together with the same technique and injected one animal subcutaneously with 30 γ daily of testosterone propionate for 11 days. This treatment increases the weight of the prostate and seminal vesicles of the injected rat, while it does not modify the sexual organs of the partner parabiotic animal.

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Laboratori Ricerche Farmitalia, Milano, November 18, 1957.

Riassunto

Il 4-clorotestosterone acetato presenta alta azione anabolica e scarsa attività androgena, è privo di proprietà estrogene o progestative.

Ricorrendo al metodo della parabiosi nel ratto si dimostra che il nuovo steroide non inibisce la secrezione ipofisaria di gonadotropine.

[1] G. SALA and G. BALDRATTI, Proc. Soc. exp. Biol. et Med., N. Y. *95*, 22 (1957).
[2] G. SALA, G. BALDRATTI, and R. RONCHI, Folia endocrin. (in press).
[3] R. HERTZ and R. K. MEYER, Endocrinology *21*, 756 (1937).

Effect of 4-chlorotestosterone and testosterone on gonadotrophin effect of parabiotic rats (mean organ weight ± standard errors referred to 100 g body weight)

Treatment	No. of pairs	Male castrated rat		Female rat	
		Prostate mg	Seminal vesicles mg	Uterus mg	Ovaries mg
Controls	8	7·7 ± 1·06	12·3 ± 1·87	149·7 ± 20	76·6 ± 10·4
4-chlorotestosterone acetate	7	12·2 ± 1·8	16·7 ± 0·76	147·8 ± 7·26	110·3 ± 12·6
Testosterone propionate . .	6	47·6* ± 8·13	70* ± 9·2	69·6* ± 17·1	35·5* ± 4·22

* Difference from controls highly significant ($P < 0{\cdot}01$).