

## INTRANUCLEAR CISTERNAE RESEMBLING STRUCTURES OF THE GOLGI COMPLEX

EMILIO BUCCIARELLI. From the Viral Biology Branch, National Cancer Institute, Bethesda, Maryland. The author's present address is Istituto di Anatomia e Istologia Patologica, Divisione di Ricerche sul Cancro, Policlinico (Monteluce), Perugia, Italy

The presence of cytoplasmic structures, apparently inside the nuclei of neoplastic cells, has been observed repeatedly in the electron microscope (1). These structures, designated "nuclear pseudo-inclusions" (1), are the result of cross-sections of cytoplasmic invaginations of the nuclear membrane. Their extranuclear origin is evident, since these structures are surrounded by a well defined, double, nuclear membrane. A situation different from these "nuclear pseudo-inclusions" is reported here.

During a fine-structural study of intracranial chicken sarcomas, induced by intracerebral inoculation of Rous sarcoma virus, structures having the morphology of a Golgi zone (2) were observed in the nucleus of a neoplastic cell (Fig. 1). These structures consisted of small vesicles (*V*<sub>2</sub>) and stacks of smooth-surfaced, flattened cisternae (*C*). Some cisternae were distended (*V*). Several vesicles contained an electron-opaque material similar in appearance to early secretory granules (2). Such structures resembling those of the Golgi complex occurred in three regions of the section of the nucleus. None was surrounded by the nuclear membrane. The nuclear envelope was well defined, consisting of an outer and inner membrane. The inner membrane was invaginated at one point, forming a flattened sac which protruded into the nucleus (Fig. 1, arrow). In the course of this particular investigation, numerous cells were studied but no other examples of similar structures like Golgi elements were observed.

The absence of a nuclear envelope surrounding the membranes appearing like Golgi structures indicates they are not "nuclear pseudo-inclusions." Several possibilities can be suggested to explain their location within the nucleus. It is possible that the Golgi zone, usually located in the perinuclear area, has been included within the nucleus during an abnormal mitosis. Such an explanation has been offered by others (3) for the presence of intranuclear mitochondria. In the present case, the invagination of the internal nuclear membrane suggests two additional explanations: (*a*) the observed structures are the result of cross-sections of numerous invaginations, still attached to the inner nuclear membrane; or (*b*) the structures represent detached sacs formed by invaginations of the inner nuclear membrane which have associated in the nucleoplasm. The latter two possibilities suggest an alteration of the nuclear membrane perhaps associated with the neoplastic process.

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### REFERENCES

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FIGURE 1 Portion of a cell in an intracranial Rous sarcoma. The nucleus contains three aggregates of flattened cisternae (*C*), some being distended (*V*), and vesicles (*Ve*). The inner nuclear membrane is invaginated into the nucleoplasm (arrow). Note the absence of a nuclear membrane around the intranuclear structures. Glutaraldehyde-osmium tetroxide fixation. Epon-Araldite. Double-stained with uranyl acetate and lead citrate. Approximately  $\times 9,000$ .