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4 Guideline on core SmPC and Package Leaflet for 5 fluorodopa (18F)

6 Draft

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Comments should be provided using this template. The completed comments form should be sent to radiopharmaceuticalsDG@ema.europa.eu.

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Keywords	***Radiopharmaceuticals, radionuclide, kit for radiopharmaceutical preparation, core SmPC, core Package Leaflet, fluorodopa, ^{18}F, fluorodopa (18F)***

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30 Churchill Place ● Canary Wharf ● London E14 5EU ● United Kingdom
Telephone +44 (0)20 3660 6000 **Facsimile** +44 (0)20 3660 5555
Send a question via our website www.ema.europa.eu/contact

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Executive summary

This guideline describes the information to be included in the Summary of Products Characteristics (SmPC) and Package Leaflet for fluorodopa (18F).

1. Introduction (background)

The purpose of this core SmPC and Package Leaflet is to provide applicants and regulators with harmonised guidance on the information to be included in the Summary of product characteristics (SmPC) for fluorodopa[1]. This guideline should be read in conjunction with the core SmPC and Package Leaflet for Radiopharmaceuticals, the QRD product information templates and the guideline on Summary of Product Characteristics.

This fluorodopa (18F) Core SmPC has been prepared on the basis, and taking into account the available published scientific literature dated from more than 10 years. The indications mentioned in section 4.1 of the SmPC are supported by this literature. However, any new application or extension of indications for a radiopharmaceutical product containing fluorodopa (18F) should be submitted with all the required data in order to be valid. For any new indication that is not in the core SmPC, it should be supported by appropriate efficacy and safety data.

2. Scope

This core SmPC and Package Leaflet covers fluorodopa (18F).

3. Legal basis

This guideline has to be read in conjunction with Article 11 of Directive 2001/83 as amended, and the introduction and general principles (4) and part I of the Annex I to Directive 2001/83 as amended.

4. Core SmPC and Package Leaflet for fluorodopa (18F)

[1] Concept paper on the harmonisation and update of the clinical aspects in the authorised conditions of use for radiopharmaceuticals and other diagnostic medicinal products (EMEA/CHMP/EWP/12052/2008)

ANNEX I

SUMMARY OF PRODUCT CHARACTERISTICS

< ▼This medicinal product is subject to additional monitoring. This will allow quick identification of new safety information. Healthcare professionals are asked to report any suspected adverse reactions. See section 4.8 for how to report adverse reactions.> [For medicinal products subject to additional monitoring ONLY]

1. NAME OF THE MEDICINAL PRODUCT

{(Invented) name strength pharmaceutical form}

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

One mL contains XXX GBq or MBq of fluorodopa (18F) at date and time of calibration.

The activity per vial ranges from XXX GBq/ or MBq to XXX GBq or MBq at the date and time of calibration.
Fluorine (^{18}F) decays to stable oxygen (^{18}O) with a half-life of 110 minutes by emitting a positronic radiation with a maximum energy of 634 keV followed by photonic annihilation radiations of 511 keV.

Excipient(s) with known effect:
[Product specific]

For a full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Solution for injection.
[Product specific]

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

This medicinal product is for diagnostic use only.

fluorodopa (18F) is indicated for use with positron emission tomography (PET) in adults and paediatric population.

Neurology
PET with fluorodopa (18F) is indicated for detecting loss of functional dopaminergic neuron terminals in the striatum. It can be used for diagnosis of Parkinson's disease and differentiation between essential tremor and parkinsonian syndromes.

