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Study of Normal and Malignant Tissues by Microincineration.*

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Policard and Doubrow,¹ using the technique of microincineration, made a comparative study of corresponding normal and malignant tissues and found significant differences in their ashed remains. Recently it has been possible to improve the technique so that one can examine incinerated preparations with oil immersion objectives and study individual cells with great facility (Scott^{2, 3}). Using these improvements, Horning and Scott⁴ studied the distribution of the inorganic salts in the developing chick embryo and found some points of interest in connection with the Cohnheim "Embryonal Theory" of tumor proliferation. Our belief that the method of microincineration is capable of yielding information of a new kind relative to malignancy has led us to study some human medullary duct carcinomata of the breasts as well as several of the scirrhous types,‡ together with the transplantable mice tumors, M. 63, S. 37 and 180.

The preliminary observations of the microincinerated tumors confirmed the previous statement of Policard and Doubrow that cancerous tissue remains carbonized longer than does normal tissue. Another constant feature of the human and rodent neoplasms is the relatively greater content of ash of the tumor when it is compared with similar normal tissue. Observations with oil immersion objectives show that the nuclei contain more ash than do nuclei of normal duct tissue. This deposit is margined and evidently represents the ash remains of an hyperchromatic condition similar to that described by Horning and Richardson⁵ in malignant growths. It is interest-

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¹ Policard, A., and Doubrow, S., *Ann. d'Anat. Path. med.-ch.*, 1924, **1**, 163.

² Scott, G. H., *Comp. Rend. Acad. Sci.*, 1930, **190**, 1073.

³ Scott, G. H., *Proc. Soc. Exp. Biol. and Med.*, 1932, **29**, 349.

⁴ Horning, E. S., and Scott, G. H., *Anat. Rec.*, 1932, in press.

‡ We desire to express our thanks to Dr. Robert Elman, who supplied us with this material. Thanks are also due to Dr. Leo Loeb and Dr. F. Carter Wood for providing these rodent transplanted tumors.

⁵ Horning, E. S., and Richardson, K. C., *Med. J. Australia*, 1930, Feb. 22, 3.

ing to note that these nuclear salts contain visibly more iron oxide than do those of normal cells. The cytoplasmic ash deposit is more abundant than in the normal.

Three factors are suggested which cause the increased appearance of ash in the cancerous ingrowths when viewed with the low power of the microscope. There are more nuclei per unit area present than in the adjacent fibrous stromal tissue and the nuclei themselves contain more inorganic residue than do those of normal cells. In addition, the cytoplasm of the neoplastic cells contains more mineral salts than is common for this type of tissue.

A survey of the inorganic structure of neoplastic and normal tissues demonstrates that the individual cells composing the malignant growths are richer in mineral constituents than normal tissues—especially in calcium and iron oxide. An additional interesting feature is the similarity between developing embryonic cells and cancer cells with respect to the distribution and arrangement of certain mineral salts. Both types are characterized by an extraordinary variation in intensity, concentration and orientation of their inorganic constituents and contrast greatly with the appearance of the mineral elements in healthy adult tissue which remain proportionally fixed.

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Experimental Fixation of the Mediastinum.

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One of the difficulties in carrying out surgical compressive therapy for various lung diseases is that in some individuals the mediastinal contents are so little stabilized that such procedures as artificial pneumothorax and theracoplasty merely result in crowding the affected lung over into the opposite side of the chest instead of producing the desired compression of pulmonary cavities. The theoretical considerations, together with the demonstration of the importance of having a fixed mediastinum in such conditions, upon which is based the modern treatment of acute empyema have been described by Graham.

The method producing fixation must be innocuous, *i. e.*, should not produce "Pick's syndrome" of adhesive mediastino-pericarditis,