

Preliminary and Short Report

A HISTOLOGIC AND ELECTRON MICROSCOPIC STUDY OF A PIGMENTING BASAL CELL EPITHELIOMA*

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Since basal cell epitheliomas were first described by Krompecher (1), comparatively little has been said about the pigmented variety, although, according to Becker, Sr. (2), one-third of all basal cell epitheliomas contain melanin.

Bloch (3) in 1927 described pigmented cells of dendritic structure within certain forms of basal cell epitheliomas. Eller and Anderson (4) also stated that there are dendritic pigmented cells scattered among the epithelial cells of basal cell tumors. Lever (5) explained the presence of melanin in basal cell epitheliomas by the fact that melanocytes are present not only in the surface epidermis but also in the primary epithelial germ, which in his opinion gives rise to the tumor. Allen's text (6) expressed views in apparent disagreement with Lever's, mentioning that part of the melanin is in chromatophores and the remainder is formed by neoplastic basal cells.

The purpose of this study was to reexamine the question of the origin of melanin in pigmented basal cell epitheliomas. To this end a representative example of these tumors was studied by means of an RCA EMU-2A electron microscope and by histologic techniques, and the results correlated.

METHODS AND MATERIALS

An excised pigmented basal cell epithelioma was bisected and one half was immediately placed in 1% buffered osmium tetroxide, embedded in Vestopal W in a manner previously described (7) and sectioned in the routine manner. The other half of the tumor was fixed in 10% formalin, embedded in paraffin and histologic sections were stained with hematoxylin and eosin and with silver nitrate.

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RESULTS

Histologic studies of the tumor showed well-formed dendritic cells interspersed between epidermal tumor cells (Fig. 1). The dendritic cells of the tumor masses appear to be larger and contain a greater number of pigment granules than normal epidermal melanocytes. In one section, a tumor mass was observed budding off the epidermis. In this newly formed tumor mass, which still retained its connection to the epidermis, the melanocytes, while larger and more numerous, were found preponderantly in the peripheral part of the tumor mass (Fig. 1). In deeper tumor masses this orientation of dendritic cells in the peripheral layer of the tumor was not present, but the cells were scattered throughout the tumor lobules (Fig. 2).

The appearance of normal melanocytes as seen with the electron microscope was recently described in detail by two of us (8). In summary, the melanocyte of normal human epidermis has no attachments to neighboring cells, possesses dendritic processes, and has a well-developed system of smooth-walled vesicles throughout its cytoplasm (Fig. 3). Mitochondria are abundant and the Golgi apparatus is well-developed. Surprisingly, melanin granules are few in number in epidermal melanocytes.

In the pigmented basal cell epithelioma studied, numerous pigment-forming melanocytes were present. These melanocytes, in contrast to those of normal epidermis, were filled with pigment granules (Fig. 4). The fully formed pigment granules were irregular in structure and larger than those of epidermal melanocytes. A greater than normal number of smooth-walled vesicles were present and pre-melanin granules were also more prominent. Pigment was also abundant in chromatophores in the stroma surrounding the tumor.

DISCUSSION

The results of this study confirm the view that the pigment within the pigmented basal cell tumor is formed by melanocytes rather than by neoplastic basal cells. Melanocytes are interspersed among the epidermal tumor cells and apparently are producing pigment more actively than are melanocytes of normal epidermis. Normal

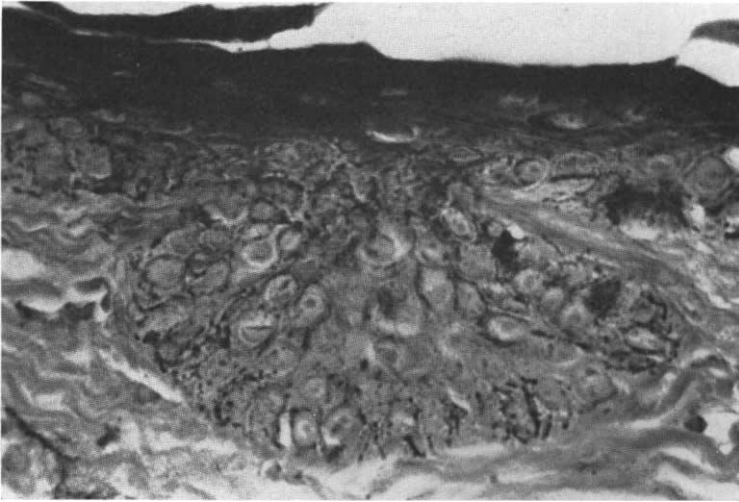


FIG. 1. The tumor is budding off the epidermis and the melanocytes are located predominately in the peripheral cell layer. $\times 450$ (silver nitrate).

