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Technology of DTPA conjugatation immunoglobulins and their labeling with ⁹⁰Y and ¹⁷⁷Lu radionuclides

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Model study of the γ-immunoglobulin G (Human or Bovine IgG, polyclonal antibodies) and bifunctional chelating agent diethylenetriaminepentaacetic acid dianhydride (cDTPAA) conjugation was carried out. Various values of the cDTPAA/antibody conjugation ratio (15/1, 40/1, 105/1, 125/1 and 250/1) and the weight concentration of IgG 10, 5 and 1 mg mL⁻¹ in 0.1 mol L⁻¹ phosphate buffer (pH 7.3) and 0.1 mol L⁻¹ carbonate buffer (pH 8.5) were used. Further, the labeling conditions of the DTPA-IgG conjugate by radionuclides ⁹⁰Y and ¹⁷⁷Lu were optimized and the labeling yield, the conjugate degrees of prepared radionuclide-DTPA-IgG conjugates were determined.
The DTPA-MEM-97 (monoclonal antibody) was another tested conjugation system.
This system was investigated at above-mentioned conjugation ratio of the cDTPAA/antibody and 2.5 mg mL⁻¹ MEM-97 (the weight concentration) in 0.1 mol L⁻¹ phosphate buffer and 0.1 mol L⁻¹ carbonate buffer.
Incubation time of the immunoglobulin conjugation, analogous to the monoclonal antibody MEM-97, was obtained after 30 minutes from mixing of individual components.
The labeling yield of radionuclide-DTPA-antibody conjugate higher than 80 % was achieved. Higher values of conjugation degree of radionuclide-DTPA-antibody conjugate were achieved in 0.1 mol L⁻¹ carbonate buffer, pH 8.5. It follows that the 0.1 mol L⁻¹ carbonate buffer is suitable for the studied conjugation systems. This study has shown that the labeling yield as well as the conjugation degree of tested systems depend on the amount of antibody substance, on the bifunctional chelating agent/antibody conjugation ratio and on pH value of buffer in which the conjugation was carried out.

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