THE RELATION OF HYDROSTATIC PRESSURE TO SPECIFIC PRECIPITATION, ANTIBODY INACTIVATION, AND PROTEIN DENATURATION. Frank H. Johnson, Princeton University, Princeton, New Jersey.

Under a pressure of 10,000 lb per sq inch the rate of specific precipitation, in the presence of the synthetic hapten 1,3-dihydroxy-2,4,6, tris (azobenzene-4'-azobenzene-3'-arsonic acid) benzene, is greatly retarded at room temperature, although following the release of pressure it takes place in apparently the normal manner. The inactivation of anti-Staphylococcus hemolysin at 65 C is also retarded by this pressure. Lower pressures accelerate the rate of bacterial reproduction above the normal optimum temperature, presumably by counteracting a reversible denaturation of the limiting enzyme. Pressures up to 10,000 pounds retard the rate of disinfection of Escherichia coli at temperatures above 45 C, as well as at lower temperatures in the presence of quinine which accelerates the disinfection rate. The precipitation of purified human serum globulin at 65 C is accelerated by small concentrations of ethanol but is greatly retarded by pressures up to 10,000 pounds, with as well as without the alcohol. These results indicate large molecular volume changes of activation or of reaction, suggesting extensive changes in protein molecules in each case. The data were obtained in collaboration with Dr. Dan Campbell, Dr. George Wright, and Mr. Isaac Lewin.

THE AGGLUTINATION OF CERTAIN TYPES OF INTESTINAL BACTERIA FROM A HEALTHY HUMAN SERUM. Hazel B. Gillespie, M. Harriet Waugh, and Yvonne V. Serrett, Department of Bacteriology, New Jersey College for Women, Rutgers University, New Brunswick, New Jersey.

Aerobic and facultative cultures (85 rapid and 7 slow lactose-fermenting, coliform types; 13 gram-negative, non-lactose-fermenting rods; 9 easily grown, gram-positive rods) were isolated from feces from one healthy human being. Using agglutinating sera, 571 tests were made with serum from the individual from whose intestinal flora the cultures had been secured, 40 with serum from two other human beings, 194 with rabbit serum, 160 with horse serum, 40 with serum from a newborn calf, and 26 with cow serum.

Sixty-six (72 per cent) of the 92 coliform and paracolon antigens gave titers ranging from 1:230 to 1:2,560 with "homologous" human serum, whereas none of the 22 non-coliform antigens gave titers higher than 1:80. "Heterologous" sera agglutinated many coliform antigens, but the titers obtained were lower.

These data suggest the possibility that certain strains of coliform bacteria which may inhabit the so-called normal intestine have greater invasive power or virulence than do other similarly situated bacterial types.


Antihistaminic substances are able to prevent allergic manifestations in which histamine is considered to be the principal offender. It is generally supposed that they do not interfere with the antigen-antibody reaction but with histamine, which is liberated during this reaction.

In order to determine whether pyribenzamine interferes with bacterial immune processes, studies were made on its influence upon the therapeutic action of antipneumococcal serum in experimental pneumococcal infection, of sulfathiazole in
pneumococcal and streptococcal infections, and of penicillin in streptococcal infections of mice; the production of immunity in mice after recovering from pneumococcal infections; the opsonic activity of leucocytes toward staphylococci; the capsular swelling reaction of Neufeld; the agglutination reaction between staphylococci and homologous staphylococcal rabbit serum; and the hemolytic activity of streptococci in vitro.

In no case was any influence upon these processes observed. These results show that therapy with pyribenzamine does not interfere with immunization activities of the body and the chemotherapeutic activity of antibacterial agents. Such studies might help clarify the question of relationship between sensitization and immunization.

EASTERN PENNSYLVANIA BRANCH

One Hundred and Eighty-sixth Meeting, Philadelphia County Medical Society

Building, Philadelphia, Pa., March 26, 1946


An improved apparatus for the study of experimental airborne disease embodies the three essentials in an earlier model: first, an atomizer to suspend organisms in the air constantly; second, an inhalation chamber in which animals may be safely and conveniently exposed to this infection and samples collected; and third, an incinerating chimney to create constant airflow through the apparatus and to dispose of the organisms before the air is discharged into the room. Connecting lines are also adapted to the use of the apparatus as a testing device, using live animals for study of the effects of state and stage of airborne infection.

