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“*Murdochiella vaginalis*” sp. nov., a new bacterial species cultivated from the vaginal flora of a woman with bacterial vaginosis



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ABSTRACT

Here, we summarize the major characteristics of “*Murdochiella vaginalis*” strain Marseille P2341 (=DSM 102237 =CSUR P2341), a new member of the *Murdochiella* genus cultivated from the vaginal swab of a 33-year-old woman with bacterial vaginosis.

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As part of the study of vaginal microbiota by the concept “culturomics” [1], we isolated in the vaginal sample of a 33-year-old patient suffering from bacterial vaginosis [2], a bacterium that could not be identified using matrix-assisted laser desorption-ionization time-of-flight mass spectrometry (MALDI-TOF) mass spectrometry (Microflex spectrometer, Bruker Daltonics, Leipzig, Germany) [3]. The study was authorized by the local ethics committee of the IFR48 (Marseille, France; agreement 09-022) and the patient gave also her written consent.

The vaginal sample was first pre-incubated in a blood culture bottle (BD Diagnostics, Le Pont-de-Claix, France) supplemented with 4 mL rumen that was filter-sterilized through a 0.2 µm pore filter (Thermo Fisher Scientific, Villebon-sur-Yvette, France) and 3 mL of sheep blood (bioMérieux, Marcy l’Etoile, France) at 37 °C. After 15 days of pre-incubation, the sample was inoculated on Schaedler Agar enriched with sheep blood and vitamin K (BD Diagnostics) and on Trypticase soy agar (BD Diagnostics). After 7-days incubation at 37 °C in anaerobic conditions, strain P2341 was isolated on both Schaedler and Trypticase soy agar plates. Bacterial cells are Gram-positive cocci with a diameter ranging from 0.6 to 0.7 µm. They exhibited also a positive oxidase activity but catalase activity is negative. After 3-days on Columbia agar supplemented

with 5% sheep blood (bioMérieux), colonies are circular, white, and opaque with a diameter of 2–2.5 mm. Strain Marseille P2341 is strictly anaerobic.

The 16S rDNA sequence was obtained after amplification using the universal primer pair (fd1 and rp2) and a 3130-XL sequencer (Applied Biosciences, Saint-Aubin, France), as previously reported [4]. 16S rRNA gene sequence-based identification of strain Marseille P2341 showed 97.3% of identity with *Murdochiella asaccharolytica* strain WAL 1855C (GenBank accession number NR_116331.1), the phylogenetically closest bacterium with a validly published name (Fig. 1). As this sequence was smaller than the 98.7% threshold set by Stackebrandt and Elbers to define a new species without carrying out DNA-DNA hybridization [5], strain Marseille P2341 was classified as a new member of the *Murdochiella* genus belonging to the phylum *Firmicutes*.

Created in 2010 by Ulger-Toprak et al., the genus *Murdochiella* contains only one species *Murdochiella asaccharolytica* isolated in the human abdominal wall abscess and a sacral pilonidal cyst aspirate [6]. *M. asaccharolytica* is a strictly anaerobic Gram-positive bacterium, negative for catalase and urease.

Strain Marseille P2341 presents a 16S rRNA divergence around 2.7% with its phylogenetically closest species [7], we propose that strain Marseille P2341 may be the representative strain of a new species named “*Murdochiella vaginalis*” (va.gi.na’lis. L. n. vagina sheath, vagina; L. masc. suff. -alis suffix denoting pertaining to;

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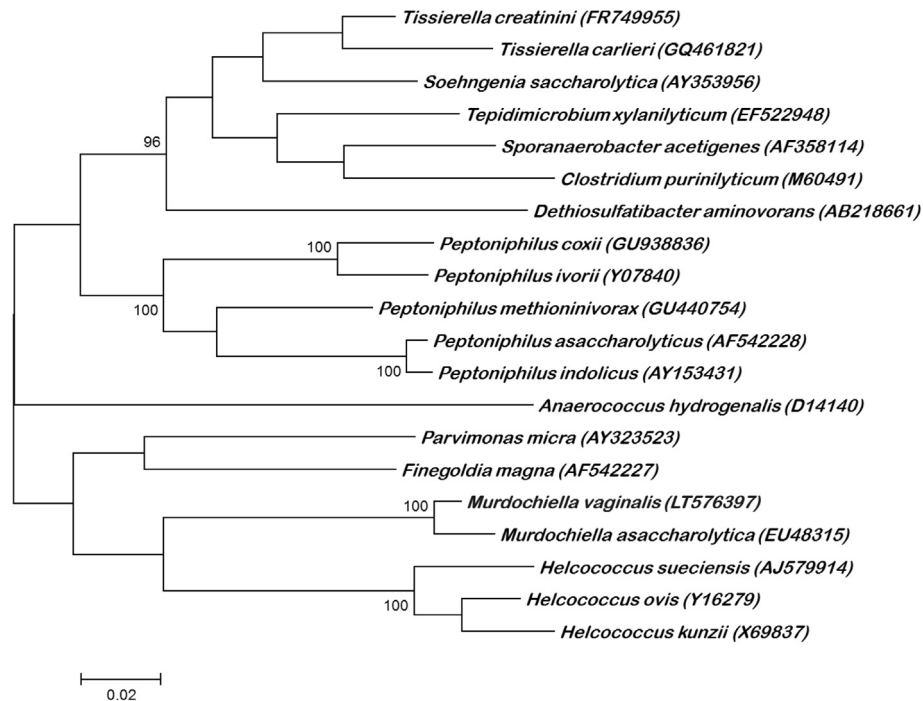


Fig. 1. Phylogenetic tree highlighting the position of “*Murdochiella vaginalis*” strain Marseille P2341^T relative to other closest species. GenBank accession numbers are indicated after the name. Sequences were aligned using Muscle v3.8.31 with default parameters and phylogenetic inferences were obtained using neighbor-joining method with 500 bootstrap replicates, within MEGA6 software. Only bootstrap bigger than 95% are shown. The scale bar indicates a 2% nucleotide sequence divergence.

N.L. masc. adj. vaginalis pertaining to vagina, of the vagina). Strain Marseille P2341^T is the type strain.

MALDI-TOF MS spectrum accession number: The MALDI-TOF MS spectrum of “*Murdochiella vaginalis*” is available at <http://www.mediterranee-infection.com/article.php?leref=256&titre=urms-database>.

Nucleotide sequence accession number: The 16S rRNA gene sequence was deposited in EMBL-EBI under accession number LT576397.

Deposit in culture collection: Strain Marseille P2341 was deposited in both the collection “Deutsche Sammlung von Mikroorganismen” (DSM) and the “Collection de Souches de l’Unité des Rickettsies” (CSUR, WDCM 875) under numbers 102237 and P2341, respectively.

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