Phylum BIII. Thermodesulfobacteria *phy. nov.*

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Thermodesulfobacteria is currently represented by a single genus which branches deeply in the major reference trees. Gram-negative, rod-shaped cells possessing an outer membrane layer which forms protrusions. Thermophilic, strictly anaerobic, chemoheterotrophs exhibiting a dissimilatory sulfate-reducing metabolism.

*Type order:* Thermodesulfobacteria *ord. nov.*

Class I. Thermodesulfobacteria *class. nov.*

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Rod-shaped cells, 0.3–0.6 × 0.9–2.0 μm; occur singly, in pairs, or in chains in young cultures; sometimes pleomorphic in old cultures. Possess an outer wall membrane layer. **Gram negative.** Does not form spores. **Usually nonmotile,** but motility might be observed in some species. Thermophilic. Neutrophilic. Chemoorganotrophic, **strict anaerobe,** ferments pyruvate. The principal fermentation end products are acetate, CO₂, and hydrogen. Sulfate and thiosulfate are used as electron acceptor for growth. Lactate and pyruvate used as electron donors for growth. In the presence of sulfate, lactate and pyruvate are incompletely oxidized to acetate. Thermodesulfobacterium forms a distinct lineage within the domain *Bacteria* (Fig. B3.1). Occur in thermal environments, including thermophilic digestors, hot springs, and hot oil reservoirs.

*The mol% G + C of the DNA is:* 34–38.

*Type order:* Thermodesulfobacteria *ord. nov.*

Order I. Thermodesulfobacteria *ales. nov.*

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Thermodesulfobacterium type genus of the order; -ales ending to denote an order; M.L. fem. pl. n. Thermodesulfobacteriales the order of Thermodesulfobacterium.

Only one order, Thermodesulfobacteriales, is accepted in the class Thermodesulfobacteria; the description of the order is therefore the same as for the class.

*Type genus:* Thermodesulfobacterium Zeikus, Dawson, Thompson, Ingvorsen and Hatchikian 1995, 197VP (Effective publication: Zeikus, Dawson, Thompson, Ingvorsen and Hatchikian 1983, 1167.)
Family I. Thermodesulfobacteriaceae fam. nov.

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Thermo.desulfobac.te.ri.a'ce.ae. M.L. neut. n. Thermodesulfobacterium type genus of the family; -aceae ending to denote a family; M.L. fem. pl. n. Thermodesulfobacteriaceae the family of Thermodesulfobacteriales.

Only one family, Thermodesulfobacteriaceae, is accepted in the order Thermodesulfobacteriales; the description of the family is therefore the same as for the class. Only one genus is accepted in the family Thermodesulfobacteriaceae.

Type genus: Thermodesulfobacterium Zeikus, Dawson, Thompson, Ingvorsen and Hatchikian 1995, 197VP (Effective publication: Zeikus, Dawson, Thompson, Ingvorsen and Hatchikian 1983, 1167.)

Genus I. Thermodesulfobacterium Zeikus, Dawson, Thompson, Ingvorsen and Hatchikian 1995, 197VP (Effective publication: Zeikus, Dawson, Thompson, Ingvorsen and Hatchikian 1983, 1167)

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Thermo.desulfobac.te'ri.um. Gr. masc. n. thermos heat; L. pref. de from; L. neut. n. sulfur sulfur; Gr. n. bakterion a small rod; M.L. neut. n. Thermodesulfobacterium a thermophilic rod reducing sulfate.

Straight rod-shaped cells, 0.3–0.6 × 0.9–2.0 μm; occur singly, in pairs, or in chains. Possess an outer wall membrane layer. Gram-negative. Cellular extrusions or blebs form next to the outer membranous layer. Contain non-phytyl ether-linked lipids, cytochrome c₅₅, desulfofuscidin, but no desulfoviridin. Thermophilic. Chemoorganotrophic, strict anaerobe, and dissimilatory sulfate-reducing metabolism. Lactate and pyruvate are used as electron donors, and sulfate or thiosulfate are used as electron acceptors for growth. In the presence of sulfate, lactate and pyruvate are incompletely oxidized to acetate. Occur in thermal environments including hot springs and hot oil reservoirs. The mol% G + C of the DNA is: 31–38.