inhibition and growth retardation (NAEYE and BLANC: J. amer. med. Ass. *194:* 1277 [1965]). In seeking an explanation for these phenomena a substance inhibiting mitosis was found in infected WI-38 cells. WI-38 cells that had gone into mitotic arrest two weeks after rubella virus infection were extracted by freeze-thawing. When freed of virus, extracts of infected cells induced mitotic inhibition of normal WI-38 cells and of a skin fibroblast cell strain. No effect was seen on continuous lines of human cells or on non-human cell lines. The inhibitory substance was trypsin-sensitive and heat-labile but was unaffected by rubella antibody, ether, ribonuclease, or deoxyribonuclease. It was not sedimentable or acid-stable and did not protect cells against the action of vesicular stomatitis virus. Concentrated rubella virus inactivated by ultra-violet irradiation did not itself produce growth inhibition.

This substance offers a potential explanation for the mitotic inhibition associated with rubella virus infection *in vitro* and *in vivo*. (SPR)

34 *Clinical Experience with Natural and Atentuated Rubella Virus Infection.* H.M. MEYER, Jr.*, P.D. PARKMAN* and T.C. PANOS, National Institutes of Health, Bethesda, Md., and Univ. of Arkansas Medical Center, Little Rock, Ark.

Experience with attenuated rubella virus (strain HPV-77) indicates that infections in vaccinees are asymptomatic and non-communicable. HPV-77 is fully immunogenic when given parenterally but much less so intranasally. Ninety-six % of 51 subjects given 10 to 10,000 tissue culture infectious $dose_{50}$ ($TCID_{50}$) subcutaneously developed antibodies while only 2 of 26 sero-converted after intranasal inoculation. None of 49 susceptible contacts of vaccines was infected. Antibodies evoked by HPV-77 remained unchanged in titer in 30 persons followed for 1 year. In a group with natural rubella, antibodies also followed a plateau-curve but were 8 to 16 times higher throughout. Vaccine dosage did not influence antibody response; inoculation of 10, 100, 1000 or 10,000 $TCID_{50}$ of attenuated virus resulted in similar levels of antibodies. Persons with prior immunity from natural rubella had antibody increases in 2 of 17 instances after rubella exposure and in 3 of 12 after HPV-77 vaccination; none had illness or excreted virus. Five children with antibodies from vaccination 8 to 12 months earlier were challenged intranasally with 200 $TCID_{50}$ of unmodified virus. All remained asymptomatic and virus was not recovered from pharyngeal swabs or blood. Antibody levels increased in two. Five controls similarly challenged developed typical rubella with virus excretion and viremia. These observations suggest: 1. the HPV-77 strain is a safe and effective immunizing agent; 2. vaccine-induced immunity persists for long periods; 3. under natural conditions rubella exposure may be important in insuring life-long immunity; 4. attenuated virus vaccine can boost antibody levels of persons with declining immunity. (APS)

35 *Evaluation of a Live Attenuated Mumps Vaccine.* PHILIP A. BRUNELL* and ANTHONY BRICKMAN*, NYU Sch. of Med., New York, N.Y. (introduced by Saul Krugman).

A live attenuated mumps vaccine (Jeryl-Lynn strain) was evaluated in a field trial which included more than 2300 children who had no previous history of mumps. The objectives were to study antigenic potency and side effects of the vaccine. Parents of vaccinees recorded daily temperatures and other symptoms on a card which was returned. Paired serum specimens were obtained at the time of vaccination and one month later from 1202 children. The results to date indicate: 1. 45 % of 592 children who had no history of having mumps had detectable serum antibody before vaccination; 2. 98 % of 340 seronegative vaccinees had 4-fold or greater antibody response; 3. the vaccination was tolerated very well; the incidence of febrile responses and of clinical symptoms was essentially the same in 335 successfully vaccinated children as compared with 252 children who were immune prior to vaccination. These studies indicate that the vaccine is antigenically potent and is clinically acceptable. (SPR)

36 *Experimental Genital Herpes Simplex infection in the Mouse.* ANDRÉ J. NAHMIAS, ZUHER M. NAIB*, ANITA K. HIGHSMITH* and WILLIAM E. JOSEY*. Emory Univ. Sch. of Med., Atlanta, Ga.

