APPLICATION OF RADIOIMMUNO ASSAY TO THE
STUDY OF AUSTRALIA ANTIGEN

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Australia antigen in blood and blood products is associated with post-transfusion hepatitis. Methods for detecting the antigen based on immunodiffusion, immunoelectrophoresis or complement fixation detect only about one-third of the blood samples that transmit the disease. This is due in part to the insensitivity of these methods.

Radioimmuno assay (RIA) can be used to detect lower concentrations of antigen. Conventional RIA procedures are based on $^{125}$I-labeled antigen interacting with a limited amount of antibody(1). The amount of an unknown is estimated by competitive inhibition with the labeled antigen(2).

\[ (1) \quad ^{125}\text{I}-\text{Ag} + ^{125}\text{I}-\text{AgAb} \]

\[ \text{Ab} \]

\[ (2) \quad \text{Ag} + \text{AgAb} \]

Variations of the method are based on detecting the $^{125}$I-AgAb complex in the presence of unreacted $^{125}$I-Ag.

We have developed a new method based on $^{125}$I-labeled antibody. The amount of antigen in an unknown sample is then determined directly in a 2-step procedure.

Step 1 : Undiluted serum is added to a tube coated with hyperimmune anti-Australia antigen serum. During the incubation Australia antigen in the sample binds to the specific immune globulin fixed to the tube.

Step 2 : After removal of the sample, anti-Australia antigen globulin, labeled with $^{125}$I, is added to the tube. The amount of $^{125}$I fixed is in direct proportion to the amount of Australia antigen in the original sample.

The method is generally applicable to antigens having multiple antigenic sites. It is 100 times as sensitive as complement fixation and detects Australia antigen in the presence of antibody or antigen-antibody complexes. The method gives an increased number of antigen positives in blood donor populations, and also sera from diagnosed and suspected hepatitis patients. Results of these studies and details of the method will be discussed.