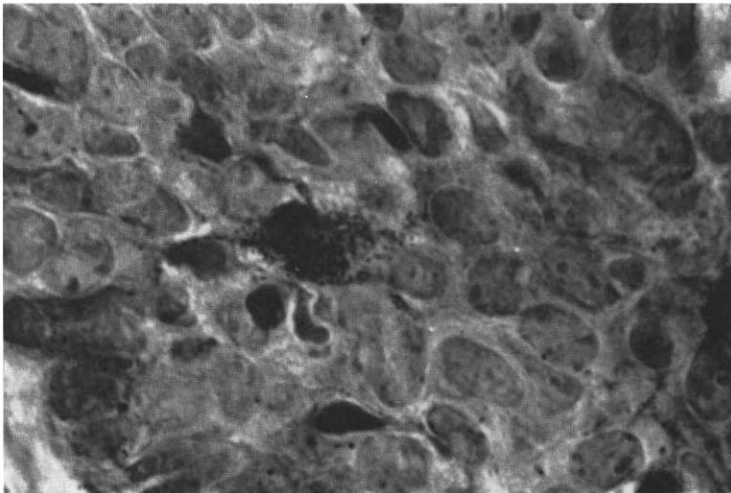


FIG. 2. A higher magnification of a melanocyte located near the center of a tumor mass and containing numerous melanin granules. $\times 1200$ (silver nitrate).

epidermal melanocytes contain very little melanin or pre-melanin granules; while melanocytes found in the tumor contain these structures in abundance. It is possible that the melanocytes in the tumor originate in the epidermis and are somehow stimulated to greater metabolic activity, including pigment production. This view is supported by Montagna's findings (9) in mouse skin, which suggested that stimulation of the epidermis with

carcinogens stimulates the melanocytes as well as the epidermal cells.

Caudiere (10 and 11) commented that these tumors should be called pigmented rather than pigmented basal cell epitheliomas, and this designation has since been the favored one. In view of the finding of greater than normal pigment-producing activity of melanocytes in these tumors, it would appear that, contrary to

