

PLAINTIFF'S EXHIBIT

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DEPT. OF THE INTERIOR
BUREAU OF MINES
INDUSTRIAL HYGIENE
AND SANITATION

TREASURY DEPARTMENT

UNITED STATES
PUBLIC HEALTH SERVICE

WASHINGTON D. C.

Nov. 7, 1934

M.H.D.

Dr. A. J. Lanza,
Assistant Medical Director,
Metropolitan Life Insurance Company,
New York, N.Y.

Dear Dr. Lanza:

I am transmitting herewith the progress report
for the month of September, for Dr. Viller, Mr. Proske, Mr. Stoll,
and Mr. Brubach. I regret that this report is late - we have been
short of stenographic help until recently.

Sincerely yours,

R. H. Sayers
R. H. Sayers,
Medical Officer in Charge

Mr. J. W. Miller, Mr. H. C. Froese, Mr. E. F. Brubach and Mr. Ray
Stall.

Interperitoneal Injection Tests

Seven completed during the month.

1. Asbestos No. 65. This dust is a mixture of tremulite (asbestos) and talc. The particles appear as long bladed crystals and flat folia. The series of tests including those of 560 days duration showed the dust to be inert in reaction. An excessive amount of fat was noted in the peritoneum and omentum. This has been observed in most of the long duration tests of the absorptive and inert groups.

2. Asbestos No. 72. This dust is the same as Asbestos 2, used by Stueber, Wells and Brinker in lymphatic injection experiments. (J. Indust. Hygiene 16:287 - Sept. 1934). Tests of 90 day duration showed it to be inert in the peritoneal tissues.

3. Asbestos. Three types of asbestos viz: Canadian asbestos No. 80, Crocidolite No. 86, and Amosite No. 87 were used. Tests of 30 day duration showed that these dusts were apparently inert in reaction. A longer duration series is in progress. Stueber says that following injection of asbestos into the lymphatics no proliferation took place. (J. Indust. Hygiene 16:287 - Sept. 1934). This is in keeping with our observations.

It is to be noted that the behavior of all of the dust used up to date in interperitoneal injection tests has been uniform. They have all shown one or the other of the three types of reaction described in

The results of these tests in the guinea pig group are more difficult to gauge as to their possible effect on the human lung. It is interesting to note that in this group are found talc, anthracite coal, hematite and asbestos, all of which are known to produce pneumoconioses.

Intraperitoneal Response to Various Amounts of Dust.

Six groups of guinea pigs were injected with air separated quartz and calcite in doses of 0.1, 0.05 and 0.01 gm. per pig. Tests of 14 and 30 day duration were completed. It was found that with the smallest dose of quartz the nodules found at the end of 30 days were larger than those in 14 days. The 30 day tests with calcite showed a disappearance of the dust from the peritoneum whereas in 14 days appreciable nodules were noted. The quantity of dust introduced appears to speed the reaction to some extent. It will be more difficult possibly to differentiate between the proliferative and inert groups in as short a time. These tests are now in progress.

Tubercle Bacillus H₂ Dosage Tests.

Animals injected intraperitoneally with emulsions of 0.1, 0.15, 0.2 and 0.5 mg. of tubercle bacillus H₂ were examined 35 days after injection. It was found that the 0.1 mg. dose gave the most desirable response. This dosage produced a tuberculous involvement of sufficient lightness to be used in conjunction with dusts.

Intraperitoneal Tests with Tubercle Bacillus H₂ and Dusts.

Two groups of guinea pigs were injected intraperitoneally with 0.1 gm. of calcite and quartz (air-separated). These animals were immediately injected with 0.1 mg. of Tubercle Bacillus H₂. Examinations will

Recovery of Tubercle Bacilli

It has been previously shown that the addition of .4 per cent of sodium silicate to Lang's synthetic medium enhances the growth of tubercle bacillus strains H-57 and H-1 and is almost as effective as Carver's egg yolk medium. However, for the recovery of tubercle bacilli from pathologic material the latter substrate is superior.

