THE ROLE OF EXPERIMENTAL ANIMAL STUDIES IN DEVELOPMENT AND EVALUATION OF RADIOPHARMACEUTICALS FOR DIAGNOSIS AND THERAPY OF PATHOLOGICAL DISEASES

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Introduction

The goal of this work is to present our experience in establishment of the procedures and protocols for experimental studies as an essential part in development of new radiopharmaceuticals and quality control for the existing radiopharmaceuticals for the diagnosis and treatment of some pathological processes.

Methods

Generally, the most common animals used in experimental studies are rats and mice. The following experimental designed animal models were one of more important which results are already employed in clinical trials.

❖ Stasis-induced thrombus in the femoral vein after injection of thromboplastin to demonstrate Deep Venous Thrombosis using radiolabeled Tirofiban – GPIIb/IIIa inhibitor;

❖ Dialysis related amyloidosis induced by multiple application of beta-2-microblobulin. The deposit in the osteoaricular tissues was detected using Tc-99m-labeled MDP, hIgG and specific beta-2-microglobulin;

❖ Collagen-induced arthritis as a model of inflammatory arthritis to evaluate Tc-99m-labeled hIgG;

❖ Bacterial abscesses by the injection of *Staphylococcus aureus* to evaluate Tc-99m-labeled hIgG;

❖ Chemical induced Colon injury and inflammation (Crohn disease) using TNSB to test orally administered gelatin microspheres containing drug, were used for quality control of radiopharmaceuticals (Tc-99m MDP, Tc-99m hIgG, Tc-99m dextran, Tc-99m colloids);

❖ Liver Transplantation model to imaging of Allograft Rejection using radiolabeled Annexin V;

❖ The clinical utility of Tc-99m HIDA scintigraphy following liver surgery;

❖ *per os* administration of iodine labeled BSA loaded microspheres to show the strong adjuvant effect by inducing IgA secretion at the genitor-urinary mucosa;

❖ athymic nude mice tumor bearing to demonstrate specificity of pretargeting technique referred to the affinity Enhancement System (AES) uses bispecific antibodies and radiolabeled bivalent haptens;

Conclusions

Employing experimental animal models are one of the main way to introduce and tested new radiopharmaceuticals for many pathological processes even this approach can never replicate the human disease or the multifarious and complex physical and physiological manifestations of the human conditions.

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