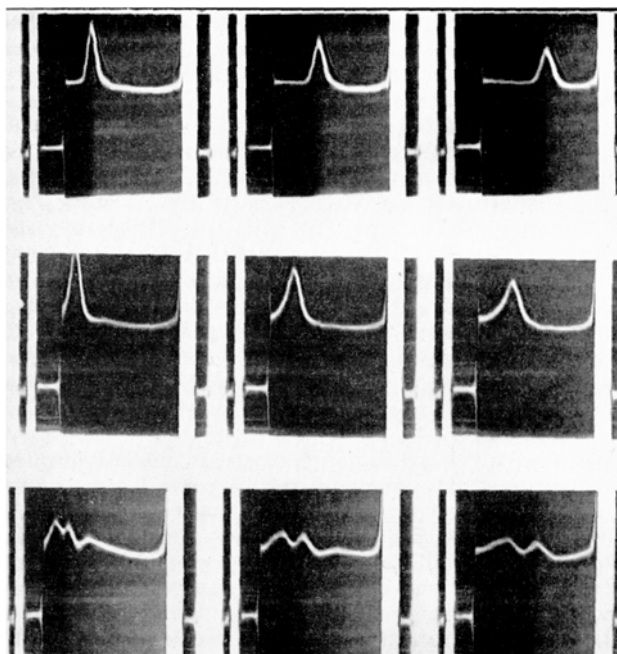




Ultracentrifuge diagrams of catalase and anticatalase before and after reaction.

The protein was dissolved in 0.1 M borate buffer pH 7.8. The amount of catalase or anticatalase used separately is identical to that used in the reacting system. The angles were 30° throughout, speed—44770 rpm. Pictures were taken at 16 min intervals. Upper series: Catalase. Middle series: Anticatalase. Lower series: Catalase-anticatalase mixture. In the picture on the left the most rapidly migrating peak represents the antigen-antibody complex and the intermediate peak the catalase.

Ouchterlony plate assay was performed. Only one precipitin line between the catalase and purified anticatalase could be observed.

The literature^{7,8} suggests that normal rabbit γ -globulin possesses a single polypeptide chain with N-terminal alanine. Anticatalase gives one N-terminal residue which is identified as DNP-alanine by cochromatography in

1.5 M phosphate buffer (pH 6.0). Finally, the amino acid composition of the anticatalase is remarkably similar to that of the rabbit antibodies in general⁹ (Table)¹⁰.

Average amino acid composition of rabbit anticatalase^a

Constituent	Constituent per 100 g protein g	Constituent	Constituent per 100 g protein g
Lysine	6.76	Glycine	5.58
Histidine	2.11	Alanine	5.39
Ammonia	1.25	Valine	9.16
Arginine	5.91	Methionine	1.30
Aspartic acid	10.07	Isoleucine	4.39
Threonine	11.78	Tyrosine	6.97
Serine	9.63	Phenylalanine	5.70
Glutamic acid	12.93	Leucine	8.50
Proline	8.91		

^a Each value represents an average from two determinations.

Zusammenfassung. Antikatalase isoliert aus dem Katalase-Antikatalase-Präzipitin nach Denaturierung, hat einen $S_{20,w}$ -Wert von 6,9, ein Molekulargewicht von 177 600 (Archibald-Verfahren), ein $E_{1\%}^{1\text{cm}}$ (280 m μ , pH 5,7) von 15,2 und Alanin als freie endständige NH_2 -Gruppe. Diese Merkmale, wie auch der Aminosäure-Gehalt der Antikatalase, sind mit den generellen Antikörpern des Kaninchens vergleichbar.

F. FRIEDBERG

Department of Biochemistry, College of Medicine, Howard University, Washington (D.C., U.S.A.), November 24, 1961.

⁷ R. R. PORTER, *Biochem. J.* **46**, 473 (1950).

⁸ M. L. McFADDEN and E. L. SMITH, *J. biol. Chem.* **214**, 185 (1955).

⁹ E. L. SMITH, M. L. McFADDEN, A. STOCKELL, and V. BUETTNER-JANUSCH, *J. biol. Chem.* **214**, 197 (1955).

¹⁰ This investigation was supported in part by a research grant, E-1953, from the National Institutes of Health, Public Health Service, and an equipment grant from the Charles F. Kettering Foundation.

