Commentary

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Commentary on Iodine-124

Abstract

The use of radiopharmaceuticals for molecular imaging of biochemical and physiological processes in vivo has evolved into an important diagnostic tool in modern nuclear medicine and medical research. Positron emission tomography (PET) is currently the most sophisticated molecular imaging methodology, mainly due to the unrivalled high sensitivity which allows for the studying of biochemistry in vivo on the molecular level. The most frequently used radionuclides for PET have relatively short half-lives (e.g. 11 C: 20.4 min; 18 F: 109.8 min) which may limit both the synthesis procedures and the time frame of PET studies. Iodine-124 (124 , t 1/2 = 4.2 d) is an alternative long-lived PET radionuclide attracting increasing interest for long term clinical and small animal PET studies. The present review gives a survey on the use of 124 I as promising PET radionuclide for molecular imaging. The first part describes the production of 124 I. The second part covers basic radiochemistry with 124 I focused on the synthesis of 124 I-labeled compound for molecular imaging purposes.

Keywords: Iodine-124• positron emission tomography (PET) • molecular imaging

Frank Wuest*

Department of Oncology, University of Alberta, Edmonton, Canada

*Author for correspondence:

wuest@ualberta.ca

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Introduction

Converage of molecular and cellular biology with imaging sciences to molecular imaging has revolutionized current medicine. Molecular imaging is outlined because the in vivo characterization and\ measure of life processes at the cellular and molecular level. Molecular imaging aims at developing non-invasive methods for characterizing the molecular and metabolic identification in living subjects. Molecular and cellular processes may be studied and visualised at varied levels of resolution by suggests that of in vivo imaging techniques, that span from supersonic to gamma-ray frequencies. In recent years, antielectron emission imaging (PET) has become a strong non-invasive molecular imaging technique that provides useful data of physiological, organic chemistry and medicine processes in laboratory animals and humans [1]. the likelihood to watch molecular interactions in living organisms and to see absolute values of physiological parameters places PET in a very distinctive position among alternative molecular imaging techniques. in a very typical PET study the PET radiotracer, a compound labeled with a fugacious antielectron electrode, is injected intravenously into a personality's or animal..

Description

Early investigations into the assembly of 124 I most typically used the 124 Te(d,2n) 124 I natural action theme. additional recently but, with the rise within the variety of low-energy nucleon cyclotrons (for the aim of manufacturing ancient PET isotopes like eighteen F or eleven C), the 124 Te(p,n) 124 I reaction has been gaining quality [2,3]. Despite the slight decrease in yields noted with the 124 Te(p,n) 124 I natural action , this theme offers the likelihood of getting the best levels of 124 I radioiodine purity at the time of administration.

The number of reaction methods on the market for the assembly 124 I at a specific facility is settled by the irradiation energies and particles on the market. If multiple schemes area unit potential, the selection of that reaction strategy to use needs an intensive analysis of the specified 124 yields and also the tolerable level of radioiodine impurities at the time of administration. VPET depends on the detection of the 2 succeeding 511 keV photons in coincidence[4]. These 2 photons arise from antielectron annihilation following the antielectron (β+) decay of the isotope on the\ tagged pharmaceutical. As these 2 annihilation photons area unit emitted in opposite directions (nearly 180º), the annihilation event is taken to possess occurred on the trail connection the 2 detectors (referred to because the line of response (LOR)). The present review has summarized the applying of 124 I as a PET radionuclide for molecular imaging. Over the last four decades, radioiodinated radiopharmaceuticals have contend a crucial role in medicine. The quickly growing field of molecular imaging has excited analysis on novel positron-emitting radionuclides, particularly with longer half-lives[5]. The positron-emitting radiohalogen 124 I with its 4.2 half-life is especially enticing for in vivo detection and quantification of long run biological and physiological processes. The long half-life of 124 I is very fitted to in vivo studies of the prolonged time course of uptake of upper relative molecular mass compounds like organism antibodies (MAbs) in solid tumors. Moreover, the long half-life permits serial scanning protocols over a amount of many days.

Acknowledgement

None

Conflict of Interest

No conflict of interest

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