SARCOMA FORMATION IN AN AUTOLOGOUS GRAFT OF MAMMARY TISSUE

ALBERT FISCHER

(From The Biological Institute of the Carlsberg Foundation, Copenhagen)

The occurrence of mammary carcinoma in mice and of an epidermoid cyst, following repeated autologous transplantation of mammary tissue has been reported in earlier papers (1). The present report concerns a round-cell sarcoma which appeared following the same procedure. It is uncertain whether this tumor arose from the stroma or interstitial cells of the transplanted mammary tissue or whether, indeed, it may not be a coincidence having nothing to do with the graft.

Exp. No. 1666–3: On Oct. 26, 1936, the right inguinal mammary gland of a mouse was removed, sutured to a piece of tail as in the earlier experiments, and grafted intramuscularly on the back of the neck. On Nov. 21 the graft had increased in size; it was removed, was found to contain a rather large parenchymatous tumor, and was re-implanted subcutaneously in the left flank. On Dec. 12 the animal died. At autopsy a large tumor was found at the site of transplantation in the flank, in part solidly adherent to the overlying skin, and in part to the underlying muscles. The liver and the lungs contained small, gray tumor-like lesions. The spleen was much enlarged.

Microscopic examination of the primary tumor showed a tissue consisting of apparently round cells (Figs. 2 and 3), with a rather large, slightly irregular nucleus and scanty protoplasm. The appearance was that of a round-cell sarcoma of the type which may be
designated as lymphosarcoma or a leukemic tumor (2). In the tumor and between it and the skin were cystic dilatations lined with epithelium (Fig. 4), which may have been remnants of ducts from the mammary tissue. There were invasion and destruction of the muscles (Fig. 5) and in the tumor a vessel obliterated by tumor cells was found (Fig. 1). The blood appeared to be normal. In the middle of the primary tumor the piece of tail was seen embedded with the silk sutures. The liver, kidney and lung showed perivascular infiltration with tumor cells (Figs. 6–8). The spleen was found to contain few tumor cells, in spite of the fact that it was much enlarged; its normal structure had disappeared (Fig. 9).

Tumors of this kind have frequently been described (3) and in certain strains of mice they are not uncommon (4). Silver impregnation according
to the method of Foot reveals a fine intercellular reticulum in some parts of the primary tumor. In general, however, this is absent.

The question arises whether the tumor here recorded developed as a result of the graft or independently. The findings would indicate that the tumor developed primarily in the original graft and continued to grow after re-grafting in the flank. It was probably propagated through the vessels, as a vessel filled with tumor cells was found in the tumor in the second graft. Whether this was an embolus of tumor cells from another part of the body.
Fig. 6 shows the metastatic growth in the liver, Fig. 7 in the kidney and Fig. 8 in the lung. Fig. 9 shows the structure of the spleen.

or a primary source of cell distribution cannot be determined. There is evidence, however, that the animal was already ill at the time of the transplantation, and that tumors formed in the grafts simply because these offered a locus minoris resistentiae. The enlargement of the spleen also favors this explanation. Another possibility is that a lymph node was removed together
with the mammary tissue and implanted with it, but here again the question arises whether such a node was already involved in the general diseased condition of the animal or whether natural selection among the lymphatic cells contained in the node resulted in a tumor. From a study of the tissues alone, we are not able at the present time to answer this difficult question.

References
2. Kaalund-Jörgensen, O.: Experimental Studies on a Transmissible Myelomatosis (Reticulosis) in Mice, Copenhagen, Levin & Munksgaard, 1936.