Swelling of Uterus Mitochondria with Folliculin and Progesterone

Recent researches on morphology of chondrioma showed the existence of several substances capable of modifying the swelling of mitochondria, which occurs when they are suspended in isotonic sucrose, both by quickening and by inhibiting this process. As we have not found, in the abundant bibliography concerning the action of the sexual hormones on the uterus, any reference to the functional and morphological modifications of its mitochondria, we decided to investigate the effects of folliculin and progesterone, administered *in vivo*, on uterus mitochondria.

Method and Material. We prepared three groups of prepuberal female guinea-pigs, as follows: 1st group—12 control prepuberal female guinea pigs. 2nd group—12 prepuberal female guinea pigs injected intraperitoneally with 5 injections of 0.5 mg each of folliculin, every three days (Dimenformon, Organon). 3rd group—12 prepuberal fe-

male guinea-pigs injected intraperitoneally with 5 injections of 0.5 mg each of progesterone, every three days (Progestin, Organon).

Animals were killed by beheading, and then we isolated the uterus. While a part of the organ was fixed in 10% formalin solution for the histological study, 0.5 g of substance were homogenized in 0.25 M sucrose buffered with 0.02 M Tris-chloride, pH 7.4 at 4°C, by the method of SCHNEIDER¹. 1 ml of the final concentrated suspension was equivalent to 0.25 g of fresh uterus. Changes in extinction at 520 m μ read in Beckmann model DU spectrophotometer were taken as a measure of swelling, as described by CLELAND² and by CASU³.

Each test tube contained 3 ml of 0.25 M sucrose, buffered with 0.02 M tris-chloride, pH 7.4; then 0.3 ml of the mito-

¹ W. C. SCHNEIDER, *J. biol. Chem.* **165**, 585 (1946).

² K. W. CLELAND, *Nature* **170**, 497 (1952).

³ A. CASU, *Exper.* **16**, 189 (1960).

chondria suspension were quickly added and the test tube was shaken; the optical density was stated within 20–30 sec after mixing, and then, at given times, up to 35 min.

The whole experiments were made within 75 min from the beheading of the animal. The Figure shows the behaviour of the spontaneous swelling of uterus mitochondria as estimated by the optical method in the three groups.

Histological sections from 3 to 5 μ were prepared in the meantime and stained by the method of NOVELLI⁴ for mitochondria. By this method it was possible to individuate the cellular mitochondria both of endometrium and of myometrium, above all in the thinnest sections. In the controls, mitochondria appeared as granular or as rods scattered or collected near the upper pole of the glandular cells; at the perinuclear sarcoplasm they were always of a granular shape. In the animals treated by folliculin, mito-

chondria always appeared more visible and more numerous; in some glandular cells they clearly showed a rounded shape and myometrium mitochondria appeared more bulky and better visible also in the interior of the fibrocytes. In the animals treated by progesterone, both the cells of endometrium and the cells of myometrium have more bulky and more numerous mitochondria than the normal controls, some of which clearly show swelling.

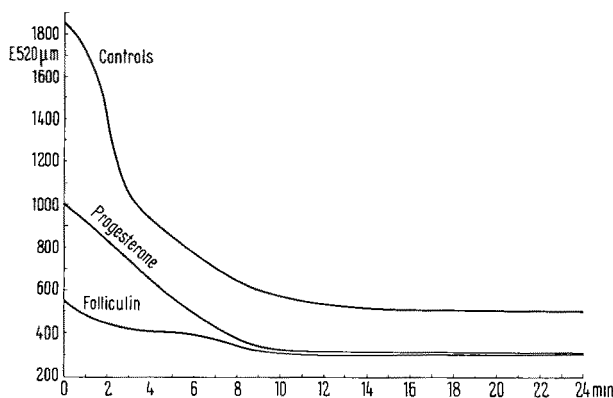
Conclusions. The results of this research permit the statement that, with the doses used, both folliculin and progesterone, administered *in vivo* to prepuberal female guinea pigs, act on uterus mitochondria by increasing their number in the cells and by causing them to swell. The swelling and the increase of number of the mitochondria induced by folliculin appears lightly higher than that induced by progesterone.

