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**ABSTRACTS**  
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Details of following articles are written in Japanese in following pages.

IMMUNITY IN CARCINOGENESIS
(I) TUMOR INDUCTION BY IRRADIATION

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a) Clinical approach to tumor induction by irradiation: Many clinical cases of cancer or leukemia thought to be induced by irradiation were published in the past, but only studies standing with statistical analysis of cases were reliable, as spontaneous occurrence had to be considered. According to March (1944), Henshaw and Hawkins (1944) and Ulrich (1946), leukemias occurred more frequently in radiologists than in other physicians. The Japanese Committee on Biological Influences of The Atomic Bomb (1953, 1956) also reported considerable occurrence of leukemias in Hiroshima and Nagasaki.

b) Experimental approach: The most comprehensive and attractive experimental studies on X-ray induction of thymoma in C 57 B L mice were achieved by Kaplan and his associates (1947-1958). The mice were most sensitive to fractional irradiation at age of one month and produced tumors in almost one hundred per cent of those irradiated. Inhibitory effect on the tumor induction by bone marrow protection against irradiation or transplantation of isologous cells after irradiation were demonstrable. Tumors were also induced in the thymus transplanted in thymectomized and irradiated hybrids and were thought not to be parental in cellular origin, but to be autologous. This means that the tumors came up in the process not of injury, but of recovery.

c) Immunological consideration of tumor induction: It is well known that irradiation induces serious damage especially to lymphoid tissues which are considered to be necessary for tumor immunity. This suggests that suppressed antibody formation in irradiated animals may permit further growth of transformed cells, if induced by or after irradiation, containing newly-occurring tumor antigens.

CLINICAL AND PATHOLOGICAL STUDIES ON THE POSTOPERATIVE PROGNOSIS OF LUNG CANCER I. CLINICAL STUDIES

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A series of 608 patients with lung cancer was reviewed. Of this series, 262 were subjected to pulmonary resection. Therefore, the resectability was 42.8 % for the whole series. Patients who were regarded as inoperable at thoracotomy were 126 and constituted 20.8 % of the whole series.

Three-year-survival rate was 38.4 % and five-year-survival rate was 32.3 % for the whole group receiving pulmonary resection, while the 3 yr survival rate was 52.6 % and the 5 yr rate was 47.6 % for subgroup receiving curative resection.

Sixty two were lung cancers less than 3cm in diameter. Forty six of them received curative resections, and the remainder received palliative resection or exploratory thoracotomies. The 5 yr-survival rate after pulmonary resection for this group was 50 %. The postoperative prognosis of lung cancers less than 2cm in diameter was so favorable that they should be called "early lung cancers" from the clinical point of view.

The survival-rate was best for cancers of the right lower lobe and worst for those of the left upper lobe.

Volume-doubling time of lung cancers ranged from $2\frac{1}{2}$ to 15 months: No significant relationship between the volume-doubling time and the postoperative prognosis was seen.

There was no significant difference of prognosis between peripheral and central (hilar) cancers.

The presence of metastases to hilar lymph nodes has been shown to be a dominant factor influencing prognosis in carcinoma of the lung. For patients in whom the lymph nodes were tumor free or lymph node involvement was limited to broncho-pulmonary nodes, the 5 yr-survival rate was more than 60 %. For patients in whom lymph node involvement was found beyond the tracheal bifurcation, the 5 yr-survival rate was about 10 %.

CLINICAL AND PATHOLOGICAL STUDIES ON THE POSTOPERATIVE PROGNOSIS OF LUNG CANCER

II. PATHOLOGICAL STUDIES

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Kiyoyuki TAKAHASHI

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A study was made of the correlation between histopathology and postoperative prognosis in 319 resected cases of lung cancer, including 35 small cancers less than 3 cm in diameter, and 111 autopsy cases.

