Surface Activity of Lysophosphatidylethanolamine

SIR—Uziel and Hanahan (1957) have reported that the fatty acid present in lysolecithin is capable of migration in the presence of either migratase enzyme or acid. Surface tension studies which we have made with aqueous sols of lysophosphatidylethanolamine have shown that after initial falls the surface tensions remain fairly constant and then commence to rise slowly. This rise in surface tension with time may be due to a migration of the fatty acid from the α to the β position in the absence of any enzyme or acid.

A static method (Wilhelmy Plate) has been used to measure surface tension. Concentrations of 0·01 per cent (w/v) and below were used since lysophosphatidylethanolamine, unlike lysolecithin, is only slightly soluble in water.

The surface tension changed considerably with time, after the plate had been immersed in the surface of the sol. It fell rapidly for about 1 hr., and then more slowly; the rate of change was least at 5–6 hr. For example a 0·005 per cent sol gave an initial reading of 56·23 dynes cm., after 2 hr. it was 39·63 and after 6 hr. it was 37·33. With further increases in the time the surface tension started to rise slowly. On repeating the readings on the same sol on subsequent days a similar pattern was followed but the values obtained 6 hr. after immersing the plate in the surface of the sol were higher on each succeeding day. With the above sol, the surface tension after 6 hr. on the second day was 44·80, and after 6 hr. on the fourth day was 58·93.

On experimenting with a 0·005 per cent (w/v) sol of phosphatidylethanolamine the surface tension fell initially with time and eventually a constant value was reached which remained unchanged for 4 days.

It seems from these results that a possible explanation of the change in surface tension with time with lysophosphatidylethanolamine sols is due to a migration of the fatty acid from the α to the β position. Such a migration could not occur in phosphatidylethanolamine, since both the hydroxyl groups are esterified so that once an equilibrium is set up between the concentration of phosphatidylethanolamine in the surface and the concentration in the bulk of the phase no change in the surface tension occurs. Further investigations are being made and will be reported more fully later.

On plotting the values obtained after 6 hr. with lysophosphatidylethanolamine sols against concentration, a sharp change in the slope of the graph is obtained within the concentration range of 0·001–0·002 per cent (w/v), indicating that the critical micelle concentration for lysophosphatidylethanolamine occurs within this concentration range.

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REFERENCE

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