Riassunto. Gli autori hanno osservato che la follicolina ed il progesterone, somministrati a cavie femmine prepuberi, inducono un aumento dei mitocondri cellulari dell'utero e rigonfiamento degli stessi. Tali osservazioni sono state possibili studiando il comportamento del rigonfiamento spontaneo dei mitocondri sospesi in soluzione isotonica di saccarosio col metodo della densità ottica e controllando i risultati così ottenuti mediante allestimento di preparati istologici.

A. ZINNARI and V. VALLERINO

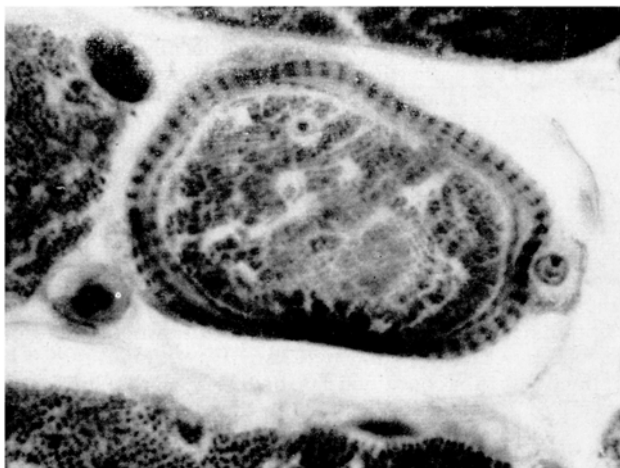
Istituto di Patologia Generale dell'Università di Genova (Italy), January 16, 1962.

⁴ A. NOVELLI, *Exper.* 15, 274 (1959).



Die Ringbinden als eine allgemeine unspezifische Reaktion der quergestreiften Muskulatur

Unter Ringbinden verstehen wir bisher wenig bekannte zusätzliche Strukturen an quergestreiften Muskelfasern, welche darin bestehen, dass die längsverlaufenden Myofibrillen der Faser zusätzlich durch eine besondere Schicht spiral- oder ringförmig verlaufender Fibrillen umgeben



Typische Ringbinde aus der epaxonalen Muskulatur von *Vipera berus* L. ♂, 63 cm Länge, Fixierung Susa, Eisenhamatoxylin nach HEIDENHAIN, Ob. 90, Ok. 6.

sind (Figur). Genauere Angaben über den Bau dieser Gebilde bringen die unten erwähnten Arbeiten. Die Entstehungsursachen und die Bedeutung dieser seltsamen Ringbinden sind noch unbekannt.

Untersuchungen an Muskeln des Kammolches *Triturus cristatus* Laur. – der übrigens ein besonders gutes Untersuchungsobjekt darstellt – ergaben, dass die Zahl der histologisch festgestellten Ringbinden immer dann höher war, wenn die Tiere vorher unfreundlichen Einflüssen ausgesetzt waren (z.B. teilweises Austrocknen des Wasserbehälters). Im Zusammenhang mit Ergebnissen anderer Autoren führten uns diese einfachen Beobachtungen wie auch weitere eigene Befunde zur Annahme, dass die Ringbinden eine unspezifische einheitliche Antwort des Muskelgewebes auf verschiedene Störungen hin sein könnten. Nach SELYE¹ könnte man sagen, dass die Ringbinden eine Antwort auf einen beliebigen «Stressor» sind.

DOMS², VOSS³, später WEISS und JAMES⁴ haben bei sehr verschiedenen Versuchen keine eindeutigen Ergebnisse gefunden, sondern nur ein Ansteigen der Ringbindenzahl feststellen können. Zahlenmäßige Zusammenstellungen der in menschlichen Augenmuskeln auftretenden Ringbinden, unter Berücksichtigung des Alters und des Gesundheitszustandes, zeigten⁵, dass diese Gebilde sowohl

¹ H. SELYE, *Stress zycia*, PZWŁ, Warschau (1960).

² H. DOMS, *Arch. mikrosk. Anat.* 87, 66 (1916).

³ H. VOSS, *Z. mikr.-anat. Forsch.* 28, 161 (1932).

⁴ P. WEISS und R. JAMES, *J. exp. Zool.* 129, 607 (1955).

⁵ A. JONECKO, *Folia morphol.* (Warschau) 9, 143 (1958).