

Appreciation

I would like to express my great thanks and tribute to every one who support me in my work; especially my colleagues from Radiation and Isotopes Center of Khartoum (RICK).

Full regardness for my supervisor Dr Adam Khatir Sam who gave a perfect advice and ideas, in such way that he motivated me to complete the work in success.

Dedication

To

My supervisor Dr Adam Khatir Sam, my family and my colleagues
from RICK.

Abstract

This study reviews synthesis, evaluation, diagnostic and therapeutic applications of iodine radiopharmaceuticals especially with ^{131}I and ^{123}I in contemporary nuclear medicine. It is well known that iodine is used in thyroid diagnostic and therapy with sodium iodide and played an important role in diagnostic procedures using single photon emission tomography (SPECT).

The study covers the general chemistry of iodine, physical properties, biological role of iodine, general uses of iodine compounds, production and decay schemes of ^{131}I , ^{125}I and ^{123}I in the first chapter. Preparation of radioiodine labeled compounds, quality control of radiopharmaceuticals and safety of radioiodination are dealt with in detail in two chapters.

These were followed by chapters dealing in length with the chemistry, preparation, quality control, pharmacokinetics and radiation dosimetry of

Some iodine radiopharmaceuticals, and then current trends in diagnostic and therapeutic applications of iodine radiopharmaceuticals particularly $^{131/123}\text{I}$ -MIBG and ^{123}I -IMP.

We found that the iodine radiopharmaceuticals are considered amongst principal indicators in single photon emission tomography (SPECT), and $^{131/123}\text{I}$ -MIBG and ^{123}I -IMP appear to be appropriate diagnostic and therapeutic agents for variety of diseases.

الخلاصة

تناولت هذه الدراسة ملخصاً كاملاً عن إنتاج و تحضير وضبط جودة المستحضرات الصيدلانية الخصة بنظيرى اليود -131و 123 وكذلك تناولت عدد من التطبيقات التشخيصية والعلاجية لهما في مجالات الطب النووي. من المعلوم لدينا أن اليود يستخدم في تشخيص وعلاج الغدة الدرقية ويلعب أيضاً دوراً هاماً في التشخيص باستخدام تقنية المسح الإشعاعى. (SPECT)

قامت هذه الدراسة بتغطية الجوانب المتعلقة بالكيمياء العامة لليود والخواص الفيزيائية والكيميائية والاستخدامات العامة لمركبات لليود . كما غطت الدراسة أيضاً طرق الإنتاج والتحليل الإشعاعى لنظائر اليود -131و125و123 فى الفصل الثانى.

تحضير الواسمات مع نظائر اليود وضبط جودة المواد الصيدلانية المشعة من المواضيع ذات الأهمية لذا عمدنا الى تغطيتها بشي من التفصيل فى الفصلين الثالث والرابع.

فى الفصل الخامس تناولنا بعض المركبات الصيدلانية المشعة لليود من حيث التحضير وضبط الجودة والتحليل الاحيائى والقياس الإشعاعى ثم تناولنا فى الفصل السادس التطبيقات الحالية فى العلاج والتشخيص وقد ركزت هذه الدراسة بصفة خاصة على المركبات $^{131/123}\text{I-MIBG}$ و $^{123}\text{I-IMP}$.

وقد وجدنا أن نظائر اليود من أهم العناصر المستخدمة فى التشخيص باستخدام تقنية المسح الإشعاعى (SPECT) وكذلك المركبات $^{131/123}\text{I-MIBG}$ و $^{123}\text{I-IMP}$ لها تطبيقات هامة فى علاج وتشخيص كثير من الأمراض.

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