Technical methods

An envelope system designed to facilitate safer transport and rapid identification of 'high risk' specimens in hospital laboratories

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It is generally assumed that the incidence of viral hepatitis in hospital employees is greater than in the general population (Lous, Olesen, and Skinhoj, 1970), and it is probable that of all hospital staff laboratory personnel are at particular risk because of the relatively high frequency of contact with material containing hepatitis-associated antigen (Grob and Jemelka, 1971).

Attempts to reduce this risk in laboratories can readily be divided into two areas. In the first place a system is required in which all biological fluids arriving at laboratories are housed in leak-proof containers and samples suspected or known to be potentially hazardous are identified without breaking the sealed container. Once high-risk samples are easily distinguished and safely packaged, then appropriate precautions can be taken within each laboratory area.

Method

The system is designed around a double plastic bag which is closed by an electric heat sealer. One side houses the biological fluid in its container and the other the appropriate request form (Fig. 1). The open ends of each side are heat sealed (Fig. 2) either independently or together.

The essential features of this system are as follows.

A strong (250 gauge) polythene bag is used which can be made completely leak-proof by an inexpensive heat sealer, which is held in the sealing position for approximately three seconds.

Blood specimens, etc, and request forms are transported together but physically separated, thereby preventing contamination of the latter should the test sample spill or leak.

Fig. 1 Diagrammatic representation of the double plastic bag showing the separate entry of specimen and request form.

Fig. 2 Heat sealer in 'open' position to permit entry of double plastic bag.

Fig. 3 Double plastic bag with overprinting '? hepatitis'.

¹The double plastic bags and heat sealers can be obtained from Pro-pack Ltd, Bridge Street, Redditch, Nr Birmingham.

The size of the bags can be varied to meet the requirements of different regions in terms of request form size and sample container size. The size found most useful in this study was one with a total length of 50 cm and 13.5 cm wide.

The transparency of the plastic bag permits of immediate identification of leakage, and facilitates reading or photocopying request forms without breaking the seal.

Bags marked 'high risk' or 'hepatitis' (Fig. 3) which arrive in the laboratory can be instantly recognized and conveyed to a high-risk area.

Modification of the electrophoretic separation of lipoproteins on paper

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The conventional paper electrophoresis as suggested by Lees and Hatch (1963) does not afford complete resolution of the pre- β lipoprotein band. Chin and Blankenhorn (1968) obtained a satisfactory separation by electrophoresis on cellulose acetate and Rapp and Kahlke (1968) and Noble (1968) in agarose gel.

By a slight modification of the conventional paper electrophoresis technique, we obtained a good separation of the pre- β lipoprotein. Electrophoresis was carried out at room temperature on paper, Whatman no. 1 chromatographic grade, in a horizontal cell (Gelman Instrument Company) for 10 hours at 120V with a current of approximately 1 Ma per strip. Barbitol buffer of ionic strength 0.09, pH 8.6, containing 0.001 M EDTA was used in all experiments. Bovine albumin was added to the buffer so that the final concentration of the albumin in the buffer solution was 1%.

Before applying the sample the strips were equilibrated for two hours in the closed cell.

After electrophoresis the strips were dried in an oven at 95°C for 20 min and then stained by immersion in a supersaturated alcoholic solution of Oil-red-O for four to six hours at 40°C (Fredrickson, Levy, and Lees, 1967). The samples were then rinsed with water and dried.

As illustrated in the Figure, it was found that the duration of the electrophoresis is crucial for the good separation of the pre- β band; the optimum duration is 10 hours instead of 16, as suggested by

Comment

The system described has been tested in hospital wards and laboratories and a group general practice. It has been shown to be reliable, simple to operate, and acceptable to ward, laboratory, and general practice personnel.

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