The Measurement of Extracellular Fluid Volume using ^{35}S — Comparison between the anthracene free-flow cell counter and liquid scintillation counter —

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It is important to know the volume of extracellular fluid for monitoring proper hydration of surgical patients.

The volume of extracellular fluid can be calculated by the dilution method using ^{35}S labelled sodium sulfate.

An anthracene free-flow cell was designed in order to simplify counting this beta-emitting ^{35}S in liquid samples.

In this study the concentrations of radioactivity counted in this anthracene cell were compared with those obtained with liquid scintillation counter. The anthracene cell has a long narrow tunnel between a clear transparent acrylic resin disc and a white reflector acrylic resin disc, 8 cms in diameters. The tunnel is covered with fine anthracene crystals.

This cell is connected a photomultiplier tube and a scaler system. Liquid samples are put in the tunnel and counted.

Ten ml of venous blood were sampled from 22 adult patients 40, 50 and 60 minutes after 30 μCi of ^{35}S sodium sulfate were injected.

The plasma proteins of these blood somples were precipitated with 20 percent trichloracetic acid.

The concentrations of ^{35}S in the same supernatant fluids from these plasma were determined with two counters, one is this anthracene cell system and the other is a liquid scintillation counter.

The data obtained using both methods agree with each other.

The correlation coefficient was 0.907 and the regression curve was $y=0.960\,x-0.41$.

This system avoids the tedious and time-consuming process to extracellular fluid.

New Liquid Scintillation Counter with Automatic Quenching Level Selector

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One of the main problems encountered in liquid scintillation counting is the quenching of the samples. Quenching by preparation of a series of samples will give different efficiencies of counting. Quenching samples are able to be divided into the parts of a light quenching group and a heavy quenching group. The former group gives high counting efficiencies and the later group gives low counting efficiencies. In measurment of double labeled samples with the heavy quenching the separation of high energy isotope from low energy isotope is very difficult, becouse the greater parts of the high energy isotope shift into the low energy isotope channel. Thus, in conventional liquid scintillation counting system, each group has been measured at the different condition by manual setting a supply potential for photomultiplier tubes or an amplifier-gain to give