Sodium Iodide I 131 Capsules USP
Diagnostic - Oral

DESCRIPTION

Sodium Iodide I 131 Capsules USP for diagnostic use is a radiopharmaceutical containing Sodium Iodide I-131 and supplied for oral administration in a gelatin capsule. Each capsule contains no-carrier-added Sodium Iodide I-131, Disodium Edetate Dihydrate USP as a stabilizer, Sodium Thiosulfate Pentahydrate USP as a reducing agent, and Dibasic Sodium Phosphate Anhydrous USP.

DRAXIMAGE Sodium Iodide I 131 Capsules USP (Diagnostic Oral) is available in strengths of 0.33, 0.61, 1.11, 2.03 and 3.7 MBq (9, 16.5, 30, 55 and 100 µCi/capsule) at time of calibration.

Sodium Iodide I-131 is designated chemically as $Na^{131}I$ (MW 153.99, CAS 7681-72-5).

PHYSICAL CHARACTERISTICS

Iodine I-131 decays by beta emission and associated gamma emission with a physical half-life of 8.04 days.[1] Photons that are useful for detection and imaging are listed in Table 1.

Table 1
Principal Radiation Emission Data

Radiation	Mean % per Disintegration	Mean Energy (keV)
Beta-1	2.12	69.4
Beta-3	7.36	96.6
Beta-4	89.3	191.6
Gamma-7	6.05	284.3
Gamma-14	81.2	364.5
Gamma-17	7.26	637.0

[1]Kocher, David C, "Radioactive Decay Data Tables", DOE/TIC-11026, (1981) p. 133.

EXTERNAL RADIATION

The specific gamma-ray constant for iodine I-131 is 2.2 R/hr-millicurie at 1cm. The first half-value thickness of lead (Pb) for iodine I-131 is 0.24 cm. A range of values for the relative attenuation of the radiation emitted by this radionuclide that results from interposition of various thicknesses of Pb is shown in Table 2. For example, the use of 2.55 cm of Pb will decrease the external radiation exposure by a factor of about 1,000.

Table 2
Radiation Attenuation by Lead Shielding

Shield Thickness (Pb) cm	Coefficient of Attenuation
0.24	0.5
0.89	10^{-1}
1.6	10^{-2}
2.55	10^{-3}
3.73	10^{-4}

Data supplied by Oak Ridge Associated Universities, Radiopharmaceutical Internal Dose information Center, Oak Ridge TN, 1987

To correct for physical decay of iodine I-131, the fractions that remain at selected intervals after the time of calibration are shown in Table 3.

Table 3
Physical Decay Chart: Iodine I-131 (half life 8.04 days)

Days	Fraction Remaining	Days	Fraction Remaining	Days	Fraction Remaining
0*	1.000	11	.388	22	.151
1	.918	12	.356	23	.138
2	.842	13	.327	24	.127
3	.773	14	.300	25	.116
4	.709	15	.275	26	.107
5	.651	16	.253	27	.098
6	.597	17	.232	28	.090
7	.548	18	.213	29	.083
8	.503	19	.195	30	.076
9	.461	20	.179		
10	.423	21	.164		

*Calibration time

CLINICAL PHARMACOLOGY

Pharmacokinetics

Absorption: Following oral administration, Sodium Iodide I-131 is readily absorbed from the gastrointestinal tract.

Distribution: Following absorption, the iodide is primarily distributed within the extra-cellular fluid of the body. It is trapped by the thyroid. The thyroid uptake of iodide is usually increased in hyperthyroidism and in goiter with impaired hormone synthesis, decreased in hypothyroidism, and normal to decreased in hypothyroidism receiving iodine. It should be noted that the uptake of radioactive iodide is a function of stable iodide concentration in the serum and the functional state of the thyroid. The iodine concentrating mechanism of the thyroid, termed the iodide trap or pump, accounts for an iodide concentration of some 25 times plasma levels, but may increase as much as 500 times under certain conditions. It is also concentrated by the stomach, choroid plexus, and salivary glands, but is not protein-bound.

Metabolism: Trapped iodide is oxidized to iodine and organically incorporated so rapidly that the iodide trap of the thyroid contains less than 0.2% free iodide in comparison to the organically bound iodine. This process results in further concentration of iodine in the thyroid gland to about 500 times that in the blood.

