Transfer of Arthrobacter variabilis (Müller) to the Genus Corynebacterium, as Corynebacterium variabilis comb. nov.

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Arthrobacter variabilis (Müller) differs so much from the type species of the genus Arthrobacter, Arthrobacter globiformis, that it should not be retained within this genus. On the basis of biochemical and chemical criteria, it is proposed that Arthrobacter variabilis be reclassified in the genus Corynebacterium, as Corynebacterium variabilis comb. nov. The type strain is ATCC 15753 (NCIB 9455).

The species Arthrobacter variabilis was originally isolated from animal fodder and assigned to the genus Arthrobacter by Müller in 1961 (7). The placement of this species in the genus Arthrobacter has always been controversial, and recent chemotaxonomic studies clearly indicate that this microorganism should be reclassified in the genus Corynebacterium (1, 2, 6, 8, 10). It is now universally accepted that the genus Arthrobacter should be restricted to those species which possess a murein based on L-lysine (5). A. variabilis differs from true arthrobacters in possessing a directly cross-linked murein based on meso-diaminopimelic acid (6, 8), a type consistent, however, with the genus Corynebacterium (1). The wall of A. variabilis also differs from that of true arthrobacters but is similar to that of Corynebacterium spp. in containing an arabino-galactan polymer (6). Support for the inclusion of A. variabilis in the genus Corynebacterium also comes from the reports of short-chain mycolic acids (30 to 36 carbon atoms) and predominantly straight-chain saturated, mono-unsaturated, and 10-methyl-branched long-chain fatty acids in this species (1, 2). True members of the genus Arthrobacter lack mycolic acids and contain predominantly straight-chain saturated, iso- and anteiso-methyl-branched long-chain fatty acids (4). A. variabilis also differs from true arthrobacters in possessing phosphatidylinositol diamannosides (Collins, unpublished data). A. variabilis has also been shown to be unrelated to true arthrobacters on the basis of 16S ribosomal RNA cataloging (10). These studies have demonstrated that A. variabilis is more closely related to true corynebacteria than to the other mycolic acid-containing genera Mycobacterium, Nocardia, and Rhodococcus (10). Therefore, in view of the overwhelming phenotypic and phylogenetic evidence, it is formally proposed that A. variabilis be removed from the genus Arthrobacter and reclassified in the genus Corynebacterium, as Corynebacterium variabilis comb. nov.

Description of Corynebacterium variabilis comb. nov. Gram-positive, strictly aerobic, nonmotile, rod-shaped cells (0.8 to 1.1 by 1.4 to 3.5 μm). Cells are irregular (club-shaped or tapered) and occur singly, in pairs with typical V forms or clumps; ovoid forms occur in older cultures. Colonies are small (ca. 2 to 4 mm), circular (sometimes irregular), convex, and grey-white (occasionally slight pink) with a dry appearance. Optimum temperature is between 25 and 30°C. Grows in 7% NaCl. Acetate, propionate, capronate, 4-amino butyrate, caprylate, succinate, dL-malic, levulinate, and some other compounds may be used as sole carbon sources (9). Xanthine, tyrosine, and starch are not hydrolyzed. Catalase positive, oxidase negative. Murein is of the directly cross-linked type based on meso-diaminopimelic acid. The glycan moiety of murein contains only acetyl residues. The cell wall contains an arabino-galactan polymer. Short-chain mycolic acids (30 to 36 carbon atoms) are present. Long-chain fatty acids are of the straight-chain saturated, mono-unsaturated, and 10-methyl-branched types. The major menaquinones are MK-9(H2) and MK-8(H2). The deoxyribonucleic acid base composition is 65 mol% guanine plus cytosine (Tm). The type strain is ATCC 15753 (NCIB 9455). The characteristics of the type strain correspond to those of the species.

Other distinguishing characteristics. Corynebacterium variabilis can be readily distinguished from other Corynebacterium species in containing high levels of 10-methyloctadecanoic (tuberculostearic) acid. The only other authentic Corynebacterium species known to contain this acid is C. minutissimum. C. variabilis, however, can be readily distinguished from the latter species in being aerobic and in possessing a substantially higher guanine-plus-cytosine content (ca. 56 to 59 mol% for C. minutissimum) (1).

LITERATURE CITED