Reversal of sulphonamide action in *Escherichia coli* (B_{12} auxotroph) by vitamin B_{12}

Sulphonamides are known to block sequentially the synthesis in *Escherichia coli* of methionine, xanthine, serine, thymine, valine[1,2] and glycine[3]. At each of these steps, the inhibition index is increased in presence of vitamin B_{12}[2,3]. Since the requirement of vitamin B_{12} for growth of *E. coli* B_{12} auxotroph can be met completely by methionine[4], it was of interest to study the growth inhibition by sulphanilamide (SA) in this mutant as influenced by the two metabolites.

The mutant strain[4] of the organism was grown in the medium of GREEN AND SEVAG[5] with additions as shown (Table I). Growth was measured after 24 hours incubation at 30° and expressed in terms of galvanometer deflections in a Klett-Summerson photoelectric colorimeter at 660 mμ.

TABLE I

COMPARATIVE ACTIVITY OF METHIONINE AND VITAMIN B_{12} IN OVERCOMING SA GROWTH INHIBITION OF *E. coli* B_{12} AUXOTROPH

Additions to 10 ml basal medium	*mg SA added*			
	0	0.5	0.7	1.0
	Growth at 24 hours			
1. None	0	0	0	0
2. Methionine, 100 μg	48	0	0	0
3. Methionine, 1 mg	48	0	0	0
4. Vitamin B_{12}, 2 mμg	47	46	17	10
5. Vitamin B_{12}, 20 mμg	49	48	39	23
6. As in (3) + xanthine 0.25 mg	48	30	17	14
7. As in (6) + serine 0.2 mg	50	49	36	19

It is observed (Table I) that, in presence of vitamin B_{12}, a higher concentration of SA is required to inhibit growth than when methionine is used. The protective effect of vitamin B_{12} is more pronounced at the higher concentration of the vitamin and can be simulated by a combination of methionine, xanthine and serine.

These observations suggest that, although methionine could, interchangeably with vitamin B_{12}, serve the requirement for growth of the mutant, this vitamin assumes additional functions in a condition of stress caused by SA bacteriostasis analogous to its *p*-aminobenzoic acid potentiating action already observed[2] with the wild strain under similar conditions. That the requirements for growth and for metabolic activity with respect to specific systems need not necessarily be the same is known[6].

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Relationship between skew diffusion gradient curves and axial ratios of rod-shaped particles

It is a well-known phenomenon that from experiments with filamentous molecules skew diffusion gradient curves are obtained, in contrast to the symmetrical curves obtained from those with spherical particles. Thus POLSON[1], GRALÉN[2] and JULLANDER[3] found that in plotting diffusion curves of cellulose derivatives, which are known to be filamentous, the curves obtained are asymmetrical. KAHLER[4] made similar observations in his diffusion experiments on solutions of sodium thymonucleate, and NEURATH AND SAUM[5] obtained skew diffusion curves in their work