The iodinated organic compounds chiefly consist of thyroxine (T4) and triiodothyronine (T3), which are bound by thyroglobulin in the follicular colloid. T4 and T3 are released by enzymatic proteolysis of thyroglobulin into the blood where they are specifically bound and transported by plasma thyroid binding proteins. These reactions are primarily under the control of anterior pituitary gland release of thyroid stimulating hormone (TSH) and hypothalamic thyroid release factor (TRF).

Excretion: Sodium Iodide I-131 is excreted by the kidneys. The normal range of urinary excretion is 37-75% of the administered dose, varying with the thyroid and renal function of the patient.

INDICATIONS AND USAGE

Sodium Iodide I-131 is indicated for use in performance of the radioactive iodide (RAI) uptake test to evaluate thyroid function. Diagnostic doses may also be employed in localizing metastases associated with thyroid malignancies.

CONTRAINDICATIONS

Sodium Iodide I-131 is contraindicated for use in women who are or may become pregnant. Iodine-131 may cause harm to the fetal thyroid gland when administered to pregnant women. Review of the literature has shown that transplacental passage of radioiodide may cause severe, and possibly irreversible, hypothyrodism in neonates. Use of Sodium Iodide I-131 in women of childbearing age should be deferred until the possibility of pregnancy has

been ruled out. If this drug is administered to a woman with reproductive potential, the patient should be apprised of the potential hazard to a fetus.

WARNINGS

None

PRECAUTIONS

General

The recent intake of stable iodine in any form, or the use of thyroid or anti-thyroid drugs will affect the uptake of radioiodide. Accordingly, the patient should be questioned carefully regarding previous medication and procedures involving radiographic contrast media.

The calibration date and expiration date are indicated on the container label.

Radiopharmaceuticals should be used only by nuclear physicians and/or radiopharmacists who are qualified by training and experience in the safe use and handling of radionuclides, and whose experience and training have been approved by the appropriate governmental agency authorized to license the use of radionuclides. (See **Drug Handling and Final Dosage Form Preparation** sections.)

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient consistent with proper patient management and to assure minimum radiation exposure to occupational workers.

Carcinogenesis, Mutagenesis, Impairment of Fertility,

No long-term animal studies have been performed to evaluate carcinogenic potential, mutagenic potential, or whether this drug affects fertility in males or females.

Pregnancy Category X

See CONTRAINDICATIONS section

Nursing Mothers

Radioiodine is excreted in human milk during lactation. Therefore, formula feedings should be substituted for breast feedings.

Pediatric Use

Safety and efficacy in pediatric patients have not been established.

Geriatric Use

Adequate and well controlled studies on the relationship of age to the effect of radioiodide have not been performed in geriatric population.

This drug is known to be substantially excreted by the kidney and the risk of toxic reactions to this drug may be greater in patients with impaired renal function. Because elderly patients are more likely to have decreased renal function, care should be taken in dose selection and it may be useful to monitor renal function.

ADVERSE REACTIONS

Although rare, reactions associated with the administration of iodine containing radiopharmaceuticals for diagnostic use include, in decreasing order of frequency, nausea, vomiting, chest pain, tachycardia, itching skin, rash and hives.

INFORMATION FOR PATIENTS

Patients should inform their health care practitioner if they have one or more of the following:

- Inform your physician if you are pregnant.
- Inform your physician if you are allergic to any drugs or food, or if you have immune, autoimmune, or immune deficiency disorders. Also, inform your physician if you had any reactions to previous injections of dyes used for x-ray procedures.
- Inform your physician of all medications you are currently taking, including non-prescription drugs (over-the-counter), before you have this procedure.

DRUG ABUSE AND DEPENDENCE

Patients administered Sodium Iodide I 131 Capsules USP are not at risk for developing chemical dependency.

OVERDOSAGE

The clinical consequences of overdosing with Sodium Iodide I 131 Capsules are not known. Treatment of an overdose should be directed toward the support of all vital functions and prompt institution of symptomatic therapy.

DOSAGE AND ADMINISTRATION

The suggested oral dosage ranges employed in the average patient (70 kg) for diagnostic procedures for thyroid function are as follows:

Thyroid Uptake:
0.185 to 0.555 megabecquerels (5 to 15 microcuries)

Scintiscanning:
1.85 to 3.7 megabecquerels (50 to 100 microcuries)

For localization of extra-thyroidal metastases the usual dose is 37 megabecquerels (1000 microcuries).

General Dosing Information

Patients should be adequately hydrated before and after administration of radioiodide to assure rapid urinary elimination of the iodide that is not absorbed by the thyroid gland.

