Unusual *Chromobacterium violaceum*: Aerogenic Strains

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This is the first report of *Chromobacterium violaceum* strains that are aerogenic. Two pigmented strains of *C. violaceum* and their nonpigmented variants produced gas in glucose broth, Kligler iron agar, and triple sugar iron agar. They were similar morphologically and biochemically to other anaerogenic strains studied previously.

Two pigmented strains (886A and 617A) of *Chromobacterium violaceum* and their nonpigmented variants (886ANP and 617ANP) consistently produced gas when inoculated into glucose broth (peptone water-based medium with Andrade indicator), Kligler iron agar (KIA), and triple sugar iron (TSI) agar. Strains 886A and 617A were isolated from nature (pond water).

Twenty-one other cultures of *C. violaceum* from the stock culture collection of the Veterinary Research Institute were also examined for gas production in glucose broth, KIA, and TSI agar. Among these 21 cultures were pigmented strains and their nonpigmented variants isolated from clinical material and nature and nonpigmented strains isolated from nature. None of these cultures produced gas.

Gas production was distinctly seen after 24 h of incubation at 37 C in the case of cultures 886A, 886ANP, 617A, and 617ANP. The cultures were incubated under controlled humidity conditions so that dehydration of KIA and TSI agar would not produce cracks in the media, thus giving false results. The other 21 cultures showed no evidence of gas production, even after incubation for 7 days at 37 C. These aerogenic cultures did not produce gas in the tubes of peptone water without added glucose which were used as controls.

Anaerogenic clones were rarely isolated from the population of cultures 617A and 617ANP, but were quite easily selected from 886A and 886ANP when individual colonies of these cultures were inoculated into glucose broth, KIA, and TSI agar.

These four aerogenic cultures produced pockets of gas in KIA and TSI agar, and in the glucose broth a quantity of gas was produced, which was indicated by the collection of air bubbles in the inverted vial (Durham tube) placed in the broth. The quantity of gas col-

lected in the inverted vial ranged from one-fourth to one-third of the length of the vial.

In other respects, these aerogenic strains were similar morphologically and biochemically to other anaerogenic strains of *C. violaceum* studied in our laboratory (2) (Table 1).

Twenty-three strains of *C. violaceum* examined at the Center for Disease Control, Atlanta, Ga., were not aerogenic in glucose broth or TSI agar (R. E. Weaver, personal communication). Eighteen strains (mesophils) studied by Sneath (4) did not produce gas from carbohydrate fermentations in peptone water.

Nonpigmented strains of *C. violaceum* have been isolated from nature (2) and clinical material (R. E. Weaver, personal communication). Pigmented strains of *C. violaceum* are easy to identify due to their unique violet pigmentation. Characteristics other than pigmentation have to be relied upon for the identification of nonpigmented strains. KIA and TSI agar have been found to be useful for the screening of nonpigmented, gram-negative bacilli for nonpigmented strains of *C. violaceum* (1-3, 6). Previously, it had been the practice to eliminate nonpigmented *C. violaceum* if the test organism showed any evidence of gas production in preliminary screening media, such as KIA and TSI agar, as the definition of the genus *Chromobacterium* includes the clause that "visible gas" is not produced from carbohydrates fermented by the bacteria (5). Such aerogenic strains should not be excluded from the genus *Chromobacterium*, if their aggregate characteristics are otherwise typical.

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TABLE 1. Biochemical reactions of 4 aerogenic and 21 anaerogenic cultures of *C. violaceum* studied^a

Test	Reactions of:	
	886A, 886ANP, 617A, and 617ANP	21 other cultures
Catalase	+	+
Oxidase	+	+
Indole	—	—
Methyl red	—	—
Voges-Proskauer	—	—
Citrate (Simmons)	+	± (15) ^b
Nitrate to nitrite	+	+
KIA	K/A, H ₂ S—, G+	K/A, H ₂ S—, G—
TSI	K/A, H ₂ S—, G+	K/A or A/A, H ₂ S—, G—
KCN	+	+
Motility	+	+
Gelatin	+	+
Urea (Christensen)	—	—
MacConkey, growth	+	+
Blood agar, growth, hemolysis	+	+
Glucose, acid	+	+
Glucose, gas	+	—
Lactose	—	—
Sucrose	—	± (13) ^b
Maltose	—	—
Xylose	—	—
Mannitol	—	—
Mannose	+	+
Fructose	+	+
Trehalose	+	+
10% Glucose, acid	+	+
10% Lactose, alkaline	+	+
Arginine dihydrolase	+	+
Lysine decarboxylase	—	—
Ornithine decarboxylase	—	—
Phenylalanine deaminase	—	—
Glucose OF open, acid	+	+
Glucose OF sealed, acid	+	+

^a +, Positive reaction within 1 or 2 days; —, negative reaction at 7 days; OF, oxidation-fermentation test in Hugh and Leifson medium. For KIA and TSI agar: A, acid; K, alkaline; G, gas.

^b Number of positive reactions obtained from the 21 cultures tested.

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