Identification of *Facklamia sourekii* from a Lactating Cow

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(Received 10 April 2006/Accepted 7 July 2006)

ABSTRACT. A gram-positive, catalase-negative, facultatively anaerobic coccus was isolated from a lactating cow with hematuria and urodynia in Japan. The isolate was identified by 16S rRNA gene sequence analysis as *Facklamia sourekii*. The biochemical and culture characteristics of the isolate were well consistent with those of *F. sourekii* type strain. Since all *F. sourekii* strains reported so far were isolated from human clinical specimens, this is the first reported case of *F. sourekii* isolated from veterinary clinical specimen.

KEY WORDS: *Facklamia sourekii*, hematuria, lactating cow.

*F. sourekii* is a recently described gram-positive, catalase-negative, facultatively anaerobic coccii [2]. In the genus *Facklamia*, five more species, *Facklamia hominis*, *Facklamia ignava*, *Facklamia languida*, *Facklamia tabacinasalis*, and *Facklamia miroungae*, have been described to date [1, 3, 4, 7, 10]. Although *F. tabacinasalis* and *F. miroungae* strains were isolated from powdered tobacco and a nasal swab of a juvenile elephant, respectively [3, 7], all other *Facklamia* strains were isolated from human clinical specimens [1, 2, 4, 5, 10]. In this report, we describe a case of *F. sourekii* isolated from an animal source.

Late in April 2005, a 5-year- and 5-month-old lactating cow (Holstein), which was kept in a farm in Ishikawa prefecture, Japan, presented with hematuria and urodynia. On the first examination in May 2005, the cow had normal body temperature and a good appetite. Arched back was not observed. After drying off, the cow was treated intramuscularly with 2 g of enrofloxacin on that day, and 2 g of oxytetracycline the day after the first examination, the cow was additionally treated intramuscularly with 4 g of oxytetracycline. Since, in addition to the hematuria, urinary tract infection was presumed, and urine sample was obtained for further investigation. Microscopic examination of the urine showed numerous red blood cells, white blood cells, epithelial cells, *Streptococcus*-like bacteria, but no urinary casts were observed. Further urinalysis demonstrated normal urobilinogen, positive protein, and a pH of 8–9, with negative results for glucose, ketones, bilirubin, and ascorbic acid.

The urine sample was inoculated onto Trypticase soy agar plates and Columbia agar plates containing 5% sheep blood or 5% horse blood, and incubated at 37°C in air plus 5% CO2. After 24–48 hr of incubation, small gray to colorless colonies (maximal diameter of 1.0 mm) with little hemolytic activity on sheep blood cells were observed in pure culture. The isolate (NIAH 13370) was gram positive and ovoid in shape and formed single cells, pairs, or short chains. The strain grew in 6.5% NaCl at 37°C, but not at all at 10 or 45°C. The strain was non-spore-forming, catalase-negative, oxidase-negative, leucine aminopeptidase-positive, pyrrolidonylarylamidase-positive facultative anaerobe (Table 1). Biochemical profile (0023011500; Table 1) generated by the API ID32 STREP system (bioMérieux) identified the isolate as *Aerococcus viridans* and *Streptococcus acidominimus* with only 65.7% and 34.2% probabilities, respectively. Considering the insufficiency of this identification, the 16S rRNA gene sequence was determined as described previously [12], and comparison of the sequence (1,502 bp; DDBJ/EMBL/GenBank accession no. AB248259) with all bacterial sequences available from DDBJ/EMBL/GenBank databases was performed with the BLAST program (http://www.ncbi.nlm.nih.gov/BLAST/).

The isolate was identified as *Facklamia sourekii* based on the base of a 99.87% identity of the 16S rRNA gene sequence with that of *F. sourekii* type strain CCUG 28783AT. In this case, the cow's urinary symptoms eventually resolved. However, because the cow’s condition did...
not drastically improve even after a series of the oxytetracycline and enrofloxacin treatments, it is unclear whether the recuperation could be attributed to the antibiotic treatments or the cow’s inherent immunity.

Because of the limited clinical information, the natural habitat and pathogenesis of *F. sourekii* strains remain unknown at present. Since most of the *Facklamia* strains from human clinical specimens were isolated from female
patients [9], and three of the six F. hominis strains in the original description of the species were isolated from vaginal swabs [1], it has been postulated that the natural habitat of the Facklamia species is the female genitourinary tract [9]. Isolation of F. hominis from urine of a girl [1] and F. languida from the blood of a woman with a urinary tract infection [10], as well as a recent case of chorioamnionitis caused by F. hominis [6], may support this assumption. Consistent with this assumption, in the case presented here, F. sourekii NIAH 13370 was isolated from the urine of a female cow. In addition, the cow presented with hematuria and urodynia. These facts suggest that the habitat of F. sourekii in milk cows is also the female genitourinary tract, and that the species may cause opportunistic genitourinary infections in compromised hosts. For investigation of these possibilities and pathogenesis of the organism, extended epidemiological and molecular biological studies of the Facklamia species will be necessary.

Using the bioMérieux API ID32 STREP system, the F. sourekii isolate was not identified correctly. Instead, the obtained profile misidentified the isolate as A. viridans or S. acidominimus. Similar misidentification of F. sourekii strains by this rapid identification system has been reported previously [8]. In the report, the first of three F. sourekii strains tested was identified as “unaccepted ID”, the second was misidentified as S. acidominimus (%ID=99.9), and the last was misidentified as A. viridans (%ID=94.5, doubtful ID). Similarly, using two other rapid identification systems (the BBL Crystal rapid gram-positive identification and the Remel IDS RapID STR), the three strains could not be identified as F. sourekii [8]. Therefore, when gram-positive cocci-like isolates are identified as S. acidominimus or A. viridans by the API ID32 STREP system, further confirmation using molecular techniques should be performed to obtain an accurate identification.

ACKNOWLEDGEMENT. We thank Dr. Keisuke Matsuda for providing clinical information.

REFERENCES

Table 2. MICs for F. sourekii NIAH 13370 and CCUG 28783A

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>MIC (mg/liter)</th>
<th>F. sourekii NIAH 13370</th>
<th>F. sourekii CCUG 28783A</th>
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<tbody>
<tr>
<td>Enrofloxacin</td>
<td>0.125</td>
<td>0.5</td>
<td></td>
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<tr>
<td>Oxytetracycline</td>
<td>2</td>
<td>0.25</td>
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