1. The prognosis following the resection of lung cancers is very difficult to predict on the basis of histopathological findings. However, some factors are worth considering in relation to the postoperative course.
 - a. Among the various types of lung cancers, adenocarcinomas have a comparatively favorable postoperative course.
 - b. Cases with detectable blood vessel invasion, especially of veins and capillaries, have a poor prognosis.
 - c. In cases of adenocarcinoma, the presence of even one histological criterion suggesting high grade malignancy points to a poor prognosis.
2. Lung cancers less than 3 cm in diameter were examined histopathologically in detail, and the following conclusions were drawn:
 - a. Histological pleomorphism is not common in small lung cancers.
 - b. The postoperative prognosis of small lung cancers is poorer for adenocarcinomas and is not always unfavorable in anaplastic carcinomas. This discrepancy in prognosis between small and more advanced adenocarcinomas seems to depend partly on the fact that some adenocarcinomas metastasize to distant areas easily, and some do not.
3. Thus it must be emphasized that the histopathology of small lung cancers is significantly different from that of more advanced cancers, particularly in autopsy cases.
4. The growth rate of lung cancers as determined roentgenographically does not always correlate positively with the histological appearance of malignancy or the postoperative prognosis.

A NEW APPROACH TO THE CULTIVATION OF
MYCOBACTERIUM LEPRÆMURIUM
IN METABOLICALLY ACTIVE,
CELL-FREE MEDIUM

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Since all trials hitherto done to obtain a macroscopic growth of *Mycobacterium lepraemurium* or *M. leprae* in cell-free media have been unsuccessful, many researchers seem to admit that these bacteria inherently lack the ability to grow in such media. The author assumed that if cell homogenate or filtrate which might maintain the intracellular metabolic activities of the host were given to the culture medium throughout the cultivation of rat leprosy bacilli, macroscopic growth of the organisms could be expected.

The method of cultivation is as follows: (1) the rat leprosy bacilli adsorbed onto silicone-coated slides were put into the cell-free medium which contained freshly-prepared host cell filtrates, (2) the slides were taken out of the medium on the next day and put into new medium of the same composition; this procedure was continued 6 times a week and the growth of the bacilli was checked macroscopically and with magnifying lens and photographed every 4 weeks.

After 20 weeks of incubation, a granular patch visible with magnifying lens appeared on the same area as the inoculum had been applied. After about 30 weeks of incubation the patch became ivory white and was visible with the naked eye. The organisms in the patch did not grow on ordinary media such as brain heart infusion agar, Löwenstein egg, or Kirchner's liquid medium. However, these organisms grew on the silicone-coated slides, again making an ivory white patch after 30 weeks of incubation.

AN EXPERIMENTAL STUDY ON TRANSPLANTATION IMMUNITY OF TUMORS

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Chest Disease Research Institute, Kyoto University*

It has been reported that, when the same tumor is retransplanted subcutaneously in an experimental animal immunized with tumor tissue, resistance is induced to the growth of transplanted tumor. In order to solve the problem of whether such resistance differs in different parts of the immunized animal or not, and can be induced by what mechanism, the author carried out the present experiment.

All the animals employed for this study were DDD- or C 3 H mice. The author studied the transplantation immunity of Ehrlich ascites tumor and methylcholanthrene-induced sarcoma.

In the first reported section, it was demonstrated by the method of transplanting tumor cells into lymph nodes of mice that such phenomenon as growth-inhibition in mice after general immunization with Ehrlich ascites tumor was produced against retransplantation of the same tumor, and that such a phenomenon in mice after local immunization differed in certain parts of the immunized mice. Lymphocytes are supposed to play an important role in this phenomenon.

In the second section, an original diffusion chamber designed by the author was employed, and it was demonstrated that such phenomenon as growth-inhibition in mice after general immunization with Ehrlich ascites tumor developed against the retransplantation of the same tumor was mainly caused by a cellular antibody in which lymphocytes participated. But, growth-inhibition of transplanted tumor was seen also when lymphocytes had no direct contact with tumor cells.

In the third section, similar positive results as in the first section were again obtained on methylcholanthrene-induced sarcomas in mice. On the other hand, immunological factors, i. e., iso-antibodies, seemed to participate in such a phenomenon and from the histological study of the transplanted tumor site the importance of lymphocytes as the carrier became apparent.

