14.005 - RADIOPHARMACEUTICAL FOR DIAGNOSIS OF HER2-POSITIVE BREAST CANCER WITH TRASTUZUMAB- 99m -Tc.

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Introdução:

Trastuzumab IgG1 binds to the HER2 receptor on cancer cells, inhibiting the growth signal and stimulating the immune system to combat them. Its use in therapy has been employed for HER2-positive breast cancer. Advances in nuclear medicine have enabled the development of radiopharmaceuticals for its diagnosis, consisting of a radionuclide, a molecule that binds to the specific target, and a marker that allows visualization of cancer cells through µPET/SPECT/CT. The 99m -Tc isotope is used in nuclear medicine due to its suitable half-life for obtaining images, low concentrations of the isotope, and short half-life. Trastuzumab therapy has shown efficacy in HER2+ tumors, while radiopharmaceuticals play an important role in breast cancer screening.

Objetivos:

The objective is to obtain a specific radiopharmaceutical for the HER2-positive receptor capable of diagnosing breast tumors with high sensitivity and specificity.

Métodos:

The methodology involves the preparation of the Trastuzumab antibody conjugated to the radioactive isotope 99m -Tc, conjugated with HYNIC-NHS and DMSO under 60 minutes of agitation. It is then purified with C?H?NO?, followed by the addition of 0.1 mg of Sn 2 Cl in 5µL of HCl, 1 mg of C 6 H 13 NO 5 , and 1 mg of C 2 H 4 (NHCH 2 CO2H)2 in
100 µL of C?H?NO?, and 8mCi of 99m -Tc. After incubation, the sample is washed with PBS, and the product yield is confirmed by CCD. The stability test was performed to observe the influence of external factors. Trastuzumab- 99m -Tc was added to mouse saline and plasma at 37ºC and analyzed at 15 minutes, 1, 2, 3, 4, 5, 6, and 24 hours using CCD on the Y counter.
The experiments were conducted in accordance with the approved local ethics committee (CEUA: nº30/22). Eight-week-old female Balb/c nude mice were subcutaneously inoculated with 1X106 SKBR3 cells (ATTC: HTB30- Positive for HER2) and 1x106 MDA-MB-231 ATTC: HTB-26 - Negative for HER2). The radiolabeling using Trastuzumab, HYNIC, and 99m -Tc showed aradiochemical purity of ? 95%.

Resultados:

The radiolabeling using Trastuzumab, HYNIC, and 99m -Tc showed a radiochemical purity of ? 95%. The stability study conducted in saline and plasma demonstrated that Trastuzumab- 99m -Tc is stable for up to 24 hours with a radiochemical purity of ? 95%.

Conclusão:

In conclusion, it has been determined that the radiolabeling of Trastuzumab-99m-Tc is feasible and stable for up to 24 hours. The next step is the study of cellular internalization and in vitro immunoreactivity, followed by biodistribution in animals with HER2-positive tumors when they reach a size of 0.3 cm3, using Trastuzumab-99m-Tc.

Apoio Financeiro:

CAPES