In view of the important role of maternal genital infection as the source of herpes simplex virus (HSV) infection in the newborn (J. amer. med. Ass. *199:* 1132 [1967]), an experimental model in mice was developed. Female mice could be readily infected by insertion in the vagina of a cotton pellet soaked with HSV. The occurrence of infection was substantiated by the recovery of virus from the vagina for as long as 12 days and by the demonstration of concomittant cytological changes (multinucleated giant cells with intranuclear inclusions). 90 % of the mice died of encephalitis within 20 days after inoculation. Death could be prevented in up to 60 % of infected mice by repeated administration of gamma globulin.

Evidence has been obtained that the newborn mouse becomes infected with herpes simplex virus on passage through the infected birth canal of the mother mouse. Infection in male mice was also induced by direct inoculation of virus in the penis. In addition, sexual transmission of genital infection was demonstrated when uninfected male mice placed in contact with infected females developed herpetic penile lesions.

Using this experimental model, it has also been possible to differentiate herpes strains obtained from human genital lesions from strains recovered from non-genital sites. Such differences between genital and non-genital strains of herpes simplex virus have also been found by immunological methods and by inoculation onto chorioallantoic membranes (genital strains form large pocks, non-genital strains form smaller pocks). (SPR)

37 *Studies on the Virulence of Herpes Simplex Viruses Isolated from Different Clinical Entities.* CHARLES ALFORD*, MARTHA SNIDER* and GAYLE STUBBS*. U. of Alabama Medical Center, Birmingham, Ala. (introduced by Herschel Bentley).

Recently, herpes simplex viruses (h.s. No. 1) were isolated at 5 days and 6 months after delivery from an infant with recurrent skin vesicles and microcephaly. Because of the unusual nature of this illness, studies on the virulence of h.s. No. 1 and 4 other strains of h.s. viruses, isolated from cases of recurrent labialis or conjunctivitis, were performed and compared in mice and in plasma clot cultures of human fetal brain. The virus preparations used were produced and quantitated in primary rabbit kidney cell cultures (RK) and, to avoid laboratory attenuation, 2nd to 3rd passage materials were employed as inocula.

In albino Swiss mice, h.s. No. 1 was the most virulent strain producing typical neurotropic effects with exceptionally small quantities of virus. When levels of the other strains resulted in neither neurotropic signs nor death after intramuscular inoculation of mice, 100 fold less of h.s. No. 1 produced 96 % mortality.

In young plasma clot cultures of human fetal brain, h. s. No. 1 was again the most virulent strain. Compared to simultaneous quantitation of strains in RK cultures, 10 to 300 fold less h.s. No. 1 virus was required to infect brain cultures. One of the other strains showed a lesser increase in virulence for human brain relative to the other 3. No difference in virulence of any of the strains was noted in cell cultures of human amnion, diploid lung or green monkey kidney.

These data suggest that inherent differences in the neurotropic capacities of herpes simplex viruses may be a determinant in the production of central nervous disease after infections of man. (SPR)

38 *Attenuated Vaccinia in the Elective Primary Vaccination of Eczema Patients.* C. HENRY KEMPE, University of Colorado School of Medicine, Denver, Col.

1009 patients suffering from eczema or other skin disorders have received elective primary vaccination with the CVI-78 strain of vaccinia. The vaccine is attenuated by repeated passage through chick embryoes; its infectivity titer is 8.4 (TCD_{50}/ml), and it is free of bacteria. It was administered by one of three routes (multiple pressure, subcutaneously or jet gun) with a minimal dose of $TCID_{50}$ of 1000 and a maximal dose of $TCID_{50}$ of 30,000. Local and systemic reactions and temperature elevations in these children were significantly less marked than those experienced with a standard strain of vaccinia in normal children. No virus dissemination or other complications occurred, except for two instances of mild erythema multiforme. Seroconversion was noted in all 387 patients tested to date. Multiple pressure revaccination with a standard strain one to six months later resulted in marked modification in the reaction to the standard strain; no systemic reactions developed. It would appear that CVI strain of vaccinia virus is effective for elective primary vaccination of children suffering from eczema for prevention of eczema vaccinatum. (APS)

39 *Severe Illness (Atypical Exanthem) Following Exposure to Natural Measles. 11 Cases in Children Previously Inoculated with Killed Vaccine.* PHILIP R. NADER*, MARSHALL HORWITZ* and JOHN ROUSSEAU*, National Communicable Disease Center USPHS, Atlanta, Ga., and Community Hospital, Riverton, Wyoming (introduced by Richard W. Blumberg).