In the fourth section, similar positive results as in the second section again were obtained on methylcholanthrene-induced sarcomas in mice.

When the experimental animal was immunized with tumor tissue generally or locally, the results obtained demonstrated that the transplantation immunity to the tumor was induced generally or locally; and cellular antibody from lymphocytes had much effect on such immune phenomenon. But growth-inhibition of transplanted tumor was seen also when lymphocytes had no direct contact with tumor cells. Therefore, it seems likely that target tumor cells are destroyed not only by direct contact with immunized lymphocytes, but also by the diffusible substances released from the lymphocytes.

EFFECTS OF THORACIC RADIATION ON PULMONARY FUNCTION

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Chest Disease Research Institute, Kyoto University*

Lately, radiation therapy with ^{60}Co has advanced and been carried out more extensively in patients with lung cancer, who have increased in Japan as well as in Europe and the U.S.A. It is necessary to understand the pulmonary function of the patients who have lung cancer and the effects of thoracic radiation in order to make a functional prognosis of the cases or to decide on the indication for surgical treatment.

In this study, pulmonary diffusing capacity including D_M and V_c , lung volume, ventilatory function and intrapulmonary gas distribution were measured in patients with lung cancer, and in patients who had radiation therapy to the chest. The measurements were done periodically, and as late as possible after the radiation. The result revealed that the diffusing capacity of lung with cancer was lower than normal, probably due to the senile emphysema accompanying lung cancer, and that only the diffusing capacity was affected to a great extent by the radiation to the chest.

On the other hand, the pulmonary diffusing capacity was also measured in experiments before and after radiation by ^{60}Co to the chest of dogs. The lung tissues of the dogs that had died of radiation pneumonitis or had been killed, were extirpated for histological examination. It was found that the changes of the pulmonary diffusing capacity might be attributed to the alterations in the thickness and permeability of the alveolar membrane and the decrease in the capillary bed.

EXPERIMENTAL STUDIES ON OPERATIVE INTERRUPTION OF THE BRONCHUS; ESPECIALLY ON CASES COMBINED WITH LIGATION OF THE PULMONARY VESSELS.

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Operative interruption of the bronchus seems to be worthy of review as therapy for advanced pulmonary tuberculosis. A number of papers on atelectasis by obstruction of the bronchus have been published, but little has been known of cases receiving both interruption of the bronchus and ligation of the pulmonary vessels.

The author studied the morphologic changes of the lung tissue of dogs treated by bronchial interruption and vascular ligation, and should like to conclude as follows:

1) When the bronchus is interrupted, the regional pulmonary lobe becomes atelectatic. Variable histologic patterns, such as simple, inflammatory, edematous and mixed types of atelectasis, can be observed within a month after interruption. In dogs three months after operation, narrowing of branches of the pulmonary artery and thickening of the intima are observed.

2) No necrosis results in the lobe whose bronchus and bronchial artery are interrupted.

3) The lobe becomes necrotic only when the bronchus, the bronchial artery and the pulmonary artery are interrupted.

4) When the bronchus and the branch of the pulmonary vein are interrupted simultaneously, congestion of the lobe is observed.

5) In the lobe with pleural adhesions, bronchial and vascular interruption at the hilum results in no necrosis of the regional lung tissue.

6) From these findings, on the clinical use of operative interruption of the bronchus, it is desirable to maintain the blood supply from bronchial and pulmonary vessels as much as possible.

ELECTRON MICROSCOPIC OBSERVATION ON HUMAN LUNG CANCER

Keiichiro GENKA

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Chest Disease Research Institute, Kyoto University*

In this paper, the electron microscopic findings of human lung cancer are presented and the possibility of carcinogenesis in the alveolar area is discussed on the basis of the ultrastructural findings.

The materials used for this study were 57 cases of human lung cancer tissues resected surgically in the Chest Disease Research Institute, Kyoto University.