Auxiliary apparatus includes a settling chamber in which the sedimentation rate of the experimental nuclei can be determined. Settling velocity is given by the ratio of the volume count, determined by the air centrifuge, to the area count. Equivalent diameters of different-sized droplet nuclei produced in the aerosol flask can then be computed by Stokes law.

Tubercle bacilli are separated by culture in a revolving flask, containing glass beads. Filtered through a number 4 Whatman filter, the individual cells produced by this technique are counted by the Breed method.

II. Quantitative Enumeration of Tubercle Bacilli in Vitro. Cretyl Crumb, Laboratories for the Study of Airborne Infection, University of Pennsylvania. Our problem involved the enumeration of single tubercle bacilli of the Ravenel strain in pure culture. Media supplied by standard laboratories proved unsuitable for our purpose. Whether any medium could grow single bacilli was first settled by inoculating progressive filtrates of standard cultures upon several media. Comparative tests of available media then disclosed a principle upon which an adequate formula was based. Sterile, fresh egg yolk is added with special aseptic precautions to an agar base, consisting essentially of the liquid medium used for the standard culture of these bacilli. This broth is a blend of equal parts of three Difco broths (brain heart infusion, tryptose phosphate broth, and nutrient broth) plus 5 per cent glycerol.

For the solid medium (from which the glycerol is omitted) 1.5 per cent agar is added.

The suitability of the medium for our needs was tested by inoculation with aliquotes of filtrates from 9 successive weekly generations of a standard culture. From counts of these suspensions of single cells, determined by the Breed method, and counts of colonies on this medium, we infer that, within the precision of measurement, there was no indication that any cell cultivated by the standard method would not grow. Thus the colonies represented quantitative counts.
III. Quantitative Enumeration of Tubercle Bacilli in Vivo. H. L. Ratcliffe, Department of Pathology, University of Pennsylvania.

Techniques and apparatus described by Wells and Crumb demonstrate that the respiratory system of the normal laboratory rabbit can serve as an additional means of determining the numbers of viable tubercle bacilli in droplet nuclei transported by experimental atmospheres. We have produced experimental infections resulting in the development of from 1 to more than 10,000 tubercles; but we have found that, for accurate enumeration, doses should range below 200 bacilli. Within this range tubercles reach diameters of 4 to 6 millimeters within 4 to 5 weeks and can be counted as readily as colonies of other organisms on an agar plate. Moreover, within this dosage range and time limit tubercles seem to develop as independent entities without significant evidence of fusion or hematogenous spread.

Under appropriate conditions of aerosol suspensions (Wells and Ratcliffe: 1945, Proc. Phil. Soc. Phila.) organisms are deposited quantitatively in alveoli; counts of tubercles corresponded to colonies obtained on the Crumb medium and to slide counts of suspensions. Thus we have reason to believe that any organism in our standard culture, observable under the microscope, will produce a visible tubercle in the lungs of normal rabbits if inhaled under the experimental conditions which have been described. All evidence thus far obtained supports the opinion that under the conditions of these experiments a single tubercle will develop from a single organism planted on alveolar walls.

Development of Streptomycin Resistance of Shigellae. Morton Klein and Leonard J. Kimmelman, Department of Bacteriology, School of Medicine, University of Pennsylvania, Philadelphia 4, Pa.

One Hundred and Eighty-Seventh Meeting, Philadelphia County Medical Society Building, Philadelphia, Pa., April 23, 1946

SEROLOGY OF RHEUMATOID ARTHRITIS. A. D. Wallis, Department of Orthopedic Surgery and Physical Medicine, School of Medicine, University of Pennsylvania, Philadelphia 4, Pa.

Allergy Against Insulin. Mary H. Loveless, New York Hospital and Department of Medicine, Cornell University Medical College, New York, N. Y.

One Hundred and Eighty-Eighth Meeting, Philadelphia County Medical Society Building, Philadelphia, Pa., May 14, 1946

Studies on Inhibition of Growth by Structural Analogues of Metabolites. D. W. Wolley, Rockefeller Institute for Medical Research, New York, N. Y.