INTERNATIONAL JOURNAL OF
SYSTEMATIC BACTERIOLOGY

Vol. 20, No. 2

April 1970

pp. 149-153

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ON THE IDENTITY OF MYCOBACTERIUM GORDONAE
BOJALIL AND THE SO-CALLED TAP WATER
SCOTOCHROMOGENES

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ABSTRACT. The name "Mycobacterium aquae Galli-Valerio" has been applied for a number of years to slowly growing amidase negative, scotochromogenic mycobacteria isolated from tap water or clinical specimens. This name has not been validly published, and the only extant culture representing the strains originally carrying that name has been found to be a member of the rapidly growing species M. smegmatis (Gordon and Smith 1955). Examination of the type strain of M. gordonae Bojalil (1962) has demonstrated this organism to be very similar to the hypothetical median strain of the slowly growing "aquae" strains and these organisms should be considered members of the species M. gordonae Bojalil.

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Maië, in 1922, discussed an organism he referred to as Mycobacterium aquae Galli-Valerio; implicit in this usage is the assumption that the name was previously validly published. However, not until 1927 did Galli-Valerio and Bournand employ this nomenclature (without actually proposing it even then). The descriptions of this organism given in these early papers are inadequate to permit their identification in terms of modern methods. Gordon and Smith (1955) examined the culture bearing the name M. aquae from the original Lausanne collection, and reported it to be M. smegmatis. Bönicke (1961), in describing slowly growing amidase negative scotochromogenic mycobacteria isolated from water taps, applied the name M. aquae Galli-Valerio; the organisms so described were clearly not M. smegmatis. Nevertheless, it thereafter became common usage to apply the name M. aquae to slowly growing tap water scotochromogens.

It appears, from the brief history presented above, that the name Mycobacterium aquae has never been validly published, and even if it were, it would have to be considered a synonym of M. smegmatis.

A description of the Runyon Group II tap water ("aqua") scotochromogens, based on numerical taxonomic principles, was presented by Wayne et al. (1967), and the question of nomenclature was raised at that time. Recently we received the type culture of Mycobacterium gordonae Bojalil (1962) (ATCC 14470). In examining this culture, we came to the conclusion that this organism is so similar to representative tap water scotochromogens as described by Bönicke (1961) and by Wayne et al. (1967) as to be properly placed in the same species. We therefore present an additional description of the type culture of M. gordonae Bojalil, and propose that those slowly growing scotochromogens which fit this description, and which have been called "M. aquae" or "tap water scotochromogens" in recent literature, be recognized as members of the validly published species M. gordonae Bojalil.

Materials and Methods

Culture comparisons were based on 42 characters, 30 of which have been described previously (Wayne 1966; Wayne et al. 1967). The additional 12 characters were based on tests for ability to grow at 52°; for resistance to 1, 10 and 100 µg/ml isoniazid, to 10 and 1000 µg/ml p-aminosalicylate, to 10 µg/ml thiophene-2-carboxylic acid hydrazide, to 500 µg/ml 1-nitrobenzoic acid, to 10 µg/ml thiacetazone, to 5% sodium chloride, to 5% propylene glycol; for ability to blacken on egg medium containing 1000 µg/ml p-aminosalicylate.

Hypothetical median strain (HMS) patterns were constructed for the "tap water scotochromogens," for M. scrofulaceum, and for M. flavescens, as described by Wayne (1967). Similarity scores were then determined for the type culture of M. gordonae (ATCC 14470) against the HMS patterns for these three clusters (species) and for the HMS patterns of these clusters against one another.

Results and Discussion

Table 1 illustrates the percent similarities of the type culture of M. gordonae to each of the indicated HMS patterns and of each of these patterns to one another. In this system,

Table 1. Similarity score (%S) matrix of M. gordonae Bojalil (ATCC 14470) and Hypothetical Median Strains (HMS) of three mycobacterial species. Scores are based on 42 characters.

	1	2	3	4
1. ATCC 14470	-			
2. "Tap water" HMS	91	-		
3. <u>M. scrofulaceum</u> HMS	69	74	-	
4. <u>M. flavescens</u> HMS	48	57	60	-

Wayne (1967) has indicated that species in the genus Myco-
bacterium tend to separate at the 80 to 85% level. M. gor-
donae exhibits 91% similarity to the "tap water scotochro-
mogens," and thus falls clearly into this cluster. The name
M. gordonae should therefore be applied to the species
represented by this cluster. M. gordonae is clearly sepa-
rated from M. scrofulaceum and M. flavescens on the basis
of HMS scores of 70% or less, well below the 80 to 85%
level considered significant.

In Table 2 are presented properties, based on 14 selected
tests, which are most definitive in permitting characteriza-
tion of and differentiation between the three species de-
scribed.

Table 2. Definitive properties of M. gordonae Bojalil (ATCC 14470) and
Hypothetical Median Strain (HMS) of three mycobacterial species

PROPERTIES	HMS PATTERNS OF			
	ATCC 14470	"Tap water"	<u>M.</u> <u>scrofulaceum</u>	<u>M.</u> <u>flavescens</u>
Niacin	-	-	-	-
Tween hydrol. (5d)	+	+	-	+
Nitrate reduction	-	-	-	+
Catalase (mm foam)	>45	>45	>45	>45
Tween agar opacity (1 wk)	-	-	-	+
Pigment	* Scoto.	Scoto.	Scoto.	Scoto.
Benzamidase	-	-	-	-
Urease	-	-	+	+
Nicotinamidase	-	-	+	+
Acetamidase	-	-	-	-
Pyrazinamidase	-	-	+	+
Thiacetazone 10 ug/ml	Res.	Res.	Sens.	Res.
Iron Uptake	-	-	-	-
Microcolonial Neutral Red	+	+	+	-

* Scoto. = Scotochromogenic, i. e. pigment produced even when culture is grown in the dark.

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