

Passive immunity is brought about then by transferring to a healthy animal some of the immunity substances generated by vaccination in another animal, and it is attended by no reaction, the degree of immunity produced being directly in proportion to the dose of the serum, and lasting only for a short time, whereas the active immunity may last for several years at least.

Now it is found that the basis of active immunity is not the same in all animals, and it has become clearer and clearer that every micro-organism is a problem in itself. Bacteriologists have ceased to believe that there is any single law under which all the immunities can be brought. Each disease is a problem by itself, and it is extremely unsafe because one has found an explanation of the immunity of one organism to suppose that it applies to the immunity of another disease. There are two kinds of immunity substances, one that has the property of antagonizing the specific poison produced by the organism causing the disease, that is, an antitoxine, and a second kind of protective or healing serum, which has the property of destroying the micro-organism which is concerned in producing the disease, a bactericidal immunity. As examples of the first class are those antitoxines produced from diphtheria, tetanus and snake venom, while as examples of the second stand cholera and typhoid fever. Then in a number of experimental immunities we are at present insufficiently informed as to the basis of the immunity, whether it is antitoxic or bactericidal. The evidence seems to be that there are other explanations for these.

Now let us consider for a moment the nature of the antitoxic immunity. They can be produced only when you have in your hands in the first place a toxine, and a strong one at that; and not all bacteria produce strong toxines in our artificial cultures. The fact that a germ does not produce a strong toxine, however, in our experimental work, does not prove that it will not do so in the human body. If one could get a strong toxine from the cholera vibrio, or the typhoid bacillus, there is no question but what we could produce a high degree of antitoxic immunity, and it would be of high healing value. Metchnikoff is not satisfied with the view that cholera does not produce a strong toxine, although we have not been able to demonstrate it yet, and other workers are devoting their time to an effort to produce a strong toxine from the germ of tuberculosis. We must have then, first, a strong toxine, and that when introduced into a susceptible animal, first, of course, in a small dose, and then in gradually increasing doses, in the course of time produces a high degree of antitoxic immunity. That means that the blood and tissues of the animal have acquired the property of being an antidote to the poison, but that antitoxine has the property