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Twenty years with the *Pseudonocardineae:* A work in progress

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The actinobacterial family *Pseudonocardiaceae* was first proposed by Embley *et al*. (1988) and the suborder *Pseudonocardineae* was later created by Stackebrandt *et al.* (1997) as part of their proposal for the new class *Actinobacteria*. The number of taxa encompassed in this suborder has increased dramatically over the past years as a result of advances in the development of increasingly discriminatory taxonomic methods, notably chemotaxonomy and molecular phylogenetics. For instance, the genus *Amycolatopsis*, described by Lechevalier *et al.* (1986) to contain only 4 species, now has 36 valid species. The application of then cutting-edge chemotaxonomic methods by Labeda and collaborators as well as others during the mid-1980's to 1990 resulted in the proposal for the genus *Saccharothrix* and they subsequently described 4 new species as well as transferred 8 other species from other genera (Grund & Kroppenstedt, 1989; Kroppenstedt *et al*., 1990; Labeda, 1986; Labeda & Lechevalier, 1989; Labeda & Lyons, 1989). Application of molecular phylogenetic methods to this group though analyses of 16S rRNA gene sequences (Labeda *et al.,* 2001) resulted in the recognition that a number of the species within *Saccharothrix* were actually members of other described genera, such as *Lentzea*, or were representatives of new subsequently described genera within the *Pseudonocardineae*, such as *Crossiella* (Labeda, 2001), *Goodfellowia* (Labeda & Kroppenstedt, 2006), and *Lechevalieria* (Labeda *et al.,* 2001). These phylogenetic analyses also revealed the significance of other novel chemotaxonomic markers, such as the presence of hydroxylated fatty acid-containing phosphatidylethanolamine in authentic strains of *Saccharothrix* but not in strains belonging to *Lentzea* or *Lechevalieria*. Recent phylogenetic analyses of 16S rRNA gene data for all of the taxa within the suborder *Pseudonocardineae* demonstrated several taxonomic anomalies that require resolution. *Saccharothrix tangerinus* (Takahashi *et al.*, 2000) is observed to be a distinct and consistent outlier in phylogenetic analyses of all taxa described as *Saccharothrix* species. The proposed transfer of this species to the new genus *Umezawaea* is supported by phylogeny, diagnostic nucleotide signatures, and chemotaxonomy. It is also noted that neither *Amycolatopsis fastidiosa* (Henssen *et al.*, 1987) nor *Kibdelosporangium albatum* (Tomita *et al.*, 1993) are phylogenetically placed in or near their respective genera. Polyphasic evaluation of both of theses

species supports the creation of two new genera. It is clear that the activities of researchers studying biodiversity throughout the world will result in further growth in the number of taxa represented in the suborder *Pseudonocardineae*. Moreover, the development and application of new methods providing improved taxonomic discrimination will undoubtedly result in taxonomic revision among described genera as well.

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