Egg yolk contains a considerable amount of lecithin and it was assumed that this substance may be responsible for the better growth qualities of the medium. It was therefore decided to add lecithin to the Si-Lang medium developed in this laboratory. This was accomplished in two ways:

- (1) 5 grams of Lecithin-Soybean dissolved in 10 c.c. of ether, this gradually added to the melted Si-medium. The ether fumes were evaporated on the water bath and the medium tubes and sterilized.
- (2) Lecithin in graded quantities was emulsified in Si-Lang agar.

The first medium was not satisfactory, because growth was retarded instead of hastened.

The second medium appeared to be better. The results of the experiments are shown below:

	<u>Maximum growth in days</u>	
	<u>H-57</u>	<u>H-1</u>
Carver's egg yolk medium	9	9
Si-Lang agar	12	12
" " " + .5% lecithin	12	11
" " " + 1.0% "	13	11
" " " + 2.0% "	11	10

The results show that the addition of lecithin to the synthetic Si-Lang medium somewhat enhances the growth qualities of the medium but

it is still inferior to Carver's egg yolk medium and will have to be



OFFICE OF
PUBLIC HEALTH AND
SANITATION

TREASURY DEPARTMENT

BUREAU OF
THE PUBLIC HEALTH SERVICE
WASHINGTON, D C

August 17, 1934

Dr. A. J. Lanza,
Assistant Medical Director,
Metropolitan Life Insurance Company,
New York City.

Dear Dr. Lanza:

I am enclosing the report covering work
done during the month of July, 1934, by Dr. Miller, Mr. Prosser,
Mr. Stoll, and Mr. Brubach.

Sincerely yours,

R. R. Sayers
Medical Officer in Charge

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Monthly Report. July, 1934.

Dr. J. W. Miller, Mr. E. O. Froese, Mr. H. F. Brubach, and Mr. Ray Stell.

INTRAPERITONEAL INJECTION TESTS

The following intraperitoneal injection tests were completed during the month:

Serisite No. 72, 56 days duration
Serisite No. 73, 7 and 30 days duration
Foundry sand No. 73, 56 and 90 days duration
Foundry sand No. 74, 56 and 90 days duration
Sand blast dust No. 77, 56 and 90 days duration
Fullers earth, No. 71, 56 and 90 days duration
Fly ash No. 69, 56 and 90 days duration

The results of these tests will be given on completion of the series of tests.

The following dusts were injected into guinea pigs:-

Canadian asbestos No. 80
African asbestos (crocidolite) No. 86
Asbestos No. 87

These are preliminary experiments on the behavior of asbestos in the peritoneal cavity.

INTRAPERITONEAL BEHAVIOR OF DUSTS AND TUBERCLE BACILLUS H37

Quartz, chert, calcite and bituminous coal were allowed to remain in the peritoneal cavities of guinea pigs for 123 days, a sufficient length of time to establish a well defined dust reaction. Then a uniform dose (0.1 mg.) of tubercle bacilli in a saline suspension, was injected intraperitoneally. At the end of three weeks the animals were killed and examined.

The tuberculous involvement was not marked in the omentum of all of the animals, including the controls. The size of the nodules on the anterior abdominal wall and the mass in the omentum was larger with quartz and chert. Calcite and bituminous coal injected animals showed larger tuberculous masses in the omentum than did the controls. In the calcite animals, occasional tubercles were seen at the site of absorbed nodules. These tests indicate that the tuberculous proliferation is aided by the presence of silica but is not inhibited by the presence of calcite or bituminous coal. It will be necessary to repeat this experiment as this observation is at some variance with clinical data.

VIRULENCE TESTS WITH TUBERCLE BACILLUS H-1.

Four groups of animals were injected with 0.1, 0.15, 0.2 and 0.5 mg. of tubercle bacillus H-1, a strain of less virulence than H-37, to obtain information as to the virulence and extent of involvement that this strain will produce in animals. If the response is favorable the strain will be used in place of H-37 which shows some variations in its reactions.

PATHOLOGICAL EXAMINATIONS

Lungs from two anthracite coal miners were examined and reports prepared. The lungs from both showed marked involvement and presented all of the pathologic features of advanced anthracosis without infection. The upper lobes were black and rubbery in consistency. The lower lobes showed emphysema and many black stellate nodules. A large amount of

PHOTOGRAPHS

A series of photomicrographs showing the pathology of asbestosis was prepared. They show practically all of the pathological features of asbestosis. Another series of low magnification pictures was made showing the distribution of fibrous tissue and dust in the lungs in cases of silicosis, asbestosis and anthracosis. A normal human lung specimen was also photographed for comparison.