In Chapter 1, the general fine structures of human lung cancer are described. Lung cancer cells are generally irregular in form, compared with the epithelial cells of the normal bronchoalveolar system. This tendency is stronger in less differentiated cases, where the individual cells are extremely irregular and different from one another.

In Chapter 2, the characteristics of a cancer cells are shown according to the histological classification. In adenocarcinoma, organelles in the cytoplasm are better developed than those of epidermoid and undifferentiated carcinoma.

In Chapter 3, behavior of the alveolar wall cell (type B epithelial cell) is discussed with reference to the site of carcinogenesis. The alveolar wall cell seems to have such a high potentiality that it plays an important role as the reserve cell in the alveolar area. Furthermore, it is probable that the alveolar wall cell has the ability to be transformed into cancer cell in response to certain pathogenic stimuli.

METASTATIC LUNG CANCER REPORT OF A CASE WHICH
RESEMBLED ACUTE DIFFUSE INTERSTITIAL
PULMONARY FIBROSIS

**Shunji TSUKUMA, Michiyasu NAKANISHI,
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*The First Department of Medicine (Head: Prof. Masukazu Naito)
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Kiyoyuki TAKAHASHI

Department of Pathology Central Laboratory of Kyoto University Hospital.

Diffuse interstitial pulmonary fibrosis, also referred to as the Hamman-Rich syndrome, as generally known, is a disease difficult to diagnose without lung biopsy during life. Nevertheless, a few cases with the syndrome but without histological evidence have been reported in the literature.

The present report concerns a patient who was diagnosed clinically as having Hamman-Rich syndrome because his clinical course, chest X-ray films and laboratory findings were indicative of the syndrome.

Lung biopsy was not achieved because of the severity of symptoms, and the final diagnosis based upon postmortem examination was minimal gastric cancer and far advanced metastatic lung cancer.

This 36-year-old man was admitted to the hospital because of cyanosis, sputum and progressive dyspnea. The PA chest roentgenogram revealed miliary nodules scattered extensively throughout the whole lung field and increased diffuse reticular mottling.

Treatment with antibiotics, anti-inflammatory steroid hormones and oxygen inhalation were given, affording temporary relief, ending in a fatal respiratory insufficiency 45 days after admission.

ANNUAL MEETING OF THE CHEST DISEASE RESEARCH
INSTITUTE (C. D. R. I.), KYOTO UNIVERSITY

Saturday, January 13, 1:00 – 6:00 PM, 1968, Rakuyu Kaikan Hall, Kyoto University

Special Lectures :

- 1) Ichiro Uesaka (Professor, Head of the Department of Bacteriology, C.D.R.I., Kyoto University): Classification and pathogenicity of *Nocardia*.
- 2) Kimio Yasuhira (Professor, Head of the Department of Pathology, C.D.R.I., Kyoto University): Experimental induction of lung cancer in rats.
- 3) Katsuyuki Kubo (Professor, Head of the Department of Chest Surgery, Mie Prefectural University School of Medicine): Current problems in the cardiac surgery.

Round Table Conference : “Chronic non-specific pulmonary infection”

Chairman : Professor, Shusuke Tsuji

- a. Seishiro Miyagi (Second Department of Medicine, C. D. R. I., Kyoto University): Chronic non-specific pulmonary infection, particularly chronic pneumonia.
- b. Kimiyoshi Kobayashi (National Sanatorium, Hinosa): Current problems in the surgical treatment of lung abscess.
- c. Hitoshi Nakai (First Department of Medicine, C.D.R.I., Kyoto University): Three cases of chronic non-specific pneumonitis with various clinical features.
- d. Shigeru Morikawa (Department of Pathology, C. D. R. I., Kyoto University): Pathological studies on chronic pneumonitis.

