

CONCLUSIONS

It is evident from the present investigations on pantothenate-auxotroph Streptococcus faecalis that pantothenate deficiency affects the cytoplasmic membrane structure (and also its functions) to a marked extent. Its effects upon cell wall synthesis though not so marked as upon the membrane but none the less is not negligible at all. Derangement of both these structures in turn affects the cellular architecture and viability greatly. It would certainly be of interest to investigate whether other gram-positive cocci and rods are also affected in a similar way. Further studies with isolated cell membrane and wall (peptidoglycan) of the vitamin-deficient cells will be needed for a better understanding of biochemical changes produced in these structures, both quantitatively and qualitatively, specially, in regard to lysozyme-action, N-acetyl and O-acetyl substituents, I.R. spectra of the peptidoglycan, phospholipid constituents, and the condition and activities of the membrane-associated enzymes.

The phenomena of pantothenate-limited lysis of S. faecalis cells has great significance in regard to our understanding of the specific role of the vitamin in the genesis of the peptidoglycan structure. It follows from this lysis phenomena as a corollary that acetate limitation in presence of abundance of the vitamin should also produce lysis. Acetate in this organism and in the synthetic medium used would primarily be needed for lipid synthesis as well as for acetylation of hexosamine residues of the peptidoglycan of the cell wall. As a matter of

fact recent findings by Das and Chowdhury (138) of this laboratory have clearly demonstrated that acetate limitation in S. faecalis do cause similar lysis and morphological changes of the cells as observed in pantothenate-limited conditions. Presumably, further studies on the cytochemical changes of acetate-limited cells would certainly be welcome. The observation of acetate-lysis in S. faecalis cells seems to be very gratifying. It is directly supportive of the fact that lysis of the cells follows when some essential component(s) of the integumental structures of the cells is in limited supply as in the case of lysine-lysis in S. faecalis (92,93).

Evaluation of both free  $\text{NH}_2$  and N-acetyl groups in the hexosamine residues of peptidoglycan of pantothenate-deficient cells seems to be needed for a better understanding of the autolysis and lysozyme actions. Further, it might be rewarding to search for the accumulation of intracellular UDP-N-acetylglucosamine or UDP-glucosamine under pantothenate-deficient conditions.