Oncology
Among medical imaging modalities, PET with fluorodopa (18F) provides a functional approach of pathologies, organs or tissues where enhanced intracellular transport and decarboxylation of the amino acid dihydroxyphenylalanine is the diagnostic target. The following indications have been particularly documented:

Diagnosis
- Diagnosis and localisation of focal hyperplasia of beta islet cells in the case of hyperinsulinism in infants and children

- Diagnosis and localisation of paragangliomas in patients with a gene mutation of the succinate dehydrogenase D variant
- Localisation of pheochromocytoma

Staging
- Phaeochromocytoma and paraganglioma
- Well differentiated neuroendocrine tumours of midgut (jejunum,ileum,ileocaecal valve,appendix, ascendant colon)

Detection in case of reasonable suspicion of recurrences or residual disease
- Primary brain tumours of all grades of differentiation.
- Phaeochromocytoma and paraganglioma
- Medullary thyroid cancer with elevated serum levels of calcitonin
- Well differentiated neuroendocrine tumours of midgut (jejunum,ileum,ileocaecal valve,appendix, ascendant colon)
- Other endocrine digestive tumours when somatostatin receptor scintigraphy is negative

4.2 Posology and method of administration

Posology

Paediatric population
The use in children and adolescents has to be considered carefully, based upon clinical needs and assessing the risk/benefit ratio in this patient group. The activity to administer to children or adolescents can be calculated as follows, according to the recommendations of the European Association of Nuclear Medicine (EANM) task force:
- PET 3D acquisition mode is strongly recommended, using the following formula: activity administered [MBq] = 14 x multiplication factor (shown in the table below), minimum activity = 14MBq
- If only PET 2D acquisition mode is available, use the following formula: activity administered [MBq] = 25.9 x multiplication factor (shown in the table below), minimum activity = 26MBq

Weight [kg]	Multiple	Weight [kg]	Multiple	Weight [kg]	Multiple
3	1	**22**	5.29	**42**	9.14
4	1.14	**24**	5.71	**44**	9.57
6	1.71	**26**	6.14	**46**	10.00
8	2.14	**28**	6.43	**48**	10.29
10	2.71	**30**	6.86	**50**	10.71
12	3.14	**32**	7.29	**52-54**	11.29
14	3.57	**34**	7.72	**56-58**	12.00
16	4.00	**36**	8.00	**60-62**	12.71
18	4.43	**38**	8.43	**64-66**	13.43
20	4.86	**40**	8.86	**68**	14.00

Adults and elderly population
In oncology, the recommended activity for an adult weighting 70 kg is 2 to 4 MBq (this activity has to be adapted according to the body weight of the patient, the type of camera used PET(/CT), and acquisition mode), administered by direct slow intravenous injection over approximately one minute.
One half of this activity may be administered for neurological indications not requiring whole body images.

In neurology, the recommended activity for an adult weighting 70 kg is 1 to 2 MBq (this activity has to be adapted according to the body weight of the patient and acquisition mode), administered by direct slow intravenous injection over approximately one minute.
One half of this activity may be administered for neurological indications not requiring whole body images.

Renal / Hepatic impairment
Careful consideration of the activity to be administered is required since an increased radiation exposure is possible in these patients.

Method of administration

For intravenous use: the fluoro-(^{18}F)-L-dopa must be administered by slow intravenous injection, over approximately one minute.

For multidose use.

The activity of fluorodopa (18F) has to be measured with activimeter immediately prior to injection.
The injection of fluorodopa (18F) must be intravenous in order to avoid irradiation as a result of local extravasation, as well as imaging artefacts.

For instructions on extemporaneous preparation of the medicinal product before administration, see sections 6.6 and 12.

For patient preparation, see section 4.4.

Image acquisition

Neurology
- "dynamic" acquisition of PET images of the brain during 90 to 120 minutes right after injection,
- or one "static" PET acquisition starting 90 minutes after the injection.

Oncology
- Gliomas: a "static" acquisition of the brain between 10 and 30 min after injection.
- Medullary thyroid cancers: static whole body acquisition starting within the first 15 minutes after injection, possibly with a later acquisition centred on foci identified during the earlier time.
- Neuroendocrine tumours of the midgut: Whole body acquisition 1 hour after injection possibly with an early acquisition (before the development of physiological biliary activity) centred on the abdomen.
- Paragangliomas: Whole body acquisition 30 minutes to 1 hour after injection.

4.3 Contraindications

- Hypersensitivity to the active substance, to any of the excipients listed in section 6.1
- Pregnancy (see section 4.6).

