

Mailed 19 Mar 62
To Surg Forum.

TUMOR GROWTH IN ORGAN CULTURE

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As a by-product of the investigation of hemoglobin-plasma solutions for prolonged extracorporeal perfusion, a system for perfusion of isolated small organs was developed using a tiny 50 ml. disc oxygenator and a roller pump designed for flows of 20-50 ml per minute. In each experiment a canine thyroid lobe was removed with its superior thyroidal and carotid arteries intact; the lobe was perfused with plasma containing 5 grams% crystalline hemoglobin, for periods up to one week. In ten separate experiments mouse melanoma or sarcoma was implanted into each gland. The gland was transilluminated and time lapse photography was used to record growth of the original implants as well as the appearance of metastases. Circulating cells were counted twice daily and were stained according to the Papanicolaou technique. Histological sections showed good preservation of thyroid and invasion by tumor.

This technique has advantages not obtainable with tissue culture. Metastases can be counted and photographed as they appear. The counting of circulating tumor cells is simplified by the use of a perfusate free of other cells. Tumor cells invading an isolated organ retain their normal appearance compared to those cultured on glass, which are altered.

This technique is now being readied for two further investigations. One involves the study of adhesiveness and metastatic potential of tumors by varying the calcium concentration of the perfusate. The other includes the perfusion of spleen in the same circuit in an attempt to reject the implanted tumor and harvest the antibody.

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