CONSTRUCTION OF AIR SEPARATOR

In the past year the dust used in the injection tests and other experiments was graded by being passed through a 325 mesh sieve. While this is fine enough to give a reaction sufficiently differentiated to interpret, smaller particles are preferable, because of their greater speed in producing a reaction. It is also desired to determine the involvement elicited by different size-groups of dusts. With this in view, Mr. Stell, advised and directed by Dr. J. M. DallaValle, is constructing an air separator which shows promise of elutriating material to the desired size for injection. The apparatus is near completion.

Monthly Report, July, 1934.

Mr. J. W. Miller, Mr. E. O. Prucha, Mr. H. F. Buchner, and Mr. Ray Stoll.

INTRAPERITONEAL INJECTION TESTS

The following intraperitoneal injection tests were completed during the month:

Series No. 72, 56 days duration
Series No. 73, 7 and 30 days duration
Pneumonia and No. 74, 56 and 90 days duration
Pneumonia and No. 75, 56 and 90 days duration
Semi-sterile dust No. 76, 56 and 90 days duration
Pulmonary dust No. 77, 56 and 90 days duration
Fly and No. 78, 56 and 90 days duration

The results of these tests will be given on completion of the series of tests.

The following dusts were injected into guinea pigs:

Guinea dust No. 79
African asbestos (crocidolite) No. 80
Amphibole No. 81

These are preliminary experiments on the behavior of asbestos in the peritoneal cavity.

INTRAPERITONEAL BEHAVIOR OF QUARTZ AND TUBERCLE BACILLI. MSV

Quartz, chert, calcite and bituminous coal were allowed to remain in the peritoneal cavities of guinea pigs for 123 days, a sufficient length of time to establish a well defined dust reaction. Then a uniform dose (0.1 mg.) of tubercle bacilli in a saline suspension, was injected intraperitoneally. At the end of three weeks the animals were killed and examined.

The tuberculous involvement was restricted in the majority of all of the animals, including the controls. The size of the nodules in the anterior mediastinal wall and the mass in the esophagus was larger when quartz dust was present. Calcite and bituminous coal injected animals showed larger tuberculous masses in the esophagus than did the controls. In the calcite animals, occasional tubercles were seen at the site of abraded nodules. These facts indicate that the tuberculous proliferation is aided by the presence of silica but is not inhibited by the presence of calcite or bituminous coal. It will be necessary to repeat this experiment as this observation is at some variance with similar data.

VIRULENCE TESTS WITH TUBERCLE BACILLUS 2-1.

Four groups of animals were injected with 0.1, 0.15, 0.2 and 0.5 cc. of tubercle bacillus 2-1, a strain of less virulence than 2-57, to obtain information as to the virulence and extent of involvement that this strain will produce in animals. If the response is favorable the strain will be used in place of 2-57 which shows some variations in its reactions.

PATHOLOGICAL EXAMINATIONS

Specimens from two anthracite coal miners were examined and reports prepared. The lungs from both showed marked involvement and presented all of the characteristic features of advanced anthracosis without infection. The upper lobes were more involved and rubbery in consistency. The lower lobes were more emphysematous and contained more nodules. A large amount of

RESULTS

A series of photomicrographs showing the pathology of osteomyelitis has been prepared. They show practically all of the pathological features of osteomyelitis. In some cases of low magnification pictures can be seen the destruction of bony tissue and that in the image is composed of fibrin, osteoblasts and osteocytes. A normal human lung specimen was also photographed for comparison.

CONSTRUCTION OF AIR INJECTION

In the past the first step in the injection technique has been the use of a syringe being pushed through a hole made in the bone. This has been found to be a function sufficiently limited by the use of a syringe. The results are poor, because of the pressure which is applied. It is also desired to determine the involvement caused by different size-groups of ducts. With this in view, Dr. Smith, assisted and directed by Dr. J. M. Halliwell, is constructing an air injection apparatus which shows promise of abstracting material to the desired site for injection. The apparatus is near completion.