4.4 Special warnings and precautions for use

Potential for hypersensitivity or anaphylactic reactions

If hypersensitivity or anaphylactic reactions occur, the administration of the medicinal product must be discontinued immediately and intravenous treatment initiated, if necessary. To enable immediate action in emergencies, the necessary medicinal products and equipment such as endotracheal tube and ventilator must be immediately available.

Individual benefit / risk justification
For each patient, the radiation exposure must be justifiable by the likely benefit. The activity administered should in every case be as low as reasonably achievable to obtain the required diagnostic information.

Renal / hepatic impairment
Careful consideration of the benefit risk ratio in these patients is required since an increased radiation exposure is possible.

Paediatric population
For information on the use in paediatric population, see section 4.2.
Careful consideration of the indication is required since the effective dose per MBq is higher than in adults (see section 11).

Patient preparation
(Invented) name should be given to patients fasting for a minimum of 4 hours without limiting water intake (and with glucose if necessary).

In order to obtain images of best quality and to reduce the radiation exposure of the bladder, patients should be encouraged to drink sufficient amounts and to empty their bladder prior to and after the PET examination.

In neurological indications, it is recommended to suspend any antiparkinsonian treatment at least 12 hours before the PET examination.

Interpretation of fluorodopa (18F) PET images

Neurology
The interpretation of fluorodopa (18F) uptake values in the different parts of the brain requires the comparison to age and sex matched controls. Recent publications refer to data base of normal cases and voxel-based Statistical Parametric Mapping (SPM) and automated region of interest (ROI) analysis.

Oncology
False positive results in inflammatory lesions seem to be very rare with fluorodopa (18F) PET. Nevertheless, the possibility of an inflammatory lesion should be kept in mind when an unexpected fluorodopa (18F) focus is detected. The physiologic biodistribution must be taken into account in the interpretation; in particular uptake in the basal ganglia, diffuse uptake in the pancreas, uptake in the gallbladder leading to subsequent activity in the gut, and uptake in the kidney leading to “hot spots” aspect in the ureters and a high activity in the bladder.

After the procedure
Close contact with infants and pregnant women should be restricted during the initial 12 hours following the injection.

Specific warnings
Depending on the time when you administer the injection prepared extemporaneously after pH adjustment, the content of sodium given to the patient may in some cases be greater than 1 mmol (23 mg). This should be taken into account in patient on low sodium diet.

Precautions with respect to environmental hazard: see section 6.6.

4.5 Interaction with other medicinal products and other forms of interaction

Carbidopa

Prior to fluorodopa (18F) administration, use of carbidopa may increase fluorodopa (18F) bioavailability to the brain by inhibiting peripheral decarboxylase activity and restricting peripheral fluorodopa (18F) metabolism with 3-O-methyl-fluorodopa (18F) formation.

Haloperidol
Increased intracerebral dopamine turnover caused by haloperidol may result in increased accumulation of fluorodopa (18F).

Monoamine oxidase (MAO) inhibitors
Concurrent use with MAO inhibitors may result in increased accumulation of fluorodopa (18F) in the brain.

Reserpine
Reserpine-induced depletion of the contents of intraneuronal vesicles may prevent retention of fluorodopa (18F) in the brain.

Paediatric population
Interaction studies have only been performed in adults.

4.6 Fertility, pregnancy and lactation

Women of childbearing potential
When an administration of radiopharmaceuticals to a woman of childbearing potential is intended, it is important to determine whether or not she is pregnant. Any woman who has missed a period should be assumed to be pregnant until proven otherwise. If in doubt about her potential pregnancy (if the woman has missed a period, if the period is very irregular, etc.), alternative techniques not using ionising radiation (if there are any) should be offered to the patient.

Pregnancy
The use of fluorodopa (18F) is contraindicated in pregnant women due to preventive radiation protection of the foetus (see section 4.3).

Breastfeeding
Before administering radiopharmaceuticals to a mother who is breastfeeding consideration should be given to the possibility of delaying the administration of radionuclide until the mother has ceased breastfeeding, and to what is the most appropriate choice of radiopharmaceuticals, bearing in mind the secretion of activity in breast milk. If the administration is considered necessary, breastfeeding should be interrupted for 12 hours and the expressed feeds discarded.

