PROTOCOL FOR CAMERA DEADTIME MEASUREMENT

The prevailing unqualified use of the term "deadtime" is ambiguous. The term must be defined, and the values measured and applied for data correction in a manner consistent either with a paralyzable or with a nonparalyzable system. To clearly maintain this distinction, we use τ for the deadtime of a paralyzable system and T for that of a nonparalyzable one. In either system, deadtime varies with a number of factors which include counting rate, analyzer window width, scatter, and the presence or absence of a collimator. It may also vary slightly with source position. "Deadtime" may be considered a term of mathematical convenience for the correction of all sources of coincidence loss from an entire scintillation camera and data-processing system. The numerical values of deadtime may be considerably greater than indicated from oscilloscope wave forms.

We have developed a two-source method protocol for the measurement of deadtime (*1*). For mathematical convenience the system is treated as nonparalyzable (*2*). The protocol is rapid, accurate, and eliminates error from radioactive decay when employing short-lived sources such as ^{99m}Tc or ^{113}In.

On request, the authors will be pleased to provide a copy of this protocol.

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GEL CHROMATOGRAPHY AS AN ANALYTICAL TOOL FOR ^{99m}Tc RADIOPHARMACEUTICALS

It has been suggested by Eckelman, Meinken, and Richards that gel chromatography be used for the analysis of ^{99m}Tc-labeled compounds because of its ability to separate labeled proteins, chelates, pertechnetate, and hydrolyzed reduced technetium (*1*). In this article, they described the use of Sephadex G25 as a gel chromatographic medium for the analysis of a number of ^{99m}Tc-chelates. They detected three separate fractions, the pertechnetate fraction, the chelate fraction, and a fraction which was not eluted from the column which they referred to as "hydrolyzed reduced technetium". More recently, Valk, Dilts, and McRae (*2*) have shown that the results obtained from Sephadex G25 gel chromatography are sometimes inconsistent with the in vivo biological behavior of the preparation being tested. This they identified as an artifact of the gel chromatography and suggest that care must be taken in the interpretation of the results obtained from gel chromatography, especially when the radiopharmaceutical concerned is a weak chelate. Although this is a very good point and should be carefully noted by those endeavoring to analyze chelates of technetium, it should not cause them to neglect the very useful tool of gel chromatography.

Valk, Dilts, and McRae point out that Sephadex is a polymerized polysaccharide and, like other carbohydrates, will probably complex Tc(VII) which has been reduced with stannous ion. They suggest that the persistence of ^{99m}Tc on the Sephadex column when a weak Tc chelate is being eluted may be from an exchange of the ^{99m}Tc between the weak chelating agent and the Sephadex. This would seem to be a very likely explanation. If this is true, then the problem is with the Sephadex medium rather than with the technique of gel chromatography and fortunately there are alternative gel chromatography media available. One such alternative is Bio-Gel (marketed by Bio-Rad Laboratories) which is prepared from copolymerized acrylamide and methylene-bis-acrylamide. To check the validity of this explanation, Sephadex G25 and Bio-Gel P10 columns were run in conjunction with silica gel thin-layer chromatograms in saline and butyl acetate (*3*) on four different