

Pathogenesis and vertical transmission of a transplacental rat cytomegalovirus

ABSTRACT

Background Cytomegalovirus (CMV) congenital infection is the major viral cause of well-documented birth defects in human. Because CMV is species-specific, the main obstacle to developing animal models for congenital infection is the difference in placental architecture, which precludes virus transmission across the placenta. The rat placenta, resembling histologically to that of human, could therefore facilitate the study of CMV congenital infection in human. **Results** In this report, we present clear evidences of the transplacental property of a new rat CMV (RCMV), namely ALL-03, which had been isolated from placenta and uterus of the house rat. Our study signifies the detection of infectious virus, virus particles, viral protein and DNA as well as immune response to demonstrate a natural model of acute CMV infection including the immunocompetent and immunocompromised host associated with or without pregnancy. It is characterized by a full range of CMV related clinical signs; lesions and anatomical virus distribution to uterus, placenta, embryo, fetus, neonate, lung, kidney, spleen, liver and salivary gland of the infected rats in addition to the virus-specific seroconversion. The preference of the virus for different organs mimics the situation in immunocompromised man. Most interestingly, the placenta was observed to be involved in the maternofetal infection and hence confirmed the hypothesis that the RCMV strain ALL-03 is capable to cross the placenta and infect the offsprings congenitally. **Conclusion** The maternal viremia leading to uterine infection which subsequently infecting to the fetus through the placenta is the most likely phenomenon of CMV vertical transmission in our study.