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LETTER TO THE EDITOR

BLOOD IN NON-PERFUSED LUNGS

Sir,

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The lungs are being explored for the presence of an increasing number of substances, hitherto known or unknown (1, 2). Whether these substances come solely from the lungs or are contributed, partly or largely, by the blood trapped in non-perfused lungs needs to be known. Present practice is to use perfused blood-free lungs, ideally collected after perfusion of lungs *in situ* with physiological buffer solution till effluent is erythrocyte-free (3). The method, though ideal for investigations where blood components interfere with estimated parameters, suffers from several technical and practical disadvantages. It requires elaborate perfusion set-up, is time-consuming, unsuitable for unstable lung substances and impracticable when lungs are to be processed on large-scale. Besides, physiological parameters (i.e. pressure, temperature, pH, ionic strength, osmolarity etc.) of the perfusion fluid need to be carefully adjusted to ensure minimal damage to lung tissue and/or to biochemical parameters under investigation. Therefore, there is a need for a more practical and simple procedure that can provide information about the extent of blood trapped in non-perfused lungs. Such a need was actually felt by the author while searching for an antidiuretic substance in normal mammalian lungs (4). Processing of lungs on large-scale made it impracticable to use perfused blood-free lungs for extraction of the pneumadin (5). Instead a simple procedure was adopted to estimate amount of blood trapped in non-perfused lungs.

The procedure involved simultaneous determination of iron content in a samle of blood and a portion of homogenated lung tissue. The amount of iron thus determined has a direct relation with the amount of blood. It is based on following premises, i) iron content of the lungs is negligible, ii) most of the body stores of iron are in erythrocytes, about 70 per cent, iii) each gram of haemoglobin contains constant amount of iron, 3.33 mg per g haemoglobin and iv) iron estimation is one of the standard methods of estimating haemoglobin (6,7).

Utilizing the above procedure, the amount of blood in non-perfused lungs can be obtained by the following formula:-

$$BL = \frac{IL}{IB} \times 100$$

Where, BL is blood content in non-perfused lungs (per cent of fresh tissue)

IL is iron content in lungs (μg per g fresh tissue)

IB is iron content in blood (μg per ml blood)

Iron being quite stable element, can be estimated later on as per convenience of the investigator.

The procedure was routinely used by the author while recovering a biologicially active new basic peptide, pneumadin from normal mammalian lungs (4, 5). Iron was determined spectrophotometrically (8). The method enabled to detect as little as 0.01 ml blood per 250 mg fresh lung homogenate. Recovery of added iron was close to 100 per cent. No-perfused rat lung contained 48±6 μg iron per g fresh tissue (n=6) while corresponding blood contained 497±29 μg iron per ml (n=6). It indicated a blood content of 10±1 per cent (n=6) of fresh lung tissue. The value is compatible with known capillary volume in rat lungs, which is 9.2 to 9.3 per cent of total rat lung volume.

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