A cluster of cases of an unusual exanthem with high fever, myalgia, tachypnea and prostration occurred in children in R verton, Wyoming, in the spring of 1966. The initial macular rash characteristically began on the lower extremities and progressed cephalad. Most cases also developed vesicular lesions which were larger and less discrete than those seen in varicella and did not crust. A purpuric rash was noted in one instance. One child developed pneumonia and another had generalized edema. Epidemiologic investigation revealed that all 11 cases occurred among a group of 97 children who had received three injections of inactivated measles vaccine in 1962. All had a recent exposure to *natural measles*, their first known exposure since receiving the inactivated vaccine four years previously. Of 31 children in this group who subsequently received live vaccine, two developed local reactions at the site of injection of live vaccine. Viral isolation attempts in four of the cases were negative. Serial serologic specimens from five atypical cases showed a greater than fourfold rise in CF and HAI measles antibodies in one case and a greater than fourfold fall in four cases. Initial samples in these four cases were obtained one to three weeks after onset of rash. CF antibodies to varicella and herpes simplex remained stable at low or undetectable levels. (APS)

40 *Maternal and Neonatal Infection with Cytomegalovirus in Taiwan.* E. RUSSELL ALEXANDER, Univ. of Wash. Sch. of Med., Seattle, Wash., and U.S. Naval Medical Research Unit No. 2.

The prevalence of cytomegalovirus (CMV) infection in normal pregnant women in Taipei was measured by culturing cervical specimens in human diploid fibroblast cells. Eighteen of 100 Chinese women but none of 33 Americans yielded cervical CMV once (15 cases) or more (3 cases) during the second and third trimesters. Multiple urine specimens were examined from 58 of the Chinese and 36 Americans. CMV was recovered from one Chinese and one American, but not from their cervices. CMV was not recovered from the urine of 15 cervical positive women (59 cultures), the saliva of 11 (33 cultures), nor the placentae of 8. Five of 13 cervical positive women yielded CMV on post partum examination. Fourteen infants of cervical positive Chinese mothers and 11 infants of the next cervical negative mother to deliver were studied. None of the 25 yielded CMV in urine or saliva in the first week of life. Fourteen of these 25 infants first became positive between 6 weeks and 6 months of age and most remained positive on repeated cultures. Eight were born to previously positive mothers and 6 to previously negative mothers, indicating no direct association with the CMV status of the mother. Likewise, abortion or prematurity was not increased in infected mothers. Infected infants did not differ from uninfected in body measurements, growth, or apparent illness. Thus, the high prevalence of inapparent cervical CMV infection in the Chinese sample did not result in a high risk of fetal infection or infant disease, possibly because recovery of cervical CMV alone indicates a localized recurrence rather than generalized infection. (SPR)

41 *Investigation of 26 Childhood Cases of Acute Epidemic Poststreptococcal Glomerulonephritis.* ALFRED J. FISH*, ROGER C. HERDMAN* and ROBERT A. GOOD, Ped. Research Labs. of Variety Club Heart Hosp., Univ. of Minn., Minneapolis, Minn.

Controversy concerns immunological and ultrastructural features of acute poststreptococcal glomerulonephritis. Opportunity to study, by renal biopsy, immunohistochemistry and electron microscopy, an entire single population of patients with poststreptococcal glomerulonephritis permitted us to resolve several conflicts and to learn more of pathogenesis and natural history. An epidemic of 26 cases of acute poststreptococcal glomerulonephritis occurred among Red Lake Reservation Indian children 2 to 15 years of age. Type 49 beta hemolytic streptococci reappeared at Red Lake for the first time since the 1953 epidemic of acute glomerulonephritis. Clinical manifestations were minimal but most children had pustular streptococcal skin le-