NOTES

THE EFFECT OF PENICILLIN ON EXPERIMENTAL STREPTOCOCCUS, PNEUMOCOCCUS AND STAPHYLOCOCCUS INFECTIONS OF THE EGG EMBRYO

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Received for publication March 17, 1944

The following work was done as part of a study to determine the action of low concentrations of penicillin upon certain pathogens. Rammelkamp and Keefer (1942) using blood and serum cultures and Heilman and Herrell (1942) using tissue cultures markedly increased anti-streptococcal and anti-staphylococcal activity by adding penicillin. It seemed of importance to determine the usefulness of the chick embryo as a test subject in penicillin studies.

Developing egg embryos, infected with the organism under study were treated with fractions of Florey units per ml of penicillin and their behavior was compared with untreated controls. Seven-day-old eggs were inoculated with 0.2 ml of a diluted 18-hour broth culture of pneumococcus Type I, hemolytic streptococcus (203 MV), (Lancefield’s Group A), hemolytic streptococcus (342) (Lancefield’s Group C) or Staphylococcus aureus (FDA strain). Plate counts showed that each egg received approximately 10,000 chains or clusters of streptococci or staphylococci. All inoculations were made into the allantoic space. Treated embryos were given penicillin immediately following the administration of culture. Partially-purified penicillin containing from 100 to 150 Florey units per mg was used. The capacity of the eggs was estimated at 30 ml and the amount of penicillin added gave concentrations of penicillin ranging from 0.1 to 0.5 Florey units per ml of egg embryo substance.

It was found that all of the organisms studied produced quickly fatal infections when inoculated into egg embryos and that 0.1 Florey unit per ml of penicillin prevented infection. Smears and blood agar cultures were made from the fluid of embryos living after three days, and all were found to be sterile.

The experiments are significant in that they show once again the effectiveness of fractional Florey units per ml of penicillin in killing susceptible bacteria in a highly favorable medium. In addition, they suggest that small concentrations of penicillin are highly effective when injected into locations from which diffusion is delayed.

SUMMARY

Fertile eggs injected with penicillin to a final concentration of approximately 0.1 Florey unit per ml resist experimental infection with pneumococcus, Streptococcus pyogenes (Group A and C) and Staphylococcus aureus. It is thus shown that the developing chick embryo will be a useful test subject in penicillin work.
REFERENCES

A NEW SALMONELLA TYPE ISOLATED FROM MAN AND FOWLS *

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Received for publication April 13, 1944

The type to be described, Salmonella (var. concord), is represented by four cultures. Two were isolated by Dr. J. R. Beach from the heart blood of baby chicks from two different flocks and were forwarded to the writers by Dr. W. R. Hinshaw. The third was isolated from the lung of a chick 21-days-old and was sent by Dr. C. U. Duckworth. The fourth was isolated in England from the stool of one of the patients affected in a small outbreak of food poisoning. It was received from Dr. Joan Taylor.

The organisms were motile rods which possessed the usual morphological and cultural characteristics of Salmonella and which produced hydrogen sulfide but failed to form indole or liquefy gelatin. Acid and gas were produced from glucose, maltose, arabinose, trehalose, rhamnose, xylose, dulcitol and sorbitol. Lactose, sucrose, inositol, glycerol and salicine were not fermented. The organisms decomposed dextro-tartrate, levo-tartrate, meso-tartrate, mucate and citrate.

On serological examination the organisms were agglutinated strongly by Salmonella (var. oranienburg) O serum (VI, VII ... ) and in absorption tests completely removed agglutinins from the serum. The O antigens of var. concord are VI, VII .... In the examination of flagellar antigens var. concord was found to be diphasic. Phase 1 was flocculated in high dilution by sera representative of antigens lv, lw, lz12 and lz26. When tested with single factor sera, it was agglutinated by v serum but not by w, z13 or z28 sera. Phase 1 of var. concord completely removed flagellar agglutinins from serum derived from phase 1 of Salmonella (var. bredeney) (l, v). The antigens of phase 1 are l, v.

Phase 2 of var. concord was flocculated by sera derived from the various nonspecific phases of the Kauffmann-White classification. When tested with single factor sera for antigens 2, 3, 5, 6 and 7, agglutination occurred only in sera for factors 2 and 3. Serum derived from phase 2 of type newport

*The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is published by permission of the Director.