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On the Golgi Elements in the Seminal Vesicles-Epitheliumcells under Normal and Experimental Conditions.

Struktury Golgiego w komórkach nabłonka pęcherzyków nasiennych w warunkach normalnych i doświadczalnych

Структуры Гольджи в эпителиальных клетках семенных пузырьков в нормальных и экспериментальных условиях

The participation of the Golgi elements in the secretory processes of the glandular cells was investigated by Bowen (1926), Siang Hsu (1935), Lever (1947), Chodnik (1948), Sluiter (1944, 1948), Grzycki (1949, 1951, 1953), and other scientists. Deane and Dempsey (1945), describing the behaviour of the acid and the alkaline phosphatase in the glandular cells of the seminal vesicles in different animals, came to the conclusion that these phosphatases mostly accumulated at the Golgi sphere located at the secretory pole of the cell. This may also point to the fact that the Golgi area constitutes a centre for the enzymatic processes.

Miętkiewski (1949, 1959), examining histologically the effect of androgens and estrogens on the seminal vesicles and prostate gland of the males, described changes in the cytoplasm and nucleus of the glandular cells which progressed in line with the increased doses of administered hormones.

The present experiments were undertaken to explore the effect of testosterone and syntofolline, administered subcutaneously in large repeated doses, on the location, shape and size of the Golgi elements in the epithelium cells of the seminal vesicles.

MATERIAL AND METHODS

The experiments were carried out on sexually mature albino rats (*Rattus rattus L. albino*) of average weight 180 g. The animals were divided into 3 groups, including one control group.

The animals in the first group were injected subcutaneously with 25 mg of crystalline testosterone acetate (Prod. by Jeleniogórskie Zakłady Farmaceutyczne) every two hours. Each animal in this group received 4 injections amounting to a total dose of 100 mg.

The animals in the second group received 10 mg of an oil solution of 4—4' dioxy α—β diethylostilbene (Prod. by Zjednoczone Zakłady Farmaceutyczne, Warsaw) administered in 4 injections of 2.5 mg at 2-hour intervals.

Two hours after the last injection the material collected was fixed after Srivastava's and Cajal's silver salts methods, dehydrated, and embedded in paraffin. Thin 4—6 μ paraffin sections were deparaffinized in xylene and were examined, unstained, under a C. Zeiss Lumipan microscope, by oil immersion apochromatic objective HI 100/1.25 and ocular K 17 × T.

OBSERVATIONS AND RESULTS

In the sections examined by Cajal's and Srivastava's methods the morphology of the Golgi elements, blackened with silver salts, could be demonstrated. In particular its location, shape and size could be shown, under normal and experimental conditions.

Under normal conditions the Golgi „collection" in the seminal vesicle glandular cells is located in the supranuclear protoplasm and resembles a typical Golgi network. In addition to smooth filaments and rods, there exist crenated rods most probably formed of granules (Fig. 1). Hirsch (1939) calls these granules presubstance, and consi-

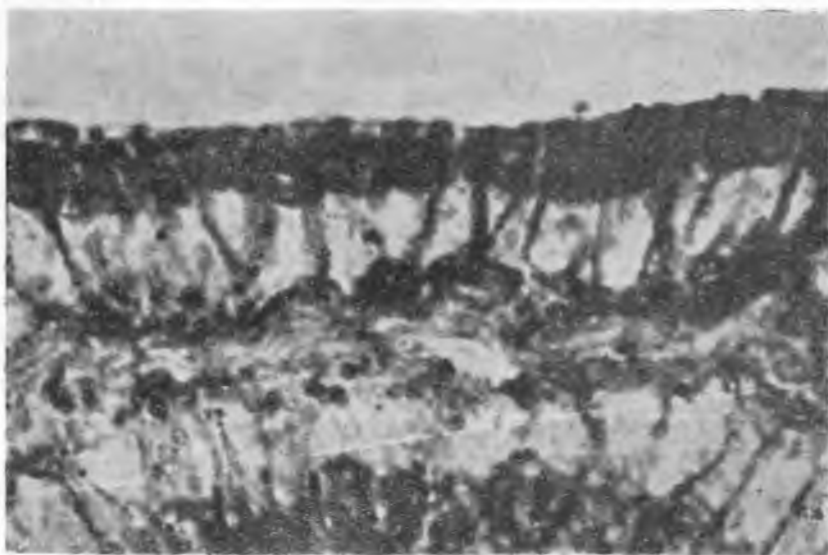

Fig. 1. Albino rat *(Rattus rattus L. albino)*. Seminal vesicles normal. A typical Golgi network blackened with Srivastava's silver salt method. C. Zeiss Lumipan microscope. Oil immersion objective Apochrom. HI 100/1.25. Ocular K 17 × T. Microphotcamera: Practina FX.

ders them to be the first developmental stage of the Golgi elements. Baker (1944), Thomas (1948) and Grzycki (1949, 1951, 1953) are also of the opinion that presubstance constitutes an initial phase in the dynamic changes in the Golgi area.