Close contact with infants should be restricted during the initial 12 hours following the injection.

Fertility
No studies on fertility have been performed.

4.7 Effects on ability to drive and use machines

The effect on the ability to drive and use machines has not been studied.

4.8 Undesirable effects

Pain at injection has been reported in rare cases which resolved within minutes without corrective measures.
Exposure to ionising radiation is linked with cancer induction and a potential for development of hereditary defects. As the effective dose is 7 mSv when the maximal recommended activity of 280 MBq is administered, these adverse reactions are expected to occur with a low probability.

Paediatric population
Not reported.

Reporting of suspected adverse reactions
Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the national reporting system listed in Appendix V.*
[*For the printed material, please refer to the guidance of the annotated QRD template.]

4.9 Overdose

An overdose in the pharmacological sense is unlikely given with the doses used for diagnostic purposes.

In the event of administration of a radiation overdose with fluorodopa (18F) the absorbed dose to the patient should be reduced where possible by increasing the elimination of the radionuclide from the body by forced diuresis and frequent bladder voiding. It might be helpful to estimate the effective dose that was applied.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: other diagnostic radiopharmaceuticals for tumour detection.
ATC code: V09IX05.

Mechanism of action
(Invented) name positron emission tomography (PET) reflects the uptake of fluorodopa (18F) by the target cells and its conversion to fluorodopamine by aromatic aminoacid decarboxylase.

Pharmacodynamic effects
Adult, elderly and paediatric populations:

At the chemical concentrations and activities recommended for diagnostic examinations, fluorodopa (18F) does not appear to have any pharmacodynamic activity.

Clinical efficacy and safety
No pivotal clinical studies were conducted, which is acceptable for this kind of procedure with more than 10 years of experience.

5.2 Pharmacokinetic properties

Distribution
Studies in healthy humans after administration of fluorodopa (18F) have shown a ubiquitous distribution of the activity throughout the body tissues.

Organ uptake
The aromatic amino acid analogue fluorodopa (18F) accumulates rapidly in the tissue, particularly the striatum of the human brain and is transformed into the catecholamine neurotransmitter dopamine. Human studies have shown that the uptake of fluorodopa (18F) in the striatum and cerebellum can be increased approximately two-fold by administration of the amino acid decarboxylase inhibitor carbidopa.

Elimination

fluorodopa (18F) is removed according to a bi-exponential kinetic process with biological half-lives of 12 hours (67-94 %) and 1.7 - 3.9 hours (6-33 %). Both these half-lives appear to be age-dependent. The ^{18}F-activity is excreted through the kidneys, 50 % with a half-life of 0.7 hours and 50 % with a half-life of 12 hours.

Half-life

On basis of distribution, organ uptake and elimination data, a biokinetic model for fluorodopa (18F) was developed. This model assumes that 100 % of the ^{18}F activity is homogeneously distributed in the body and eliminated through the kidneys with biological half-lives of 1 hour (50 %) and 12 hours (50 %). This model was considered to be dependent of age.

Renal / Hepatic impairment

The pharmacokinetics in patients with renal or hepatic impairment has not been characterised.

Paediatric population

The available data on normal biodistribution in children showed that it is similar to that of adults. No further specific data on pharmacokinetics are available in children.

5.3 Preclinical safety data

Toxicological studies with rats have demonstrated that with a single intravenous injection of undiluted fluorodopa (18F) at 5 mL/kg no deaths were observed.
This product is not intended for regular or continuous administration.
Toxicity studies with repeated administration, mutagenicity studies and long-term carcinogenicity studies have not been carried out.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Water for injections
[Product specific]

6.2 Incompatibilities

This medicinal product must not be mixed with other medicinal products.
[Product specific]

6.3 Shelf life

[Product specific]

6.4 Special precautions for storage

[Product specific]
Storage of radiopharmaceuticals should be in accordance with national regulation on radioactive materials.

