

injection of egg white into their anterior chambers, one was given egg white and the other guinea pig red blood cells intravenously. The saline control animal was injected with 1.0 cc. of guinea pig red blood cells and 24 hours later with 1.0 cc. of egg white. The animals injected with their homologous antigens reacted positively while the remaining animals failed to show any change in the eye.

The positive reaction in the eye was characterized by a moderate to deep injection of the conjunctival vessels, a similar though slight hyperaemia of the iris, slight chemosis and moderate lacrimation. This reaction tended to reach a maximum in about 5 hours and faded in the course of about 24 hours. The results of this experiment, shown in Table I, signify that specific local hypersensitiveness can be produced in the rabbit eye. Subsequent intravenous injections of the homologous antigens resulted in a much decreased local reaction. This we interpreted as a desensitization phenomenon. This desensitization could be completely accomplished by repeated injection of the usual doses of the homologous antigen.

4779

Local Organ Hypersensitiveness: II. Repeated Response in the Rabbit Eye.

DAVID SEEGAL AND BEATRICE CARRIER SEEGAL.

(Introduced by W. W. Palmer.)

From the Departments of Medicine and Bacteriology, College of Physicians and Surgeons of Columbia University, and the Presbyterian Hospital.

The demonstration of the availability of the rabbit's eye for local sensitization by a single antigen¹ suggested the possibility of the production of repeated eye response under appropriate experimental conditions. In order to avoid the phenomenon of desensitization and to work with an eye which might be kept more or less constantly in a condition of sterile inflammation, a "multiple" antigen was used to sensitize the eyes of a new series of rabbits. This was prepared by mixing together the citrated or defibrinated blood of a number of animals along with some other foreign proteins. The first multiple antigen consisted of citrated guinea pig, sheep and pigeon blood, horse serum, 5% casein, 5% egg white, and an an-hemolytic streptococcus vaccine. Considering each blood as com-

¹ Seegal, D., and Seegal, B. C., *Proc. Soc. Exp. Biol. and Med.*, 1930, xxvii,

posed of 2 antigens, serum and red cells, this constituted a total of 10 different antigens. One anterior chamber, or in some cases both anterior chambers, were injected with 0.2 cc. of this mixture after the removal of 0.2 cc. of anterior chamber fluid, as previously described.¹ The local sensitiveness of the eyes was then tested by the separate intravenous injection of each ingredient of the multiple antigen, after the initial reaction in the eye, due to the presence of the foreign proteins, had subsided. The sensitized eye responded to each succeeding injection by a sterile inflammatory reaction already described. The time allowed to elapse between the intravenous injections of each of the separate antigens varied from one to several days. The experimental results obtained in 30 rabbits over a period of 11 months may be summarized as follows:

1. Two tenths of 1.0 cc. of a multiple antigen containing 10 separate ingredients, or in other words, 0.02 cc. of a single foreign protein, when introduced into the rabbit's anterior chamber, is sufficient to produce an altered reactivity of that eye such that when 1 cc. of one of the 10 antigens is introduced intravenously the eye shows hyperaemia of the iris and conjunctiva with more or less oedema and lacrimation during the next 24 hours.

2. Eyes sensitized with the multiple antigen will show an inflammatory reaction for as long as 8 months, at least, following the intravenous injection of fractions of the total antigen.

3. Repeated daily intravenous injections of a single antigen usually produce no reaction after the first few days. Injection of different antigens intravenously on succeeding days produces a continued sterile inflammatory process in the sensitized eye. After the total number of single antigens has been injected, repetition of these injections now fails to produce a similar response. Instead, the eye reaction is at a much lower level and the inflammatory response is manifested only to a few of the antigens injected intravenously.

4. Permanent desensitization of the eye has not occurred in animals which have been followed for at least 8 months. Animals may develop maximal eye responses following intravenous injections of the same antigen if sufficient time has elapsed between injections. Nevertheless, the eye reactions which can be elicited 6 or 7 months after sensitization are less intense than the initial responses.

5. The ability of the eye to light up following the intravenous injection of the homologous antigen is not due to an initial tissue injury as is proven by the fact that the reaction is specific and anterior chambers injured with typhoid vaccine will not respond sub-

sequently when the various proteins used for sensitization of the other eyes are injected intravenously.

6. It has been impossible to demonstrate sensitivity in the eye by the intravenous shocking route until at least the fifth day following introduction of the antigen into the anterior chamber.

7. Rabbits vary considerably in the intensity of reaction which can be elicited from them, but none was found which failed completely to give any reaction.

8. An experiment may be reported in which an eye sensitized to a multiple antigen containing cat red blood cells became inflamed 5 hours after the introduction of 35 cc. of a 50% suspension of partially hemolyzed cat red blood cells by stomach tube into the gastrointestinal tract.

9. Experiments in progress show that toxic antigens and bacterial bodies may be used to elicit the type of reaction obtained with the multiple antigen described above.

4780

Observations on the Blood Vessels of the Vascular Membrane of Chicken Embryos.

A. E. COHN, F. LANGE AND W. EHRICH.

From the Hospital of the Rockefeller Institute for Medical Research, New York.

It was the object of these experiments to attempt to discover first, whether there was a difference in innervation between the blood vessels of the vascular membrane of chicken embryos and innervated blood vessels; and second, what changes occurred in the blood vessels of the embryos' vascular membrane during the course of its development. The experiments were carried out in a constant temperature room with eggs at all ages but especially at the 3rd and 4th days of incubation. The eggs were opened at the end of the air-chamber. In connection with innervation both physiological and anatomical investigations were made. In the physiological experiments stimuli of mechanical, electrical and chemical varieties were applied. In the manner of Ricker it was found possible to grade the strength of the stimuli into weak, medium and strong, and doses were found of each variety of stimulus so that comparable effects in the vessels could be observed: constriction or dilatation, but more often dilatation with the weak stimuli, constriction with