Base Composition of Deoxyribonucleic Acid from Bovine T-Mycoplasmas

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The guanine plus cytosine (G+C) content of the deoxyribonucleic acid from five bovine T-mycoplasmas measured by CsCl gradient centrifugation varied from 29 to 29.8 mol%. The difference in G+C content found between the human and bovine strains examined suggest that they represent two different species or subspecies.

T-mycoplasmas were first isolated from man by Shepard (11) and subsequently from cattle (15), dogs and monkeys (16), cats (14), and goats (5). This group of microorganisms is united biochemically by its possession of urease and requirement for urea for best growth (4, 12).

Isolates from different animal species have been found to be serologically distinct, but so have certain isolates from the same animal species (2, 7, 16). Certain differences have been observed between isolates from different animal species; these include their ability to attach to cells, colony size, and susceptibility to a factor in normal rabbit serum that inhibits metabolism (6, 8). However, these differences have not been considered sufficient to indicate the existence of different species of T-mycoplasmas.

The purpose of this study was to determine the guanine plus cytosine (G+C) content of the deoxyribonucleic acid (DNA) from several bovine T-mycoplasmas and to compare the G+C contents of bovine and human isolates, human isolates having been previously shown to have G+C contents ranging from 26.9 to 28.0 mol% (3). A comparison of G+C contents of human and bovine isolates might indicate that the two groups of strains represent distinct populations and hence comprise different species.

The two human strains and the five bovine strains listed in Table 1 have been described previously (2, 3, 7). All strains were grown in 5-liter volumes of U2 broth (6). The organisms were harvested by centrifugation at 15,000 $\times$ g, washed once, and resuspended in 1X SSC (0.15 M NaCl + 0.015 M sodium citrate, pH 7). The DNA was extracted by the method of Marmur (9) as modified by Bak and Black (1).

The G+C content of the DNA was determined by estimating the buoyant density after equilibrium centrifugation in cesium chloride (10). *Escherichia coli* strain B DNA (Sigma, London) was used as a reference (density, 1.710 g/cm³ [3, 10]).

The G+C contents of the DNA samples examined are given in Table 1. The values for the human strains T960 and 58 were 27.4 and 27.5 mol%, respectively. This compares with the values of 27.1 and 28.0 mol% reported by Black et al. (3) and is within the range of 26.9 to 28.0 mol% G+C content they found for human T-mycoplasmas. These two human strains were included as controls to ensure that our results could be compared with those previously reported for the human strains (3).

The G+C content range found for the bovine strains was 29.0 to 29.8%. Strains A417 and Gri383 cross-react serologically (7) and have identical G+C values of 29.0 mol%. The other three strains are serologically distinct from each other and from strains A417 and Gri383.

The mean G+C content of the human isolates, calculated from the results of Black et al. (3), was 27.4 mol%. That of the bovine strains was 29.3%. Thus the difference in the mean mol%G+C content was 1.9. The range of G+C contents for the human T-mycoplasmas examined by Black et al. (3) was 1.1%, and the range for the bovine strains examined here was 0.8%. The difference between the highest G+C content found for a human strain and the lowest G+C content found for a bovine strain was 1%.

The range of G+C contents of the human and bovine strains is small and the difference between the two groups of isolates is as great as the range of values for strains from either

TABLE 1. *G+C content of DNA from five bovine and two human strains of T-mycoplasmas*

Strain	G+C content (%)	
	Values	Mean
A417 (bovine)	29.69 28.98 28.27	29.0
Gri383 (bovine)	28.98 29.08	
Bu2 (bovine)	28.68 29.64 28.68	29.0
D48 (bovine)	29.71 29.49	
O13 (bovine)	29.57 29.71 30.05	29.8
T960 (human)	27.76 26.63 27.76	
58 (human)	27.51 27.49	27.5

source. Furthermore, the range of mol%G+C values observed for mycoplasmas is smaller than that of bacteria (13). These findings indicate that the human and bovine strains represent two distinct populations of microorganisms and support the hypothesis that the T-mycoplasmas examined constitute two different species or subspecies.

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