Abstracts

1. FUNDAMENTAL STUDIES IN CHEMOTHERAPY OF TUBERCULOSIS

Part 68. Experiments on Mice

No. 3. Treatment with INAH and its Derivatives

Tadashi MORI

Department of Bacteriology and Immunology, Research Institute of Tuberculosis, Kanazawa University.

(Director: Prof. Masamichi KAKISHITA)

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The curative effects of administration of INAH, IHMS and INHG-Na, each by itself and with PAS, and of INAH plus PZA were tested upon mice infected with human tubercle bacilli by means of the quantitative culture of the bacilli in the viscera.

The results obtained are summarized as follows :

1) In the solitary administration, INAH was most effective, followed by IHMS and INHG-Na in that order, while in the combined use there was no conspicuous difference of the curative effect between INAH plus PAS, IHMS plus PAS and INHG-Na plus PAS.

2) INAH plus PZA was observed to be more effective than either of the drugs administered alone.

2. IMMUNOLOGICAL STUDIES IN TUBERCULOSIS

Part 6. Experimental Studies in the Mechanism of Desensitization

No. 4. Desensitization of BCG-sensitized Guinea Pigs with OT and o-Aminophenol Azo-Tuberculin Prepared from Culture Filtrate of BCG

Akira NAKAGUCHI

Department of Bacteriology and Immunology, Research Institute of Tuberculosis, Kanazawa University.

(Director: Prof. Masamichi KAKISHITA)

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The following 6 groups of mice were subjected to experiments to investigate the influence of desensitization upon tuberculous infection.

Mice previously sensitized with live BCG, and

1) desensitized with OT "BCG"

2) desensitized with o-aminophenol azo-tuberculin (OA-Azo-T) "BCG"

3) not-desensitized, as control

Mice previously sensitized with heat-killed BCG suspended in liquid paraffin oil, and

4) desensitized with OT "BCG"

5) desensitized with OA-Azo-T "BCG"

6) not-desensitized, as control

All the groups of mice were infected with human tubercle bacilli and 4 weeks later they were autopsied, and it was revealed that the visceral lesions of the desensitized mice were slightly more intense than those of the not-desensitized ones.

3. IMMUNOLOGICAL STUDIES IN TUBERCULOSIS

Part 19. Immunological Properties of Extract of Tubercle Bacilli

No. 5. Activity of the Extract for Causing Skin Reaction in School Children

Sumio YAMAMOTO

Department of Bacteriology and Immunology, Research Institute of Tuberculosis, Kanazawa University.

(Director: Prof. Masamichi KAKISHITA)

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In the preceding study, an aqueous extract of human type tubercle bacilli prepared from the bacillary suspension (50 mg wet weight/ml) placed in an ice-box for seven days after heating at 100°C for 1 hour was observed to have high serological reactivities.

In the present study, it was found that the extract was a more powerful antigen than OT for the skin reaction, 1 : 200 diluted extract being equivalent in erythema-causing activity and superior in induration-causing activity to 1 : 2,000 OT.

4. IMMUNOLOGICAL STUDIES IN TUBERCULOSIS

Part 22. Studies of the Influence of Desensitization on Tissue Respiration

No. 1. Experiments by Desensitization with OT

Hideta OKUMURA

Department of Bacteriology and Immunology, Research Institute of Tuberculosis, Kanazawa University.

(Director: Prof. Masamichi KAKISHITA)

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The following 4 groups of mice were desensitized with OT to investigate the influence of desensitization upon tissue respiration (liver, spleen and lung).

Group A. Mice sensitized with heat-killed human tubercle bacilli suspended in liquid paraffin oil

Group B. Similarly sensitized mice receiving afterward daily injection of OT
Group C. Untreated mice
The results obtained were as follows :

1) In Group D, no marked change of the hepatic and splenic tissue respiration was observed except a slight increase observed when the concentration of OT in the medium was as high as 100 "mg"/ml.
2) No difference of the tissue respiration was observed between Groups C and D.
3) In groups A and B, the hepatic and splenic tissue respiration was observed to increase.
4) No difference of the tissue respiration was observed between Groups A and B.

5. HISTOLOGICAL STUDIES ON ALLERGY IN TUBERCULOSIS

Part 7. Histological Studies of Skin Reaction Caused by Tuberculin Fractions

No. 2. Experiments on BCG-sensitized Rabbits

Takashi INABA
Department of Bacteriology and Immunology, Research Institute of Tuberculosis, Kanazawa University.
(Director: Prof. Masamichi KAKISHITA)
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The following preparations were administered to rabbits sensitized with BCG, and the skin reactions caused were examined histologically and histochemically.

1) OT from culture filtrate of BCG and human tubercle bacilli (OT "BCG" and OT "human" respectively)
2) o-aminophenol azo-tuberculin, and protein and polysaccharide fractions from OT "BCG" (OA-Azo-T "BCG," PF "BCG" and CF "BCG" respectively)
3) OA-Azo-T, and PF and CF fractions from OT "human" (OA-Azo-T "human," PF "human" and CF "human" respectively)

The results obtained are summarized as follows :

1) All the reactions caused by the preparations were tuberculin type.
2) There was no marked difference in histological and histochemical findings between the reactions caused by OA-Azo-T "BCG" and OT "human."
3) The reactions caused by OA-Azo-T "BCG," PF "BCG" and CF "BCG" were slightly fainter than the reactions by OA-Azo-T "human," PF "human" and CF "human," respectively.

