

EXPERIMENTAL ANALYSIS OF MIXED TUBERCULOUS  
AND STAPHYLOCOCCAL INFECTION IN ALBINO MICE  
(Short Communication)

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The results of the few experimental studies of the problem of mixed tuberculous and bacterial infections have confirmed the complexity of the problems concerned and the need for new methods for their solution. The author has studied the effect of the size of the infecting dose of Mycobacterium tuberculosis, the biological properties of the strains of staphylococci, and the order of infection of the host organism with associant bacteria in the course of mixed tuberculous and staphylococcal infection.

Experiments were carried out on 1060 female albino mice weighing 18-20 g. The mice were infected intravenously. Mycobacterium tuberculosis of bovine type was injected in doses of 0.0025, 0.01, and 0.1 mg, and staphylococci isolated from the sputum of patients with pulmonary tuberculosis (1 avirulent and 3 pathogenic strains) — in a dose of 100 million bacterial cells/0.1 ml. Mixed tuberculous and staphylococcal infection was produced in two ways: 1) by preliminary infection of the mice with a culture of staphylococcus and injection of M. tuberculosis on the 10th day; 2) preliminary infection of the mice with M. tuberculosis and infection of the animals on the 15th day with staphylococci.

The severity of the tuberculous and staphylococcal processes was assessed by bacteriological and morphological investigations. A comparison was made of the weight of the organs of the control and experimental animals, using the coefficients of relative weight of the organs (lungs, spleen, liver, and kidneys), calculated by the following formula:

$$\text{Relative weight of organ} = \frac{\text{weight of organ} \times 100}{\text{body weight}}.$$

The life span of the animals was also taken into consideration. The numerical results were analyzed by statistical methods.

Under the influence of the added staphylococcal infection, not only was the course of the tuberculous process produced by a small dose of M. tuberculosis (0.0025 mg) not aggravated, but it was actually inhibited to some extent (more especially after preliminary injection of staphylococci). The avirulent streptococcus proved more active than the other strains in both variants of the experiments. Following preliminary infection of the experimental animals with highly virulent staphylococci and the use of an average dose of M. tuberculosis (0.01 mg), the course of the tuberculosis was no more favorable than in the controls. In the case of the preliminary infection of the mice with M. tuberculosis in the same average dose, and subsequent infection with virulent staphylococci, the course of the tuberculosis was more active than in the control animals.

The course of the mixed infection was particularly severe when the mice were preliminarily infected with a high dose of M. tuberculosis (0.1 mg) and on the 10th day infection with highly virulent staphylococci was added. At the moment of death of 50% of the control mice infected with M. tuberculosis, 90% of the experimental animals in the corresponding groups had died.

It may be concluded from the results of these experiments that following infection of mice with small doses of M. tuberculosis, accompanying staphylococcal infection, especially if developing in good time, leads to inhibition of the tuberculous process. This may be explained by an increase in the general resistance of the host organism of the nonspecific stimulation type.

#### SUMMARY

In infection of mice with small doses of M. tuberculosis the concomitant staphylococcal infection, especially that developing in advance, leads to attenuation of the tuberculous process.