## BIOLOGY

### Functional Changes in the Vacuole-containing Bodies of the Gastric Parietal Cell

THE cytoplasmic inclusion known as the vacuole-containing body[1] was first found by Palade[2] in a study of the fine structure of the neurone and afterwards in tracheal, intestinal and renal tubular epithelia.

It consists of a cytoplasmic vacuole—0·2–1μ in diameter—bounded by a single membrane 60 A. thick, containing small circular vacuoles, 500 A. in diameter. No morphological changes have been hitherto described in vacuole-containing bodies and their function and nature are obscure.

Similar vacuole-containing bodies are found in the gastric parietal cells of the fasting mouse[3], where one or two are found in each section. They are smaller than the mitochondria, and consist of a vacuole—0·2–0·4μ in diameter—bounded by a single membrane, which contains a few small 500-A. vacuoles (Fig. 1*a*).

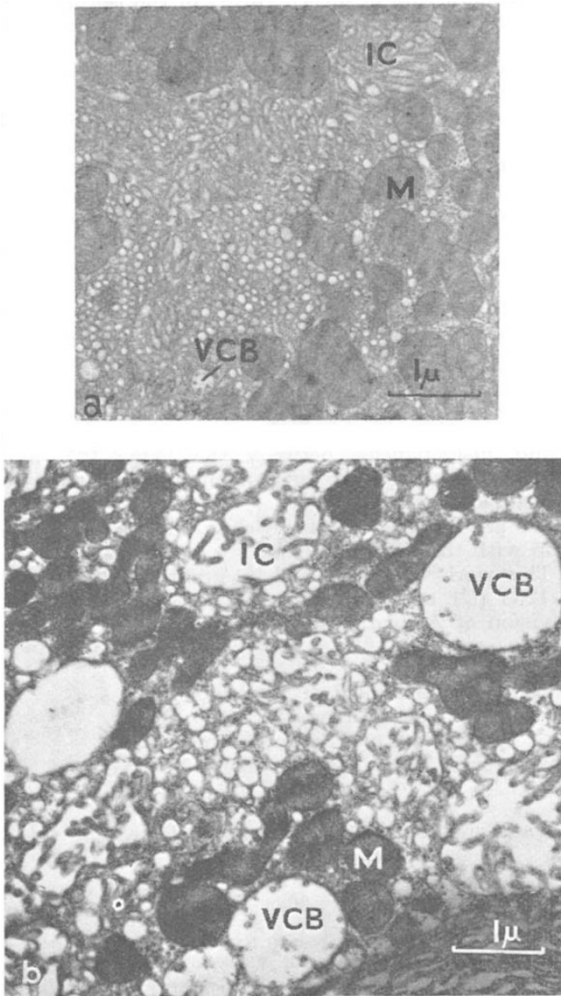


Fig. 1. Above: micrograph of parietal cell in fasting animal. A single small vacuole-containing body (*VCB*) is present. *IC*, intracellular canaliculus; *M*, mitochondria. (× 12,000). Below: micrograph of an actively secreting parietal cell. Several large vacuole-containing bodies (*VCB*) are visible. *IC*, intracellular canaliculus; *M*, mitochondria. (× 12,000)

Following repeated injections of pilocarpine nitrate, certain changes occur within the parietal cell. The vacuole-containing bodies become more numerous—about 5–7 occur in each section—and are much larger, namely, 0·5–3μ diameter. The small contained vacuoles are unchanged in size, although their total number has increased (Fig. 1*b*).

Thus in the gastric parietal cell the vacuole-containing bodies undergo marked morphological changes according to the secretory state of the cell. Phase-contrast microscopy of 2-μ sections confirms that these vacuoles are visible in the active parietal cell, and thus it should be possible, with routine histochemical methods, to elucidate the nature of this structure.

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[2] Palay, S. L., and Palade, G. E., *J. Biophys. Biochem. Cytol.*, **1**, 69 (1955).
[3] Hally, A. D., *Proc. Anat. Soc.* (in the press).

### Induction of Lung Tumours by Radioactive Particles

INHALATION provides one of the most accessible routes for the entry of radioactive materials into the body. To evaluate the health hazards of airborne radioactive particles, it is important to know the biological effects of their deposition in the respiratory tract. When relatively insoluble particles are involved, pulmonary tissues may receive a large radiation dose because of a low rate of clearance from the lungs. The occurrence of squamous cell carcinomas as a result of the intratracheal injection of $^{239}PuO_2$ was initially reported from this laboratory[1]. Recently, malignant tumours were described in rat lungs after intratracheal administration of $Ba^{35}SO_4$ and $^{144}CeF_3$ (ref. 2), polonium-210 (ref. 3), and after implantation of strontium-90 glass beads and cylinders plated[4] with ruthenium-106. This communication concerns the occurrence of malignant lung tumours in mice after intratracheal administration of $^{106}RuO_2$ as well as $^{239}PuO_2$.

Suspensions of $^{239}PuO_2$ and of $^{106}RuO_2$ particles suspended in either 0·1 per cent 'Tween-80' (Atlas Powder Co.) or 0·1 per cent 'Pluronics' (Wyandotte Chemical Corporation) were administered intratracheally to two-month-old female $BAF_1$ mice. Barium sulphate particles were also given to a group of mice as an example of a known innocuous particle[5,6]. Stable ruthenium dioxide was administered to an additional group of control animals. The relative insolubility of $^{106}RuO_2$ and $^{239}PuO_2$ was shown in other experiments[7,8]. Approximately 20 per cent of the original dose was present in lungs after 100 days and 5 per cent after 400 days. The mice were killed either 100 or 500 days after treatment and examined grossly and histologically for pathological changes.

Grossly, two types of lesions were distinguished: pulmonary papillary cystadenomas and pneumonitis. The tumours were pearly white and frequently located near the pleura. These tumours were easily identified unless obscured by pneumonitis. The pneumonitis was bacteriologically sterile, and the affected lungs were pale with focal necrosis.