Radiation Dosimetry

The estimated absorbed radiation doses to an average (70 kg) euthyroid (normal functioning thyroid) patient from an oral dose of 3.7 megabecaquerels (100 microcuries) of iodine I-131 are shown in Table 4.

Table 4
Estimated Absorbed Radiation Doses from an Oral Dose of 3.7 mBq (100 mCi)

Tissue	Absorbed radiation doses for 3.7 megabecquerels (100 microcuries)					
	Thyroid Uptake					
	5%		15%		25%	
	mGy	rads	mGy	rads	mGy	rads
Thyroid	260	26.0	800	80.0	1300	130.0
Stomach Wall	1.7	0.17	1.6	0.16	1.4	0.14
Red Marrow	0.14	0.014	0.20	0.020	0.26	0.026
Liver	0.20	0.020	0.35	0.035	0.48	0.048
Testes	0.08	0.008	0.09	0.009	0.09	0.009
Ovaries	0.14	0.014	0.14	0.014	0.14	0.014
Total Body	0.24	0.024	0.47	0.047	0.71	0.071

MIRD DOSE ESTIMATE REPORT No. 5. Summary of Current Radiation Dose Estimates to Humans from I^{123}, I^{124}, I^{125}, I^{126}, I^{130}, I^{131} and I^{132} Sodium Iodide. J. Nucl. Med., 16, No. 9, 857-60 (1975).

DRUG HANDLING AND FINAL DOSAGE FORM PREPARATION

Drug Handling

1. Sodium Iodide I 131 Capsules USP should not be used after the expiration date stated on the container label.

2. Care should be taken to minimize radiation exposure to the patient consistent with proper patient management and to insure minimum radiation exposure to occupational workers. Waterproof gloves should be used during the entire handling and administration procedure. Adequate shielding should be maintained during the life of the product.

3. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

HOW SUPPLIED

Each capsule contains 0.33, 0.61, 1.11, 2.03 or 3.7 MBq/capsule (9, 16.5, 30, 55 or 100 µCi/capsule) at time of calibration.

The capsules are composed of one white opaque half, while the other half is either a pink, yellow, blue, grey or green opaque and distributed according to the color-coded calendar which assigns a color and capsule strength for each week of the year.

Please consult the color-coded calendar provided to help you establish which colored capsules are required for your prescribed dose.

The capsules are packaged into plastic vials containing one to 25 capsules and into high density polyethylene bottles containing 26 to 200 capsules of the same strength. The vials also contain one desiccant packet and the bottles two desiccant packets.

Storage

Sodium Iodide I 131 Capsules USP should be stored between 15 and 30°C (59 and 86°F).

Storage and disposal of Sodium Iodide I 131 Capsules should be controlled in compliance with the appropriate regulations of the government agency authorized to license the use of this radionuclide.

The U.S. Nuclear Regulatory Commission has allowed distribution of this radiopharmaceutical to persons licensed to use by product material listed in Section 35.100, and to persons who hold an equivalent license by an Agreement State.

NDC 65174-461-XX (Vial)
NDC 65174-461-XX (Bottle)

SUPPLEMENTAL NEW DRUG APPLICATION (S/NDA) NDA 21-305
DRAXIMAGE SODIUM IODIDE I 131 CAPSULES USP - DIAGNOSTIC ORAL

Manufactured by:
DRAXIMAGE, a division of DRAXIS Specialty Pharmaceuticals Inc., Kirkland, Québec, Canada.
DRAXIMAGE LLC., Burlington, Vermont, USA
1-888-633-5343

SUPPLEMENTAL NEW DRUG APPLICATION (S/NDA) NDA 21-305
DRAXIMAGE SODIUM IODIDE I 131 CAPSULES USP - DIAGNOSTIC ORAL

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DRAXIMAGE SODIUM IODIDE I 131 CAPSULES USP - DIAGNOSTIC ORAL

Proposed vial and package label

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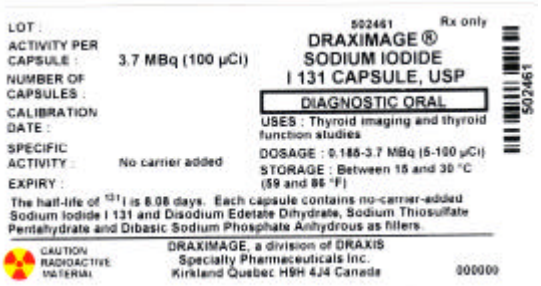

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