ease in domestic animals (e.g., pigs) and humans has reached an alarming level (Table). Human infection rates in certain areas in China have been high; for example, in Inner Mongolia, samples collected from 1,529 randomly selected persons during 1994–1996 showed that 35.3% of the local population, 57.0% of local pregnant women, and 100% of newborns of infected mothers were positive for hemotrophic mycoplasma infection (2). Infections in animals in China have been recognized since 1995, and the number of cases has been increasing rapidly. For example, >600,000 pigs infected with M. suis were reported in 2003 (Table). These infections have had a large economic impact on regions where the infection is endemic (8). Infections in other animals, including cows, sheep, and foxes, were also common, indicating a high prevalence of the bacteria in China. However, because of the lack of in vitro cultivation systems that assist in characterizing pathogens, progress in species identification and molecular characterization of these pathogens has been slow. Thus far, names of hemotrophic mycoplasma species have been based on the hosts from which they were identified. Due to the zoonotic nature of these pathogens, more in-depth studies on these microorganisms are needed.

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Sensitivity of Andes Hantavirus to Antiviral Effect of Human Saliva

To the Editor: Hantaviruses cause 2 severe and often fatal human diseases, hemorrhagic fever with renal syndrome (HFRS) in Eurasia and hantavirus cardiopulmonary syndrome (HCPS) in the Americas. Rodents are the natural hosts for hantaviruses that cause HFRS and HCPS, and humans are usually infected by aerosolized virus-contaminated rodent excreta (1,2). Except for Andes virus (ANDV), human-to-human transmission of hantaviruses does not seem to occur. ANDV clearly is transmitted directly
from human to human (3), but exactly how this occurs or why other pathogenic hantaviruses are not transmitted between humans is not known.

ANDV antigen has been detected in the secretory cells of the salivary glands of humans (4). The risk for infection with ANDV is higher in people having sex or involved in deep kissing with an infected person than in other contacts (3), suggesting that transmission of ANDV needs close person-to-person contact. Therefore, one can speculate that ANDV is likely to be secreted into saliva and that saliva is involved in human-to-human transmission. Hantaviruses can be transmitted through saliva between the natural hosts (6,7), indicating that hantaviruses can withstand the antiviral effects of saliva or can interfere with production of saliva and thereby inhibit its antiviral effect.

We recently showed that saliva from Puumala hantavirus (PUUV)—infected humans contains viral RNA (8). This finding suggests that PUUV, and perhaps other hantaviruses, might be secreted into human saliva. However, we found no evidence of replicating virus in the saliva samples (8,9); neutralizing antibodies or salivary components may have inactivated the virus. We therefore analyzed the effect of saliva on the prototype hantavirus, Hantaan virus (HTNV). Our analysis shows that although HTNV is sensitive to the overall antiviral capacity of human saliva from healthy donors, it is insensitive to the antiviral effects of certain salivary components, i.e., histatin 5, lactoferrin, lysozyme, and secretory leukocyte protease inhibitor (9), which are known to have antiviral effects against other viruses.

We tested the hypotheses that ANDV might be less sensitive than HTNV and PUUV to the antiviral effect of human saliva. Saliva from healthy persons with no evidence of seropositivity against hantavirus was pooled and preincubated at different concentrations with 10,000 focus-forming units of ANDV (strain Chile-9717869), HTNV (strain 76-118), or PUUV (strain Kazan E6) for 1 hr (9). The virus plus saliva mixtures were then titrated on Vero E6 cells. Virus without saliva was used as a control. The medium used for dilution of saliva and virus was Hank's balanced salt solution (Invitrogen, Paisley, UK) supplemented with 2% fetal calf serum, 2% HEPES, 100 U of penicillin/mL, and 100 µg of streptomycin/mL. Because of a cytopathic effect on the cells, we could not test saliva concentrations >50% (9). After incubation, titers in samples incubated with saliva were calculated and compared with titers from virus incubated without saliva.

The different hantaviruses clearly differed in their sensitivities to human saliva. At a low concentration (12.5% saliva), we observed a slight effect on HTNV, even though we saw no effect on ANDV and PUUV. ANDV was the only virus that resisted higher concentrations of saliva (25% and 50%), and an antiviral effect was clearly observed on HTNV and PUUV at these saliva concentrations (Figure).

Our finding that ANDV is less sensitive than HTNV and PUUV to the antiviral effect of human saliva might explain why ANDV, but not HTNV or PUUV, is transmitted between humans. Saliva might be the preferred route of transmission for ANDV between humans, as it is for the long-tailed rice rat (Oligoryzomys longicaudatus), the natural host for ANDV (10). However, transmission of ANDV between rodents, from rodents to humans, and between humans differs. Replicating hantaviruses have not been isolated from saliva of patients with HFRS or HCPS. In patients who have seroconverted, hantavirus-specific antibodies are likely to be present and might efficiently neutralize the virus, including ANDV. If this is the case, the interval might be short between excretion of the virus into the saliva and conversion, enabling the infected person to transmit hantavirus to other humans. Ferres et al. showed that in persons who developed HCPS after human-to-human transmission of ANDV, viremia preceded onset of disease and detection of ANDV-specific antibodies by up to 2 weeks (5). Sampling of saliva from healthy household contacts to ANDV-infected persons, with subsequent virus isolation attempts, might show whether human saliva is the mode of ANDV transfer during human-to-human transmission.
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Spread of Cantagalo Virus to Northern Brazil

To the Editor: Cantagalo virus (CTGV) is a strain of vaccinia virus (VACV; Poxviridae) that was isolated from pustular lesions on dairy cattle and dairy workers in Rio de Janeiro State, Brazil, in 1999 (1). Subsequently, similar lesions caused by poxviruses have been reported in cattle and humans in all 4 states of the southeast region of Brazil and in Goiás State in central-western Brazil (online Technical Appendix, panel A). Such lesions have now spread rapidly to other states in Brazil and neighboring countries (2). CTGV isolated from the first case was shown to be genetically related to CTGV strains unrelated to VACV (3). Subsequently, CTGV-like disease has not been reported in the northern, northeastern, and southern regions of the country, rapid interstate spread of CTGV infection is of concern. We report an episode of CTGV infection in Tocantins State, northern Brazil (online Technical Appendix, panel A).

In September 2008, teat and under lesions were found on 15 of 356 febrile (39.5°C–40°C) cattle on a dairy farm in the municipality of Muriciândia. Small papules progressed to vesicles and pustules (online Technical Appendix, panel B), which usually healed in 3–4 weeks. New lesions subsequently appeared on previously healthy cows on the same farm, and muzzle lesions developed on suckling calves. Dairy workers reported fever and lesions on their hands and neck. The farm was quarantined for 3 weeks until the condition was diagnosed.

Four scab samples were sent for virus identification by PCR. Parts of the samples were used to infect BSC-40 cells and for DNA isolation by phenol-chloroform extraction, as described (4). After 48 hours, a strong cytopathic effect suggested poxvirus infection. The PCR used unambiguously differentiates CTGV-related infections from other orthopoxvirus diseases, including cowpox virus and several VACV strains (6). The reverse primer targets nucleotide sequences flanking the deletion signature of the hemagglutinin gene from CTGV-related viruses. Therefore, a specific annealing site for the reverse primer is produced when these external sequences are contiguous, as occurs in CTGV (6).