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D. B. Carlisle

Marine Biological Association,
Plymouth.

W. J. Pitman

Ohio State University, Columbus, Ohio,
and the
Laboratory of the Marine Biological Association,
Plymouth.

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Verification of the Gastropod Golgi Cycle with an Electron Microscope

The Golgi cycle of the gastropod (*Navanax*) was detailed[1], based on osmicated preparations and studies of living embryos vitally stained with methylene blue. However, because of the scepticism that has surrounded vital-dye observations, particularly since the neutral red controversy of the early 'thirties, these studies with methylene blue have never enjoyed complete acceptance by cytologists and have been severely criticized in some quarters.

It is particularly important, therefore, to report that our recent investigations of gastropod (*Crepidula*)

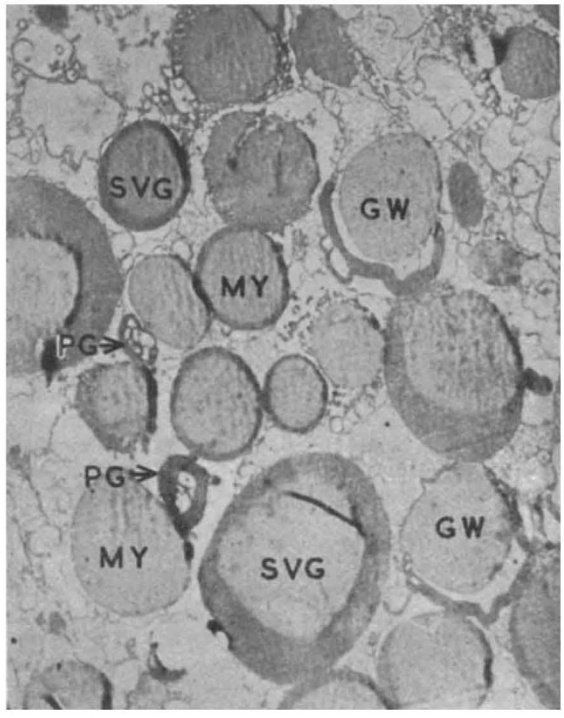

Fig. 1. Electron micrograph (× 3,400) of yolk-laden cell of *Crepidula veliger* showing three stages in the elaboration of protein yolk. Simple vesicular Golgi bodies (*SVG*), consisting of chromophilic cortices and chromophobic centres, eventually release the latter (*GW*) as mature secondary yolk spheres (*MY*). Following this withdrawal of the chromophilic envelope (*GW*), the Golgi material lies temporarily at the side of the yolk sphere as a hollow, pycnotic Golgi remnant

development, by means of the ultra-thin sectioning technique, confirm substantially the earlier findings with methylene blue. Taken together, these two independent approaches to the Golgi body problem offer what we consider to be strong evidence that :

(1) The Golgi 'apparatus' in the gastropod veliger exhibits a cycle in which certain stages can be identified consistently by both methods; these stages are Golgi granules (droplets), simple vesicular Golgi bodies (Fig. 1, *SVG*); compound vesicular Golgi bodies, pycnotic Golgi bodies (*PG*), as well as disintegrating plates of primary yolk and newly formed mature secondary yolk spheres (*MY*).

(2) The Golgi system engages in the elaboration of protein yolk which makes its initial appearance as the chromophobic component of the Golgi body, increases greatly in size during the embryonic stages, and is eventually released as a mature yolk plate by virtue of the withdrawal from its surface of the chromophilic Golgi envelope (Fig. 1, *GW*).

(3) The Golgi complement of these cells is a series of spheres, presumably chiefly phospholipoidal in chemical composition[2], but such phospholipid spheres, through their ability to release their cores as formed cell products, play a dynamic part in the economy of the cell.

(4) Under appropriate control the microscopically visible chromophilic components of the Golgi elements in these living cells are selectively stained by methylene blue and are thus revealed in essentially unaltered form comparable with identical stages observed by means of the electron microscope.

These observations, which will be reported in detail elsewhere, indicate that in these, and perhaps in many animal cells, the function of the Golgi 'apparatus' is the continual building up of formed energy reserves from the raw nutritive materials present in the cytoplasm.

Leonard G. Worley
Betty Hershenov

Biological Laboratories,
Brooklyn College,
New York.

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A 'Natriferic' Principle other than Arginine–Vasotocin in the Frog Neurohypophysis

It has been shown that neurohypophyseal extracts from amphibians and teleosts stimulate the active sodium transport across frog skin more markedly than do extracts from mammalian pituitaries, and this led to the hypothesis that they contain a new hormone, differing from either oxytocin or vasopressin[1,2]. Its chemical constitution being unknown, this principle has been provisionally called 'natriferin'. Its possible identity with Heller's 'water-balance principle'[3] was of interest.

A synthetic peptide, arginine–vasotocin, prepared by Katsoyannis and du Vigneaud[4], has been shown to possess the pharmacological properties ascribed to the 'water-balance principle'[5,6], and to exhibit a high natriferic activity[7,8]. Moreover, a hormone having the same amino-acid composition and the same pharmacological properties as arginine–vasotocin has been extracted from the neurohypophysis of the chicken[9], the frog[10], and a teleostean[11].