

proliferation of the solid tumor, we applied the "in vivo local cumulative labeling method" using ^3H -thymidine. Namely in the Case 1 or Case 2, one locus on the tumor received repeated injections of $20\ \mu\text{Ci}$ of ^3H -thymidine for 3 or 4 days every 24 hours and the another locus received single injection just before operation. Thus we obtained a specimen labeled continuously for 3 or 4 days and a flash labeled specimen. Case 3 is a 54-year-old woman bearing corpus cancer with numerous cancer cells proliferating in the ascites. For the cytokinetic analysis, $2\ \text{mCi}$ of ^3H -thymidine was injected intraperitoneally and after that smeared specimens were repeatedly obtained from the aspirated ascites during 6 days. After fixation, all the specimens were autoradiographed by dipping into SAKURA NR-M2 nuclear emulsion.

Results—Case 1; Labeling index (LI) counted in flash label autoradiographs was 24% and

at 3 days of continuous labeling 64%. Plotting these labeling indices against time, a proliferation curve was drawn, from which generation time (t_g) = 6.8 days and DNA synthetic time (t_s) = 36 hours were estimated. Case 2; LI at flash labeling was 25% and at 4 days 76%. From the proliferation curve, t_g was estimated at 7.8 days and t_s at 44 hours. Case 3; Percentages of labeled metaphases among the mitoses was plotted against time and the labeled mitoses curve was drawn. From this graph, the following calculations were made; t_g = 60 hours, t_s = 18 hours, t_2 (mean) = 9 hours, t_m = 1.5–3.5 hours, and $t_1 = t_g - (t_s + t_2 + t_m) = 31.5 - 29.5$ hours.

The generation time and the DNA synthetic time in the ascitic tumor were shorter than those in the solid tumor, but it is not clear whether difference is due to environmental changes or to the peculiarity of this particular strain of the carcinoma.

Technique of ^3H -Thymidine Labeling Via Artery and Analysis of Proliferation in Human Cancers in Vivo

H. MATSUMOTO, R. NAGANE, H. HITONAKA, S. YAMASHITA, T. KITAMURA,
T. ASHIHARA, O. TAKEOKA and S. FUJITA

Department of Pathology, Kyoto Prefectural University of Medicine, Kyoto

M. SHINODA, T. FUJISAWA and T. KODAMA

The Second Department of Surgery, Kyoto Prefectural University of Medicine, Kyoto

We performed ^3H -thymidine autoradiographic studies on the cell proliferation of human tumors in vivo by the "arterial labeling method" as modified local flash labeling.

Stomachs of rabbits were used as an experimental material. Through the vinyl tube inserted into the left gastric artery, $100\ \mu\text{Ci}$ of isotonic ^3H -thymidine diluted by 5% glucose solution mixed with several drops of patent blue was injected very slowly by an infusion pump. About 30 to 60 minutes after the infusion, the tissue was fixed and autoradiographs were prepared by dipping the sections into Sakura NR-M2 emulsion. Autoradiographically, the labeled cells of the normal rabbit stomach were found in the area be-

tween the surface epithelium and the glandular cell zone. Its labeling index was about 20–25% in various gastric areas. This result is almost equal to that obtained previously by means of the "local labeling method". From the experimental study, the injected solution colored with the patent blue was found to spread on the entire mucosal surface of the stomach and on a part of the duodenum, but the distribution of the labeled cells were limited in much narrower area. The grain counts were decreased in the peripheral area.

This arterial labeling method was also applied to 8 cases of human gastric carcinomas. Three hundred microcurie of the isotonic solution of ^3H -thymidine was slowly infused

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}I -MAA Injected Intravenously on Lung Cancer

K. KATO, H. AOKI, M. KOZAKI, K. OGINO and H. MURAYAMA

Department of Surgery and Radiology Tokyo Medical College Hospital, Tokyo

With the patient supine, $150\mu\text{Ci}$ of ^{131}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}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

T. HIGASI, S. IKEMOTO and T. HISADA

Kanagawa Dental College, Kanagawa

S. SUZUKI, M. MOGI, H. KATO, A. MURATA and M. SUGIYAMA

Yokohama Keiyu Hospital, Yokohama

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}P uptake in the cancerous tissue was measured. A considerable increase of ^{32}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}P in tissue, the semiconductor detector were coupled on the existing scintiscanner. Scinti-