Radiosynthesis and cellular uptake of ^{131}I-CoAM for Diagnosis and Therapy of Breast Cancer

Abstract

Drug molecules in nature, especially metals, offer a much wider variety of compounds and have important therapeutic applications. Metal-based compounds as therapeutic drugs have been around for more than 5000 years. Since the introduction of cisplatin (cis-dichlorodiammineplatinum(II), cis$Pt(Cl_2(NH_3)_2)$ to oncology, especially in the treatment of advanced cancers, inorganic compounds have had a tremendous impact. The activity of these metal complexes relies largely on specific interactions with DNA, which causes damage and eventually cell death. An organometallic complex compound derived from alpha mangostin has been successfully synthesized. This compound was then radiolabeled with Iodine-131 as a potent radiopharmaceutical for breast cancer diagnosis and therapy. One of the selected methods for detecting cancer is nuclear techniques using radiopharmaceuticals. The method of ynthesis with iodine is known as the radioiodination process using Chlorimine T (CAT) as oxidator. Radiosynthesis optimization was carried out by varying the number of ligands, the amount of CAT, and the incubation temperature, then in vitro test against human cell lines. The results showed that optimization of ^{131}I-CoAM using 0.25 ug CoAM, 0.5ug CAT and 15 minutes of incubation at 4^{o}C resulted in radiochemical purity of 97.76%. Cellular uptake of the ^{131}I-CoAM in MCF7, MDA-MB-231 and HaCaT cells lines at 60 minutes incubations were 4.01%±1.03; 2.56%± 0.34; 2.07%± 0.17 and compared with Iodine-131 of 0.23%±0.05. It is necessary to carry out a separation process with cold ligands to increase the affinity of ^{131}I-CoAM in cancer cells for the next step.

Keyword : Radiopharmaceuticals, Breast Cancer, Alpha Mangostin, organometallic complex