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BOOK OF ABSTRACTS

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Clinical significance of radioimmunoassay (RIA) and immunoradiometric assay (IRMA) in endocrinology

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Radiopharmaceuticals are compounds used in human medicine for the diagnosis of 95% and therapy of 5%. Radiopharmaceuticals are used by in-vivo and in-vitro in medicine. In-vitro application includes RIA methods (radioimmunoassay) in clinical laboratories. RIA methods are methods with bookmarks, i.e. the indicator molecule is marked with a radioactive isotope ^{125}J with a half-life of 60 days. RIA methods are the most sensitive quantitative and qualitative techniques.

A radioimmunoassay (RIA) is an immunoassay that uses radiolabeled molecules in a stepwise formation of immune complexes. Immunoradiometric assay (IRMA) is an assay that uses radiolabeled antibodies. It differs from conventional RIA n that the compound to be measured combines immediately with the radiolabeled antibodies, rather than displacing another antigen by degrees over some period.

RIA and IRMA are the most commonly used techniques which allow the measurement of a wide range of materials of clinical and biological importance, especially in endocrinology for estimation of hormones. These techniques have a significant impact on medical diagnosis due to the ease with which the tests can be carried out, while assuring precision, specificity and sensitivity. These techniques achieve sensitivity through the use of radionuclides and specificity that is uniquely associated with immunochemical reactions. They are largely used for measuring biologically active compounds present in low concentrations, such as hormones, proteins, drugs, microorganisms, etc.

The radioimmunoassay (RIA) method is employed to determine numerous hormones, enzymes, antigens, and drugs in very low quantities (10^{-12}–10^{-9} M) in human plasma in order to assess various diseases. In RIA, the immunologic reaction between the antigen and the antibody is highly specific, and hence the method has high specificity. The accuracy of the method depends on various experimental factors and the specificity of the antigen–antibody reaction. The precision of RIA is affected by experimental errors in pipetting of reagents, chemical separation of the complex, and counting. IRMA is much more sensitive to RIA, which in some cases (e.g. in TSH) is very significant. Because of the use of monoclonal antibodies in the first phase of the reaction, this system has a much better specificity, which significantly reduces errors due to cross-reactions with other hormones.

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