6.5 Nature and contents of container <and special equipment for use, administration or implantation>

[Product specific]
One vial contains XX to XX mL of solution, corresponding to XX to XX MBq or GBq at calibration time.
<Multidose vial>
<Not all pack sizes may be marketed.>

6.6 Special precautions for disposal <and other handling>

General warnings

Radiopharmaceuticals should be received, used and administered only by authorised persons in designated clinical settings. Their receipt, storage, use, transfer and disposal are subject to the regulations and/or appropriate licences of the competent official organisation.

Radiopharmaceuticals should be prepared by the user in a manner which satisfies both radiation safety and pharmaceutical quality requirements. Appropriate aseptic precautions should be taken.

For instructions on extemporary preparation of the medicinal product before administration, see section 12.

If at any time in the preparation of the medicinal product the integrity of the vial is compromised it should not be used.

Administration procedures should be carried out in a way to minimise risk of contamination of the medicinal product and irradiation of the operators. Adequate shielding is mandatory.

The administration of radiopharmaceuticals creates risks for other persons from external radiation or contamination from spills of urine, vomiting, etc. Radiation protection precautions in accordance with national regulations must be taken.

Any unused product or waste material should be disposed of in accordance with local requirements.

7. MARKETING AUTHORISATION HOLDER

{Name and address}
<{tel}>
<{fax}>
<{e-mail}>

8. MARKETING AUTHORISATION NUMBER(S)

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

<Date of first authorisation: {DD month YYYY}>
<Date of latest renewal: {DD month YYYY}>

10. DATE OF REVISION OF THE TEXT

<{MM/YYYY}>
<{DD/MM/YYYY}>
<{DD month YYYY}>

11. DOSIMETRY

The data listed below are from ICRP publication 106.

Organ	Absorbed dose per unit activity administered (mGy/MBq)				
	Adult	**15 years**	**10 years**	**5 years**	**1 year**
Adrenals	0.0099	0.0130	0.0190	0.0310	0.0550
Bladder	0.3000	0.3800	0.5700	0.7800	1.0000
Bone surfaces	0.0096	0.0120	0.0180	0.0280	0.0510
Brain	0.0071	0.0088	0.0150	0.0240	0.0440
Breasts	0.0067	0.0085	0.0130	0.0210	0.0390
Gallbladder	0.0100	0.0130	0.0200	0.0290	0.0500
Gastrointestinal tract					
Stomach	0.0095	0.0120	0.0180	0.0280	0.0500
Small intestine	0.0130	0.0170	0.0260	0.0390	0.0650
Colon	0.0150	0.0180	0.0270	0.0410	0.0630
(Upper large	0.0120	0.0150	0.0230	0.0360	0.0590
(Lower large	0.0180	0.0220	0.0330	0.0470	0.0690
Heart	0.0089	0.0110	0.0180	0.0280	0.0500
Kidneys	0.0310	0.0370	0.0520	0.0780	0.1400
Liver	0.0091	0.0120	0.0180	0.0290	0.0520
Lungs	0.0079	0.0100	0.0160	0.0250	0.0460
Muscles	0.0099	0.0120	0.0190	0.0300	0.0510
Oesophagus	0.0082	0.0100	0.0160	0.0250	0.0470
Ovaries	0.0170	0.0220	0.0330	0.0470	0.0740
Pancreas	0.0100	0.0130	0.0200	0.0310	0.0560
Red marrow	0.0098	0.0120	0.0190	0.0270	0.0470
Skin	0.0070	0.0085	0.0140	0.0220	0.0400
Spleen	0.0095	0.0120	0.0180	0.0290	0.0530
Testes	0.0130	0.0180	0.0300	0.0450	0.0700
Thymus	0.0082	0.0100	0.0160	0.0250	0.0470
Thyroid	0.0081	0.0100	0.0170	0.0270	0.0500
Uterus	0.0280	0.0330	0.0530	0.0750	0.1100
Remaining organs	0.0100	0.0130	0.0190	0.0300	0.0520
Effective dose (mSv/MBq)	0.0250	0.0320	0.0490	0.0700	0.1000
Bladder wall contributes 51 % of the effective dose					

The effective dose resulting from the administration of a maximal recommended activity of 280 MBq of fluorodopa (18F) for an adult weighing 70 kg is about 7 mSv
For an administered activity of 280 MBq, the typical radiation dose to the critical organs, bladder, uterus and kidney are: 84 mGy, 7.8 mGy, 8.7 mGy respectively.

