Parachlamydiaceae as Rare Agents of Pneumonia

To the Editor: Members of the Parachlamydiaceae family are emerging intracellular bacteria living in amoebae (1,2). Serologic studies have suggested that Parachlamydia acanthamoeba might be an agent of community-acquired pneumonia transmitted from a water source (3,4). In a single occasion, 16s rDNA of a member of the Parachlamydiaceae family was amplified and sequenced from a bronchoalveolar lavage sample (5). Thus, to specify the role played by the Parachlamydiaceae as agents of lower respiratory tract infection, we developed a real-time polymerase chain reaction (PCR) assay and applied it to 1,200 bronchoalveolar lavage samples, taken mainly from patients with pneumonia of unknown cause and received in our diagnostic microbiology laboratory between 1997 and 2002.

DNA extraction was performed by using the MagNA Pure LC instrument and the MagNA Pure LC DNA Isolation Kit III (Roche Molecular Biochemicals, Mannheim, Germany). Real-time PCR was performed by using TaqMan technology and targeting the gene encoding for a nonmitochondrial ATP/ADP translocase (GenBank accession no. AF490592). This energy parasite gene is present only in rickettsiae, chlamydiae, and plant plastids (6). The master mixture was prepared from the TaqMan Universal Master Mix kit (Applied Biosystems, Foster City, CA), according to the manufacturer’s instructions, and included 200 nM of each primer (Adp81F 5’-TAGTGATCTGC-TACGGGATT, Adp84R 5’-TGGATTAGGATTCAGATT) and 200 nM of the fluorescent labeled probe (6-FAM-5’-AACCTTGTAGGAAAGTTGTGTTAAGCTGTT; TAMRA is 6-carboxyfluorescein and TAMRA is 6-carboxytetramethylrhodamine). Amplification was carried out on the ABI 7700 sequence detection system (TaqMan system, Applied Biosystems), by running 45 cycles, with annealing temperature of 52°C and polymerization temperature of 60°C. To prevent carryover, 200 μM of uracil triphosphate was part of the master mixture, and uracil-N-glycosylase was used systematically. Parachlamydia acanthamoeba strain Hall coccus (kindly provided by T.J. Rowbotham) (3) and sterile water were used as positive and negative controls, respectively. In addition, PCR was tested on Chlamydothila pneumoniae and Chlamydia psittaci and four strains of Rickettsia. All but one (Rickettsia montana) was negative, as were 64 sterile water controls.

Of the 1,200 bronchoalveolar lavage samples tested, 5 (0.42%) were positive. When PCR was repeated for those five samples, four were negative for P. acanthamoeba DNA, and only one was a true positive, confirmed by sequencing the product of the additional PCR. The sequence shared 100% DNA homology with P. acanthamoeba strain Hall coccus (GenBank accession no. AF490592). The patient, a 31-year-old man who was HIV-positive, had pneumonia, cough, and no fever. Chest x-ray examination showed an opacity in the right lung and a bilateral infiltrate. Leukocyte count was 5,000/mm3 with 80 CD4 cells/mm3; microbiologic investigations (in which the bronchoalveolar lavage was examined for cytomegalovirus, Chlamydothila pneumoniae, Legionella pneumophila, Pneumocystis carinii, mycobacteria, and Toxoplasma gondii) did not identify a causal agent.

We developed a highly sensitive PCR, which could amplify as few as 10 bacteria. The assay results in a relatively high specificity (1,192/1,199; 99.67%) because it uses a target gene found only in Rickettsiae,

References
Chlamydiae, and plant plastids, and uses a specific DNA probe. We considerably decreased the risk of horizontal and vertical contamination of the PCR reaction by using uracil and uracil-N-glycosylase and by keeping reaction cups closed since the first amplification cycle.

More importantly, our study showed that Parachlamydia DNA is rarely found in bronchoalveolar lavage samples (0.083%). This suggests that persons are infrequently exposed to Parachlamydia organisms and, consequently, members of the Parachlamydiaceae seldom cause pneumonia in humans. In the only positive sample, whether Parachlamydia originated from bacteria in the oropharynx, from water, or from a colonization of the lower respiratory tract was not known; whether they caused the patient’s pneumonia is also not known. That two strains of Parachlamydia found in amoebae were recovered from the nasopharynx of healthy volunteers (7) favors the first hypothesis. However, that the positive bronchoalveolar lavage specimen was taken from an HIV-positive patient with community-acquired pneumonia suggests that Parachlamydia might occasionally play a pathogenic role in AIDS patients. Moreover, any amoebae-associated bacteria should be considered as a potential emerging pathogen because intra-amoebal growth may lead to the selection of virulence traits and to the adaptation to professional phagocytes, such as alveolar macrophages (1,2). Further studies are warranted to determine whether Parachlamydiaceae causes community-acquired pneumonia, particularly in HIV-infected persons.

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Gilbert Greub,* Pierre Berger,* Laurent Papazian,† and Didier Raoult*†

*Université de la Méditerranée, Marseille, France; and †Hôpital Sainte Marguerite, Marseille, France

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Address for correspondence: Didier Raoult, Unité des Rickettsies, CNRS UPRESA 6020 Faculté de Médecine, Université de la Méditerranée, 27 Boulevard Jean Moulin, 13385 Marseille Cedex 05, France; fax: 00-33-491-83-03-90; email: didier.raoult@medecine.univ-mrs.fr

Hantaviruses in the Czech Republic

To the Editor: Infections caused by hantavirus have been known for a long time, but their causative agent was not detected until 1976 (1). These viruses of the genus Hantavirus, family Bunyaviridae, have >20 genotypes. Hantaviruses circulate in wild rodents within natural foci over Euroasia and North and South America. They cause asymptomatic persistent infections in these small mammals. Humans may acquire infection accidentally from inhalation of virus-contaminated aerosols of rodent excreta. Hantavirus genotypes may be nonpathogenic for humans or cause serious diseases with high death rates. In Eurasia, these pathogens involve primarily the kidney and cause hemorrhagic fever with renal syndrome; in North and South America, these pathogens involve primarily the lung and cause hantavirus cardiopulmonary syndrome.

First reports on the occurrence of hantaviruses in central Europe originated from former Czechoslovakia (2,3) and Germany (4) and date back to 1984 and 1985, respectively. The first cases of hantavirus disease in humans in the Czech Republic were reported in 1992 (5). This flulike disease accompanied by microhematuria was recorded in southern Moravia. Another severe imported case was described in a soldier on active military duty in the Balkans (6). The first isolation of nonpathogenic hantavirus Tula was reported in the Czech Republic (7). Currently, several hantavirus infections have been recorded in humans, manifesting mainly as interstitial nephritis. One fatal case was also reported in a patient who had never travelled outside the Czech Republic.

We conducted studies of hantavirus ecology in the Czech Republic and hantavirus seroprevalence in the Czech population. As in neighboring Slovakia (8), hantaviruses of three genotypes, i.e., Dobrava, Puumala, and Tula, were identified in the Czech Republic. Most serious infections are caused by the Dobrava genotype; Tula genotype