A Transplantable Induced Melanotic Tumor of the Syrian Golden Hamster*

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The present paper records the availability of a new transplantable melanotic tumor in the Syrian golden hamster. A previous report (1) described the induction of multiple pigmented tumors in the Syrian golden hamster following the application to the skin of a single dose of the carcinogen 9,10-dimethyl-1,2-benzanthracene. These tumors were sharply demarcated and located in the dermis and subcutaneous tissues. Histologically, they were predominantly composed of spindle-shaped cells containing large amounts of melanin in the cytoplasm. No metastases were seen even when tumors reached a size of more than 4 cm. in diameter. In the initial study, a footnote recorded the successful transplantation of one of these tumors. This report records further transplantation studies and the characteristics of the transplanted tumors.

MATERIALS AND METHODS

The animals in this study were Syrian golden hamsters (Abrams Small Stock Breeders, Chicago, Ill.). They were housed in plastic cages, fed Rockland mouse diet, and given water ad libitum. The techniques used for transplantation were either insertion of tumor fragments 2-3 mm. in diameter into the subcutaneous tissues through a small incision, subcutaneous injection of a tumor suspension prepared in a glass homogenizer, or intracerebral injection of this same saline suspension.

In the initial studies, only those induced tumors transplanted as fragments took successfully. All efforts to transplant these tumors, when a saline suspension was used either subcutaneously or intracerebrally, both with and without added treatment with cortisone, were not successful.

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RESULTS

At the present time, two lines of transplants are being maintained, both of them having originated from induced melanotic tumors measuring approximately 2 cm. in diameter and having been transplanted as fragments to the subcutaneous tissues without any additional treatment. In the first series, the original transplant reached a size of 3 cm. in diameter after a period of 7 months (Fig. 1) and was then retransplanted to five male and five female hamsters again as fragments of tumor. In five of the females and four of the males the transplants grew successfully, reaching a size of 8-10 mm. in a period of 3 months. In the second series the original tumor reached a size of 2 cm. in diameter after 4 months and at this time was retransplanted into ten hamsters, with a suspension of tumor in five instances and fragments in the other five. The fragments grew successfully in four of the five transplants, while no takes were obtained by using the suspension. In two of these second-generation transplants the tumors grew more rapidly, reaching 2 cm. in diameter in 3 months. One of these tumors was transplanted to ten hamsters, and this third-generation transplant has proved successful in all the animals, some tumors having reached a size of 1.5 cm. in 10 weeks.

All the tumors obtained in the different series of experiments are as heavily pigmented as the original induced tumor. Thus far, no metastases have been found. Histological study of fragments of tumors was done at the time of each transplantation. Sections revealed the transplanted tumors to be composed of cells similar to those of the original induced tumors. The cytoplasm contained abundant amounts of melanin. The pigment was also present in large macrophages and free in the interstitial tissue. Sections partially bleached by treatment with potassium permanganate showed (Fig. 2) that the transplanted tumors were more cellular.
than the induced tumor. There were fewer spindle-shaped cells, and the regular arrangement in the form of interlacing bundles of parallel cells was lacking. Moreover, there were greater variations in size and shape of the cells and of their nuclei and more mitotic figures. No atypical mitoses were demonstrated. Silver impregnation showed an abundant formation of fibrillar reticulum (Fig. 3), similar to that seen in the induced melanotic tumors.

SUMMARY

Melanotic tumors induced in Syrian golden hamsters by means of 9,10-dimethyl-1,2-benzanthracene applied directly to the skin were successfully transplanted to homologous animals. The transplants resembled the originally induced lesions but showed a more pronounced and more irregular cellular proliferation. After transplantation, the tumor cells retained their ability to produce large amounts of both melanin and fibrillar reticulum.

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