Clinical Conference :

1. X-ray consultation

Conveners : Nobuo Maekawa, Takashi Teramatsu and Shunsaku Oshima

- a. Nagayasu Okada (Hyogo Pref.): Two cases of lung abscess with pleuritis caused by lung cancer.
- b. Hiroshi Yumoto (Kobe Mitsubishi Hospital): A case with massive shadow in the left lower field on chest x-ray film after recovering from bilateral pneumonia and subsequent left hemorrhagic pleural effusion without carcinoma cells.
- c. Akira Okada (Shiga Pref.): 1) Induction of surgical treatment for bilateral pulmonary emphysema. 2) A case of bilateral chronic pneumonia.
- d. Giichiro Nishimura (Miyazu City Hospital): An infant case with x-ray shadow probably due to left mediastinal pleural effusion.
- e. Takashi Manabe (Gifu City Hospital): A case of thymoma without myodystrophia gravis.

2. Rare and interesting cases

Conveners: Jun Nishioka, Toshiro Yoshida and Yoshio Okada

- a. Ken Nakamura (Shin-Kori Hospital): A case of pleomorphic carcinoma in the lung with acute progression after finding of a giant cavity at the initial examination.
- b. Yutaka Ōi (Abuyama Red Cross Hospital): A lung cancer showed acute progression.
- c. Takaaki Asada (Ōmi Sanatorium): 1) A case of uremic lung (bat-wings shadow). 2) A case of arterio-venous fistula.
- d. Katsuyuki Kubo (Mie Prefectural University School of Medicine): 1) A case of giant mediastinal tuberculoma. 2) A case of intralobal sequestration proved by the retrograde aortography. 3) A case of intratracheal adenoma (cylindroma).
- e. Keigo Ōhashi (Mie Prefectural University School of Medicine): A case of mediastinal tuberculoma with vena cava syndrome.
- f. Sadao Ikeda (C.D.R.I., Kyoto University): A case of primary lung cancer in a two-year-old child.
- g. Shusuke Tsuji and Yukinobu Kobara (C.D.R.I., Kyoto University): 1) A case of vanishing lung. 2) A case of pulmonary alveolar proteinosis. 3) A case of Hamman-Rich syndrome.
- h. Toshiro Yoshida (C.D.R.I., Kyoto University): 1) A case of pulmonary alveolar proteinosis. 2) A case of teratoma probably occurring in the pericardium.
- i. Jun Nishioka (Kamogawa Hospital, Kyoto): 1) Two cases of foreign bodies in the breast. 2) A prolonged case of lung cancer.

3. Quiz

Conveners: Yanosuke Sagawa, Yukinobu Kobara and Shunji Tsukuma

- a. Nobuo Inaba (Fukui Red Cross Hospital): A case of pulmonary metastasis of silent thyroid carcinoma not detected by clinical examinations.
- b. Kikuo Sugimoto (Nagahama Red Cross Hospital): A case of metabolic disturbances of calcium probably caused by parathyroidal insufficiency.
- c. Mikio Komatsu (Kyoto Mitsubishi Hospital): A case of tuberculin-negative tuberculosis with x-ray shadow suggesting non-tuberculous lung disease.
- d. Mikio Kato (Tenri Hospital): A case of massive left hilar shadow with hemoptysis (pulmonary infarct).
- e. Chisato Ueda (Japan Antituberculosis Association, Kyoto Branch): X-ray shadow after the mammary-plasty.
- f. Setsuro Imai (Japan Antituberculosis Association, Kyoto Branch): Two cases of diaphragmatic hernia which have been treated as pulmonary tuberculosis or abscess.
- g. Yoshio Yasubuchi (National Sanatorium, Shigarakien) and Kotoko Munezane (Hirono Kogen Hospital): A case of esophago-pleural fistula after pneumonectomy.
- h. Hisashi Yamamoto (Rakuyo Hospital, Kyoto), Shigeo Nomura and Seishiro Miyagi

(C.D.R.I., Kyoto University): A case of recurrent pleurisy with clear cell infiltration proved by pleural biopsy.

- i. Masayuki Yamashita (Kyoto Katsura Hospital): 1) Two cases of intrabronchial fibroma. 2) A case of paraganglioma. 3) A case of multiple congenital cysts of the lung.