

January 12, 1971

Sir Charles Ellis,
Westminster House,
7 Millbank,
London S.W.1, England

Dear Sir Charles,

During our discussions last fall on lung surfactant, we agreed to examine the possibility of testing the effect of smoke, especially smoke vapour phase, on lung surfactant and to communicate to you the information which we gathered.

It appears that experimentation could be carried out in three distinct areas:

1. Effect of smoke vapour phase on a surfactant model.
 2. Effect of smoke vapour phase on isolated surfactant.
 3. Effect of smoke vapour phase on intact animal lungs.
1. Surfactant model

Dipalmityl lecithin has been shown (Brown 1964) to be a major component of surfactant in rabbit lungs. Klaus et al. (1961) have shown that synthetic dipalmityl lecithin gave surface tension-area diagrams similar to those obtained with whole lung extract. Surface tension-area measurements could be made on solutions of this material before and after smoke treatment. The techniques developed in this work should be applicable to the next stage of the project.

2. Isolated Surfactant

Using the methods developed in stage 1, the effect of smoke on natural surfactant could be examined. Surfactant can be obtained by extracting fresh, minced lung tissue with saline or by washing out the lungs via the trachea with saline (Brown 1964).

3. Intact Animal Lungs

A lung, if placed in a bottle of saline, collapses when the bottle is evacuated. If it is re-inflated it retains most of the air and collapses easily on the saline. If the lung is treated with smoke, the tissue remains elastic but the surface tension is reduced. Following inflation, it does not retain the air and collapses to an air-free state. (Pattie 1968)

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Two types of assays for smoke could be based on this behavior of the lung.

(a) The isolated organ could be treated with smoke and its recovery after evacuation measured.

(b) The lungs of animals exposed to smoke for varying periods could be dissected out and their degree of recovery after evacuation, compared with that of lungs of untreated animals.

We could start experimentation with dipalmityl lecithin as soon as suitable equipment is obtained. However, stages 2 and 3 present some difficulty since we have no current access to animal tissues. Perhaps one of the laboratories in the group with access to small animals might consider tackling the work on intact lungs.

Yours sincerely,

Michael Nisbet

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MAN/sg

cc: Dr. S.J. Green ✓
Mr. P.S. Wade

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