

ly when anchored exert its poisonous effects on the cell. (These groups have received the names of the haptophore and toxophore groups respectively.) The union between the cell receptors and anchoring group of the toxin throws out of function that portion of the cell receptors so united. If many of the receptors are united to the haptophore or anchoring groups of the toxin the cell is overwhelmed, but if not then the remaining unsaturated atom groups multiply to replace the saturated group. This regeneration of the receptors, following the law of tissue regeneration generally is apt to be excessive, (Weigerts!) and the overplus of 'receptors' will be thrown off into blood constituting toxin fixing substances or antitoxin. Naturally, where we have repeated stimulation of the cells by subtoxic doses of the toxin we will greatly increase (other things being equal) the formation of the antitoxic substances. Thus, it is found that in the preparation of diphtheria antitoxin as the doses of the toxin are gradually repeated and increased, so the antitoxin formed increases up to a certain maximum. It is to the presence of these antitoxic 'receptors' in the blood that we can ascribe immunity in many diseases.

How is it that an attenuated virus, a vaccine produces immunity? It is a well known fact to bacteriologists that toxins on long standing or by the action of chemical substances may lose their toxicity and become what are termed toxoids, yet injections of such toxoids will engender an immunity against the true toxin. The toxoid is believed to possess only the anchoring or haptophore group of the toxin and has lost or changed the constitution of its toxophore group. The unanchored cell receptors are stimulated in the same way as by the toxin and an immunity is created. Now I believe that the attenuated virus produces toxoid substances or at least a minimum amount of toxin so that it has the same effect as the absorption of toxin itself. In other words attenuation of virulence of a bacterium, or mildness of an epidemic are to be ascribed to the formation of 'toxoid,' instead of the true toxins (whether soluble or intercellular).