plant severely affected with witches' broom. Thus, the primary and secondary symptoms of witches' broom intergrade. All that remains is the group of spindly basal sprouts only 5 to 30 cm. tall which, with proper care, remain alive for several months longer. If kept for eight or more months, the old stems successively die and are replaced by new sprouts and their branches which continue to arise from the tubers in or near the surface of the soil.

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P. A. YOUNG

MONTANA AGRICULTURAL EXPERIMENT STATION, BOZEMAN

STUDIES ON THE GOLGI APPARATUS OF THE MAMMARY GLAND

THE present study is a corroboration and extension of the work of Da Fano on the Golgi apparatus in different physiological conditions of the mammary glands. The primary objective of this work was to find if any evidence could be obtained as to the supposed transformation of the Golgi apparatus into a granular material that would be extruded from the cells together with the products of their activity.

It was found by using Da Fano's cobalt-silver-nitrate method that the epithelial cells of the mammary glands of rats during the later stages of pregnancy and full activity show a great hypertrophy of the apparatus together with a transformation into a reticular and granular-like structure. During lactation a part of the apparatus migrates from near the nucleus and spreads throughout the cytoplasm of the cell, concentrating at its sides in the direction of the lumen.

By use of Brouha's modified Flemming fixative it was found that the Golgi bodies could be demonstrated with ease in the lumen of the actively secreting gland —a condition unknown to Da Fano. The technique used to demonstrate the Golgi bodies in the lumen is as follows:

(1) Pieces of mammary glands of the white rat were fixed for two days in the modified Flemming fixative, which consists of:

Sol. A.	Saturated sol. of Corrosive sublimate	600 gr.
	Glacial acetic acid	40 gr.
Sol. B.	Osmic acid	1 gr.
	Chromic acid	1 gr.
	Distilled water	100 gr.

To four parts of solution A add one part of solution B.

(2) The tissue is then washed in water from one half to one hour.

(3) Dehydrate, clear in xylol and embed in paraffin.

(4) Section from 3 to 5 microns and fix sections on slides by the albumen method.

(5) Transfer sections through xylol and decreasing strengths of alcohols into distilled water.

(6) Sections are then placed in 0.2 per cent. solution of gold chloride plus 1 drop of acetic acid to every 10 cc. of solution.

(7) Wash slides in distilled water and place in 5 per cent. solution of sodium hyposulphite for two minutes and wash over again in distilled water.

(8) Dehydrate and clear in xylol.

(9) Mount in balsam.

Slides prepared by the above described technique shows the Golgi apparatus in the lumen in the form of small round bodies. These bodies are apparently located in the presumably cytoplasmic layer surrounding the fat droplet which is derived from the cytoplasm of the secreting epithelium. When the fat is dissolved the Golgi apparatus remains as granular-like bodies marking the outer limiting membrane of the droplet. Large numbers of these figures may appear in one lumen which, before the fat is dissolved, presents a deeply stained mass varying from approximately 2 to 15 microns in diameter. In some cells which were fixed just before extrusion of the fat droplet the Golgi bodies may be seen in the bulging limiting membrane of the cell describing a convex arc into the lumen of the gland.

It is also possible to demonstrate the Golgi apparatus in both the cell, and in the lumen of the actively secreting gland by use of Lundford's modified osmic acid method, although it is much more difficult to dissolve the fat from within the droplet after such long osmic acid impregnation. However, the Golgi bodies may be seen quite clearly in the peripheral layer surrounding the fat droplet before it is extruded from the cell and also in the lumen of the active secreting gland.

It would seem from this evidence that the Golgi bodies play a part in the phenomena of secretion. However, the exact part they play in this process is yet imperfectly known. That they are reformed within the cell after extrusion with the secretory products from a fragmentation of the remaining apparatus would seem the most plausible explanation from the evidence at hand. These observations would likewise suggest that the Golgi apparatus is a definite structure capable of a morphological existence without its cellular environment.

These studies are being continued.

H. W. BEAMS

ZOOLOGICAL LABORATORY, UNIVERSITY OF WISCONSIN