12. INSTRUCTIONS FOR PREPARATION OF RADIOPHARMACEUTICALS

The packaging must be checked before use and the activity measured using an activimeter.

Withdrawals should be performed under aseptic conditions. The vials must not be opened. After disinfecting the stopper, the solution should be withdrawn via the stopper using a single dose syringe fitted with suitable protective shielding and a disposable sterile needle or using an authorised automated application system.

If the integrity of this vial is compromised, the product should not be used.

Quality control

The solution is to be inspected visually prior to use and only clear solutions free of visible particles should be used.

Detailed information on this medicinal product is available on the website of the European Medicines Agency http://www.ema.europa.eu<, and on the website of {name of MS Agency (link)}>.

B. PACKAGE LEAFLET

Package leaflet: Information for the patient

{(Invented) name strength pharmaceutical form}
fluorodopa (18F)

<▼This medicine is subject to additional monitoring. This will allow quick identification of new safety information. You can help by reporting any side effects you may get. See the end of section 4 for how to report side effects.> [For medicinal products subject to additional monitoring ONLY]

Read all of this leaflet carefully before you start <taking> <using> this medicine because it contains important information for you.
- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your nuclear medicine doctor who will supervise the procedure.
- - If you get any side effects, talk to your nuclear medicine doctor. This includes any possible side effects not listed in this leaflet.

What is in this leaflet

1. What X is and what it is used for

This medicine is a radiopharmaceutical product for diagnostic use only.

X is used for diagnosis in Positron Emission Tomography (PET) examinations and is administered prior to such an examination.

The radioactive substance in X (to show dopamine metabolism) is detected by PET and is shown as a picture.

Positron Emission Tomography is an imaging technology used in nuclear medicine that produces pictures of your body. It works with a minute amount of radioactive pharmaceutical to produce quantitative and precise images of specific metabolic processes in the body. This examination is carried out to help decide on how to treat the illness you are suffering from or you are suspected of suffering from.

2. What you need to know before X is used ?

X must not be used:
- if you are allergic (hypersensitive) to the fluorodopa (18F) or any of the other ingredients of X or to any of the components of the medicinal product prepared before administration (see section 6),
- if you are pregnant.

Warnings and precautions:
Take special care with X and inform your nuclear medicine doctor before being administered X in the following cases:
- if you are pregnant or believe you may be pregnant,

- if you are breast-feeding,
- if you suffer from Parkinson's disease or are taking medicine for Parkinson's disease.

Before X administration you should:
- drink plenty of water before the start of the examination in order to urinate as often as possible during the first hours after the study
- be fasting for at least 4 hours

Children and adolescents
Please talk to your nuclear medicine doctor if you are under 18 years old.

Other medicines and X
Tell your nuclear medicine doctor who will supervise the procedure if you are taking or have recently taken any other medicines, including medicines obtained without a prescription, since they may interfere with the interpretation of the images:
- Medicine for Parkinson's disease : if you are taking medicine for Parkinson’s disease, you should stop taking this medicine at least 12 hours before your TEP examination
- Carbidopa (a medicine for Parkinson's disease)
- Haloperidol (an active substance used in psychotic symptoms, e.g. thought disorders or impaired consciousness)
- MAO (monoamine oxidase) inhibitors (medicine for depressions)
- Reserpine (active substance for lowering blood pressure)

X with food and drink
You should be fasting for at least 4 hours before the administration of X.
For the best quality image and so that radiation exposure of the bladder is reduced, it is, however, recommended that you drink plenty before and after the examination (water and unsweetened tea are permitted) and frequently empty your bladder.

Pregnancy and breast-feeding
If you are pregnant or breast-feeding, think you may be pregnant or are planning to have a baby, ask your nuclear medicine doctor for advice before you are given this medicine.