6. CYTOLOGICAL STUDIES ON EXPERIMENTAL TUBERCULOUS INFLAMMATION

No. 1. Comparative Observations on the Cellular Reactions

INDUCED BY THE SEMI-DRIED AND SALINE SUSPENSION OF THE MINIMAL DOSES OF BCG

IWAICHI SAKAMOTO
Department of Pathology, School of Medicine,
Kanazawa University.
(Director: Prof. Shirō WATANABE)
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Instead of the generally adopted methods, i. e., injection of comparatively large dose of bacterial suspension into the subcutaneous tissue, the following procedures were mainly employed : After injection of a minimal dose of semi-dried living tubercle bacilli (by means of an injection-needle provided with a mandrel) into the subcutaneous tissue of mice, streched preparations of the injected area were made, and the sequence of cellular reactions was observed from the eariest period of inflammation when there was no infiltration of neutrophilic leucocytes. As a control the normal subcutaneous tissues of a mouse fetus was also observed. The staining methods employed were Böhmers haematoxylin staining and Ziehl-Neelsen's staining.

The following results were obtained :

1. A considerable number of proliferating small mononuclear cells were observed within fifteen minutes after the treatment and proliferation infiltration of neutrophilic leucocytes was seen to take place afterward.
2. At the early stage when there was no infiltration of neutrophilic leucocytes, injection of semi-dried tubercle bacilli induced more remarkable proliferation of the small mononuclear cells than injection of saline suspension of the bacilli.
3. It is interesting to note here that small mononuclear cells always existed in small numbers in the subcutaneous tissues of mature mice concomitantly with the so-called histiocytes, whereas in their embryonic stage these small mononuclear cells were observed to be more numerous than histiocytes, and their proliferating figures were often observed. The proliferating small mononuclear cells of the early stage resembled the histiocytes in the subcutaneous tissues of the mouse fetus.

7. CYTOLOGICAL STUDIES ON EXPERIMENTAL TUBERCULOUS INFLAMMATION

No. 2. CELLULAR REACTIONS BY THE INJECTION OF MINIMAL DOSES OF SEMI-DRIED LIVING VIRULENT HUMAN TUBERCLE BACILLI, $H_{37}Rv$

IWAICHI SAKAMOTO
Department of Pathology, School of Medicine,
Kanazawa University.
(Director: Prof. Shirō WATANABE)

Received for publication, June 20, 1960.

Serial observation was carried out on the cellular reactions brought about by the injection of minimal doses of semi-dried living virulent human type tubercle bacilli, $H_{37}Rv$, in the subcutaneous tissues of adult mice.

The results obtained were :

1. Remarkable proliferation of small mononuclear cells was seen throughout all the stages of the inflammation.
2. The small mononuclear cells multiplied principally by amitotic division, and the arrangement of the multiplying cells was mainly botryoid, packet, chain-forming mosaic or tile-like.
3. The small mononuclear cells resembled lymphocytes in form and some of them were seen to be two or three times as large as normal ones. The multiplying small mononuclear cells were mainly round in form, some of the cells had linear protoplasma and others broad membraneous ones, and they frequently exhibited phagocytotic activity.

   The small mononuclear cells showed rapid multiplication and attained large size.
4. The small mononuclear cells developed to histiocytes and played a main role in the tuberculous inflammatory process of subcutaneous tissue.

8. A CACE REPORT OF THE MIDDLE LOBE SYNDROME

HIDEYUKI TAKADA, TOKIO KAMIHARA,
SHOJI NAKANO, MASAHIRO SAITO
AND TAIRA KAZIMURA

Department of Clinical Research, Research Institute of Tuberculosis, Kanazawa University.
(Director: Prof. Miyoshi URABE)

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The authors have experienced a case of the middle lobe syndrome. Roentogenological observation of the lung and precise histological study of the specimens were made, and the cause of atelectassi was discussed.

This case showed secondary bronchial stenosis of the middle lobe caused by tuberculous swelling of lymph nodes which was regarded as the result of the primary inflammation of the right lower lobe.

Histological observation showed chronic bronchitis and fibrosis, and the middle lobe was seen to be in atelectais.

It was thought that this change was irreversible and that the patient needed lobectomy.

9. BACTERIOSTATIC ACTIVITY OF FURAZOLIDONE

SUMIO YAMAMOTO, YUKIO YAGISHITA AND TAKASHI INABA

Department of Bacteriology and Immunology, Research Institute of Tuberculosis, Kanazawa University.
(Director: Prof. Masamichi KAKISHITA)

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Furazolidone exhibited marked in vitro bacteriostatic effect against B. typhi abd., B. paratyphi A, B. paratyphi B, B. coli and streptococcus. Moreover it is of great importance that the effect of the drug on the bacilli which had acquired resistance to other drugs was the same as on the sensitive strain.