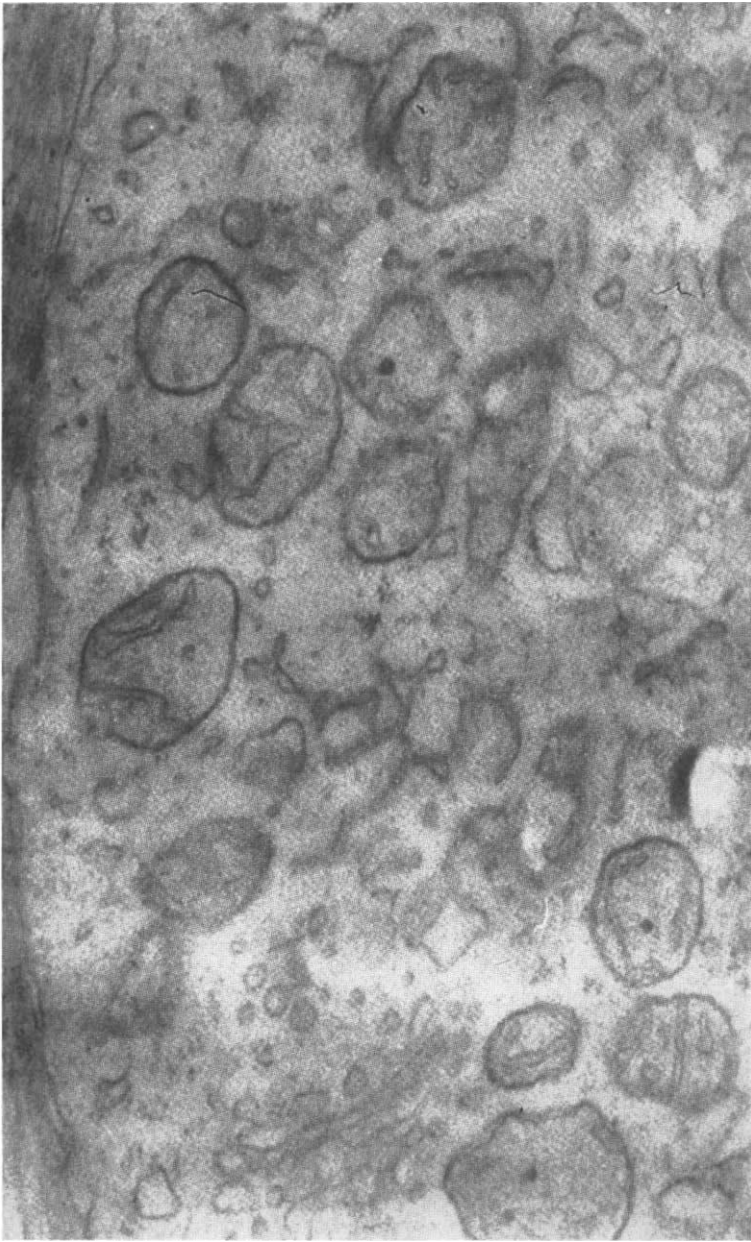


FIG. 3. A melanocyte located within normal epidermis. The cytoplasm contains numerous mitochondria, a well-developed system of smooth-walled vesicles and a Golgi apparatus. Melanin granules are absent. $\times 52,000$.

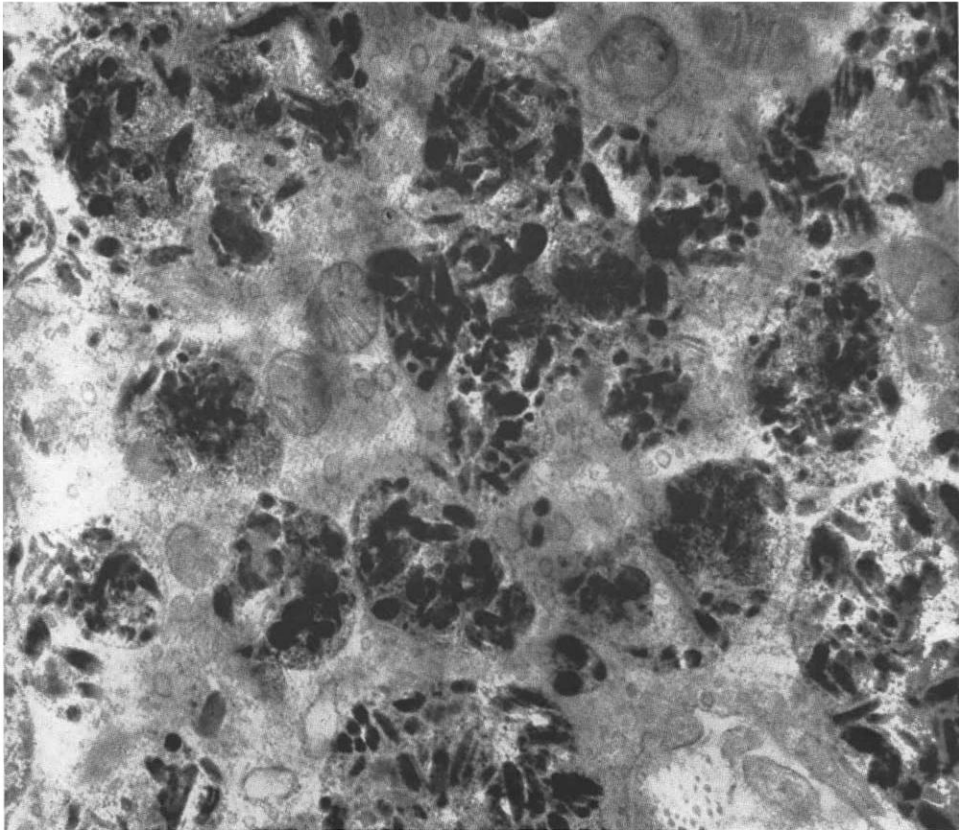


FIG. 4. A melanocyte located within the tumor. Melanin granules are large and numerous. $\times 30,160$.

Caudiere's view, the term pigmentation is more appropriate than pigmented.

SUMMARY

A pigmentation basal cell epithelioma was examined by routine histologic methods and with the electron microscope. The melanocytes in the tumor were larger and contained more melanin granules than those of normal epidermis. Because of the greater melanin production of melanocytes in these tumors the designation pigmentation is preferred to pigmented basal cell epithelioma.

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