Following the administration of 100 mg of testosterone in four injections in an 8 hr. period, a distinct growth of the Golgi sphere in the direction of the secretory pole of the cells, could be seen. The growth of the Golgi sphere thus produced consisted not only in the loosening of the typical network, but also in the hypertrophy and fragmentation of the filaments and rods into granules of various sizes. In the big granules their differentiation into typical Golgi-Thomas spheroids (Fig. 2) could be obserwed.

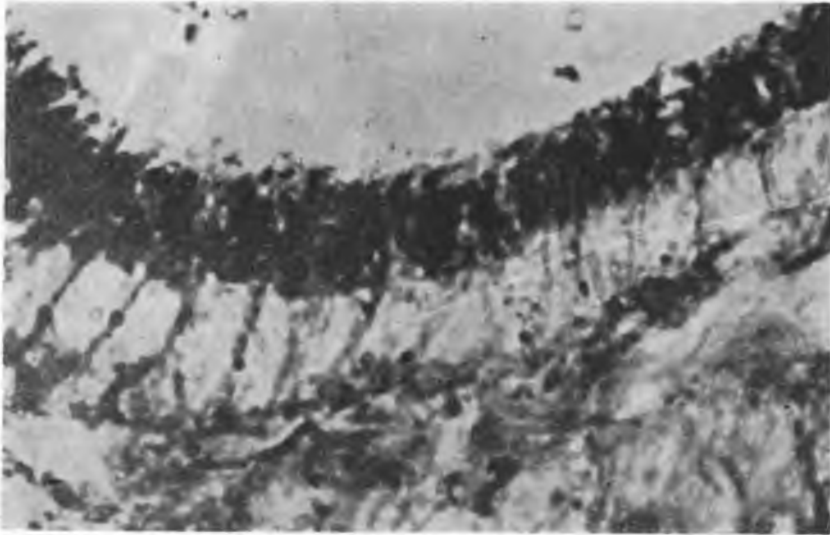

Fig. 2. Albino rat *(Rattus rattus L. albino)*. Seminal vesicles. Hypertrophised Golgi structure after administration of 100 mg *Testosteronum aceticum*. Golgi elements blackened with Srivastava's silver salt method. C. Zeiss Lumipan microscope. Oil immersion objective Apochrom. HI 100/1.25. Ocular K 17 × T. Microphotcamera: Practina FX.

The spheroid bodies were of two kinds. Some of them had a thick externum and a small clear internum, and in some others the externum was thin, and the internal vacuole big, bright and chromophobe. The second type of Golgi-Thomas bodies was more numerous, this fact may point to intensified and accelerated intracellular metabolic processes.

The existing differences with regard to the localization and morphology of the Golgi structure in the seminal vesicles glandular cells point to an intensified secretory activity produced by the administration of testosterone.

Fig. 3. Albino rat *(Rattus rattus L. albino)*. Seminal vesicles. Single Golgi rods after administration of 10 mg *Syntofollinum*. Golgi elements blackened with Srivastava's silver salt method. C. Zeiss Lumipan microscope. Oil immersion objective Apochrom. HI 100/1.25. Ocular K 17 × T. Microphotcamera: Practina FX.

On the other hand, the administration of 10 mg of 4—4' dioxy α—β diethylostilbene in 4 doses of 2,5 mg produced not only a decrease in the amount of the argyrophil Golgi substance, but also some morphological changes. Instead of the typical Golgi network, the Golgi elements appeared as short, hypertrophic rods, localized in the close vicinity of the nucleus, in some sections closely adhering to the nuclear membrane (Fig. 3). The pictures demonstrated the diminution and even the atrophy of the physiological Golgi sphere; this may be produced by the relaxation of the intracellular secretory processes, resulting from the administration of syntofolline.

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STRESZCZENIE

Autor podawał szczurom białym *(Rattus rattus* L. *albino)* duże ilości *Testosteronum aceticum* i *Syntofollinum*, następnie pobierał pęcherzyki nasienne celem zbadania zachowania się struktur Golgiego w komórkach nabłonka gruczołowego. Materiał doświadczalny utrwalał wg metod Srivastavy i Cajala.

