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METHODOLOGY: DEVELOPMENTS AND TRENDS

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In recent years the application of techniques based upon the principles of binding assays has enabled rapid advances to be made in the practice of both diagnostic and therapeutic endocrinology. Radioimmunoassay was the first method to be developed and requires the following components:

- (i) a specific antiserum;
- (ii) a reference preparation - identical with the substances to be measured;
- (iii) a radioactively labelled antigen - with a similar avidity for the antibodies; and
- (iv) a method of separating the antibody/bound fraction.

Since the initial description of the technique, the assays have been modified by:

- (i) substituting other binding materials, e.g. naturally occurring plasma proteins, cell membrane and cytosol receptors or enzymes for antibodies;
- (ii) the use of monoclonal antibodies;
- (iii) changing the nature of the radioisotope, e.g. I^{131} to I^{125} , H^3 to Se^{75} ; and
- (iv) changing the separation technique, e.g. secondary antibody, Sepharose, Dextran-coated charcoal.

In addition, it was soon realised that it was possible to:

- (i) label the antibody instead of the antigen and so move from competitive to stoichiometric analysis;
- (ii) use a different marker to a radioisotope; and
- (iii) avoid the necessity of separating the antibody/bound and free actions.

To date, at least 9 different labels have been proposed (isotopes - β and α ; enzymes, coenzymes and inhibitors, bacteria, metals, fluorescent and luminescent compounds). In addition, homogenous assays, involving the use of enzymes or fluorescent and luminescent labels, have been developed. Consequently, there is potentially a large number of alternative procedures and end-points, which has led to the use of new terms to describe the method, e.g. enzyme immunoassay, luminescent immunoassay; double antibody and solid phase systems.

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