

Now as regards the other kind of immunity, the bactericidal, that was discovered by Pfeifer in his experiments with the cholera vibrio. You can render immune a guinea-pig, which is highly susceptible to the poison of cholera by inoculating it with the living or dead cholera bacilli, using first small and then gradually increasing doses. There is here no antitoxic action. If you mix the serum of the animal with the living culture of the cholera bacillus no change takes place except that of agglutination. If you introduce the living cholera culture into the peritoneal cavity of the guinea-pig that has been so vaccinated a phenomenon takes place called generally the Pfeifer phenomenon and you can study the effects of that phenomenon by removing a drop or two from the peritoneal cavity of the guinea-pig at intervals of a few minutes, as the whole process is completed in twenty to thirty minutes and you will find that immediately after the introduction the cholera bacilli lose their motility, tend to clump together to some extent and quickly break up into granules, no longer recognizable as bacilli, and this is spoken of as a solution of the organisms. No antiseptic we are familiar with is so powerful as that, for within a few minutes they disappear.

Now if you introduce the cholera culture into the peritoneal cavity of the normal guinea-pig no such phenomenon occurs. The bacilli multiply rapidly, and the animal dies of experimental cholera. That is called the phenomenon of Pfeifer, or the Lysogenic or bacteriolytic phenomenon and the substance producing it is called lysin, so we have lysins as we have antitoxines.

Pfeifer's conception of this is that the peculiar substance exists in a negative state in the blood, and that it is rendered active when there is a demand for it, and further that it can be rendered active by a combination of the negative serum with some fresh serum. If in a test tube you take the protective serum, heat it to 55 degrees to render it negative, add to that a little fresh serum and then the bacteria, the reaction will occur. Two substances are needed then, one the specific substance, and the other some substance in the fresh serum. Erlich applies his doctrine to this also, but it is rather more difficult to understand. The main points are these. He supposes that the lysin is produced in the cells of the body just as the antitoxine substances are produced, but that it has two kinds of affinity: it unites on the one hand with the specific organism that produces the disease, and on the other, with a ferment, or alexine, which is normally present in the blood. This double affinity then is brought in to explain the bactericidal form of immunity.

Those are two of the most important contributions to the