Pod wpływem 100 mg testosteronu zaobserwował zmiany w umiejscowieniu elementów Golgiego oraz tworzenie się i wzrost zróżnicowanych systemów Golgi-Thomasa. Obrazy te mogły wskazywać na pobudzenie procesów wydzielniczych komórki.

Po podaniu syntofolliny w czterech wstrzyknięciach po 2,5 mg (razem 10 mg) autor stwierdził zmiany w strukturach Golgiego, które wyrażały się hipoplazją i hipertrofią elementów Golgiego, oraz zmniejszeniem, a nawet zanikiem strefy czynnościowej Golgiego, co mogło powstać w wyniku zahamowania procesu wydzielniczego komórki.

OBJAŚNIENIA RYCIN

Ryc. 1. Szczur biały, samiec *(Rattus rattus* L. *albino)*. Pęcherzyk nasienny normalny. Typowe siatkowate struktury Golgiego wyczernione wg metody Srivastavy. Mikroskop C. Zeiss Lumipan. Obiektyw immersyjny apochrom. HI 100/1,25. Okular K 17 × T. Mikrofot. Practina FX.

Ryc. 2. Szczur biały, samiec *(Rattus rattus* L. *albino)*. Pęcherzyk nasienny. Hipertrofia elementów Golgiego po podaniu 100 mg *Testosteronum aceticum*. Struktury Golgiego wyczernione wg metody Srivastavy. Mikroskop C. Zeiss Lumipan. Obiektyw immersyjny apochrom. HI 100/1,25. Okular K 17 × T. Mikrofot. Practina FX.

Ryc. 3. Szczur biały, samiec *(Rattus rattus* L. *albino)*. Pęcherzyk nasienny. Pojedyncze pałeczki Golgiego po podaniu 10 mg *Syntofollinum*. Elementy Golgiego wyczernione wg metody Srivastavy. Mikroskop C. Zeiss Lumipan. Obiektyw immersyjny apochrom. HI 100/1,25. Okular K 17 × T. Mikrofot. Practina FX.

РЕЗЮМЕ

Автором подавалось белым крысом (*Rattus rattus* L. *albino*) большое количество *Testosteronum aceticum* i *Syntofollinum* затем отпрепаро-

вывались семенные пузырьки для проанализирования состояния структур Гольджи в клетках железистого эпителия. Экспериментальный материал фиксировался по методам Сриваставы и Кахала.

Под влиянием 100 мг тестостерона автором наблюдались изменения в локализации элементов Гольджи а также образование и увеличение дифференцированных сфероидных телец Гольджи - Томаса. Эти результаты могут указывать на стимулирование секреторных процессов клетки.

После четырехкратной инъекции экспериментальным животным синтофоллина (2,5 мг каждая, в сумме 10 мг) автором были установлены изменения в элементах Гольджи, выражавшихся в гипоплазии и гипертрофии элементов Гольджи, а также в уменьшении или даже полном исчезновении функциональной зоны Гольджи, что, повидимому, могло произойти в результате заторможения выделительных процессов клетки.

ОБЪЯСНЕНИЯ К РИСУНКАМ

Рис. 1. Белая крыса (*Rattus rattus* L. *albino*), самец. Семенной пузырек нормальный. Типичные сетчатые структуры Гольджи, окрашенные в черный цвет по методу Сриваставы. Микроскоп Люмипан Цейс. Иммерсионный объектив апохромат HI 100/1.25. Окуляр К 17× Т. Микрофот. Practina FX.

Рис. 2. Белая крыса (*Rattus rattus* L. *albino*), самец. Семенной пузырек. Гипертрофия элементов Гольджи после подачи 100 мг *Testosteronum aceticum*. Элементы Гольджи окрашены в черный цвет по методу Сриваставы. Микроскоп Люмипан Цейс. Иммерсионный объектив апохромат HI 100/1.25. Окуляр К 17× Т. Микрофот. Practina FX.

Рис. 3. Белая крыса (*Rattus rattus* L. *albino*), самец. Семенной пузырек. Одиночные палочки Гольджи после инъекции 10 мг *Syntofollinum*. Элементы Гольджи окрашены в черный цвет по методу Сриваставы. Микроскоп Люмипан Цейс. Иммерсионный объектив апохромат HI 100/1.25. Окуляр К 17× Т. Микрофот. Practina FX.

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