

into the tumors by an infusion pump, through the vinyl tube inserted in the gastric artery or gastroepiploic artery. The labeling indices of the tumors were 20–25%. At any site of the

tumors, labeling index was almost equal and the labeling index of non-cancerous regions around the tumor was about 40%.

### **The Relation of X-Ray Findings and Scintigrams on $^{131}\text{I}$ -MAA Injected Intravenously on Lung Cancer**

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With the patient supine,  $150\mu\text{Ci}$  of  $^{131}\text{I}$ -MAA was injected intra venously Shimazu dual opposed five inch rectilinear scanners with 102 hole focusing collimators and photo-dot recording were used to obtain the scans. Dual counter was exactly opposed and addition technique was used. Fortyfive cases were scand by these methods. In nodural pulmonary carcinoma located deep lung place and less than 2cm in diameter it was very difficult to visualize a lesion as a negative shadow by intravenous injection of  $^{131}\text{I}$ -MAA. Four cases with early cancer in the main stein bronchus and with almost normal chest X-ray findings showed remarkable diminishing of activity in the re-

gional lung fields. These four cases were operated and hilar invasion to pulmonary artery, metastases and extra bronchial extension of carcinoma were not confirmed. Gas mixture with 8% Oxygen, 92% Nitrogen was administerde to unilateral side of lung by means of Carlens bronchial divided catheter, and during this procedure, MAA was injected intravenously. Significant decrease of activity was observed on hypoxic side. The reaction for the decreased deposition of the cases bronchus may be due to reflex decrease pulmonary artery perfusion secondary to lobar hypoxia as a result of bronchial obstruction by tumors.

### **On the Diagnosis of Malignant Tumor with Semiconductor Detector**

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For its compactness, unfragility and safety, the semiconductor detector has been used currently as a radiation detector.

However, the utilization of this detector in the medical field is still underdeveloped. We have been studied its medical utilization. Last time we discussed its capability to the medical applications. This time we report its utilization for detection of cancers in the oral cavity, digestive organs and uterus. This de-

tector was inserted in the cavity 20-48hours after intravenous injection of  $300\mu\text{Ci}$   $^{32}\text{P}$  uptake in the cancerous tissue was measured. A considerable increase of  $^{32}\text{P}$  uptake was marked in the cancerous tissue, which was found to be useful for estimation of the region of the cancer.

In order to determine the distribution of the  $^{32}\text{P}$  in tissue, the semiconductor detector were coupled on the existing scintiscanner. Scinti-

grams of  $^{32}\text{P}$  in the tissue, using this apparatus, were obtained. Next, microautoradiograph technique was applied to the cancerous tissues obtained from various sources such as the stomach, breast and intestine at

24 hours after  $^{32}\text{P}$  injection. The granules which indicate the presence of  $^{32}\text{P}$  in the tissue were localized in the cancerous and noncancerous cell, intercellular substance and blood vessel.

## Autoradiographic Studies on Cell Kinetics in von Recklinghausen's Disease

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We have been studying on cell kinetics in the human brain tumors by means of  $^3\text{H}$ -thymidine autoradiography. In the present paper we analysed cyto-kinetics of three cases of von Recklinghausen's disease by local cumulative labeling method. Histologically the cases 1 and 2 were neurofibromatosis and the case 3 was Schwannoma. We selected two or four nodules in the skin as the materials and injected  $^3\text{H}$ -thymidine (20  $\mu\text{Ci}$  every 12 hours) for two to eight days. After the extirpation, the tissues were fixed in 10% formalin and embedded in paraffin. The autoradiographs were prepared by dipping the sections into the liquid emulsion Sakura NR-M2. Labeling indices were counted in the places where the influence of the damage by the injection needle was negligible.

The labeling index was, in the three cases, initially very low and increased very slowly as the cumulative labeling proceeded. In the case 1, the labeling index was 0.4% at 2 hours, 4.7% at 3 days, 6.5% at 5 days and 10.8% at 8 days. In the case 2, the labeling index started at 4.8% after 2 days of the cumulative

labeling and reached 8.8% at 4 days. In the case 3, the initial labeling index was 2.8% and increased to 15.5% at 4 days. Plotting these measurements against time we determined  $t_s$  i.e. duration of DNA synthesis, to be 8~11 hours in the cases 1 and 2, and 19 hours in the case 3.

The cell turnover rate of the cases 1 and 2 was 1.5~2% per day and that of the case 3 3% per day. Accordingly there might be slight difference of cell number flowing into DNA synthetic stage per unit time between multiple Schwannoma and neurofibromatosis, although both types are included in the same diagnosis of von Recklinghausen's disease. Judging from such slow turnover rate, we suppose that the roughly estimated doubling time of these tumors should be very long, being 1~3 months. In the previous papers, we reported that the duration of DNA synthesis in normal cells in human body is 8~12 hours, and in cancers 18~47 hours. It is interesting to note that the proliferation pattern of von Recklinghausen's disease is between that of the normal tissue and of cancers.