You must inform the nuclear medicine doctor before the administration of X if there is a possibility you might be pregnant, if you have missed your period or if you are breast-feeding. When in doubt, it is important to consult your nuclear medicine doctor who will supervise the procedure.

If you are pregnant
The use of X is contraindicated in pregnant women.

If you are breast-feeding
If you are breast-feeding, breast milk may be drawn off before injection and stored for subsequent use. Breast-feeding should be stopped for at least 12 hours. Any milk produced during this period should be discarded.

Please ask your nuclear medicine doctor when you can resume breast-feeding.

Driving and using machines
The effect on the ability to drive and use machines has not been studied.

X contains sodium
Once prepared immediately before administration, this product may contain more than 1 mmol of sodium (23 mg). You should take this into account if you are on a low sodium diet.

3. How X is used?

There are strict laws on the use, handling and disposal of radiopharmaceutical products. X will only be used in special controlled areas. This product will only be handled and given to you by people who are trained and qualified to use it safely. These persons will take special care for the safe use of this product and will keep you informed of their actions.

The nuclear medicine doctor supervising the procedure will decide on the quantity of X to be used in your case. It will be the smallest quantity necessary to get the desired information.

Adults
In oncology : the quantity to be administered usually recommended for an adult ranges from X to X MBq/kg (megabecquerel, the unit used to express radioactivity), depending on the patient's body mass, the type of camera used for imaging and the acquisition mode.
In neurology: this dose can be halved (X-X MBq/kg body weight) for neurological examinations, i.e. when examining nervous system disorders for which an image of the entire body is not necessary.

Use in children and adolescents
There are few clinical data available on using this medicine for children and adolescents under 18.
In children and adolescents, the quantity to be administered will be adapted to the child's weight.

Administration of X and conduct of the procedure
X is administered by slow intravenous injection over a period of approximately one minute.
One injection is sufficient to conduct the test that your doctor needs.
After injection you will be offered a drink and asked to urinate immediately preceding the test.

Duration of the procedure
Your nuclear medicine doctor will inform you about the usual duration of the procedure.

After administration of X, you should:
- avoid any close contact with young children and pregnant women for the 12 hours following the injection
- urinate frequently in order to eliminate the product from your body

The nuclear medicine doctor will inform you if you need to take any special precautions after receiving this medicine. Contact your nuclear medicine doctor if you have any questions.

If you have been administered more X than you should
An overdose is almost impossible because you will receive a single dose of X precisely controlled by the specialist physician supervising the procedure. However, in the case of an overdose, you will receive the appropriate treatment. The elimination of the radioactive constituents should be increased as much as possible. You should drink as much as possible and frequently empty your bladder. It may become necessary to take diuretics.

Should you have any further question on the use of X, please ask the nuclear medicine doctor who supervises the procedure.

4. Possible side effects

Like all medicines, X can cause side effects, although not everybody gets them.
No serious adverse effects have been observed to date.
In rare cases, pain during the injection has been reported, which resolved within minutes without any specific measures.

This radiopharmaceutical will deliver low amounts of ionising radiation associated with the least risk of cancer and hereditary abnormalities.

Your doctor has considered that the clinical benefit that you will obtain from the procedure with the radiopharmaceutical overcomes the risk due to radiation.

Reporting of side effects
If you get any side effects, talk to your nuclear medicine doctor. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via the national reporting system listed in Appendix V.* By reporting side effects you can help provide more information on the safety of this medicine.
[*For the printed material, please refer to the guidance of the annotated QRD template.]

5. How X is stored

You will not have to store this medicine. This medicine is stored under the responsibility of the specialist in appropriate premises. Storage of radiopharmaceuticals will be in accordance with national regulation on radioactive materials.

The following information is intended for the specialist only.
X must not be used after the expiry date which is stated on the label.

6. Contents of the pack and other information

What X contains
- The active substance is fluorodopa (18F). 1 mL of pharmaceutical form contains X GBq or MBq fluorodopa (18F) at the date and time of calibration.
- The other ingredients [product specific]

What X looks like and contents of the pack

X is a clear and colourless or slightly yellow liquid.
The total activity of the vial at the date and time of calibration is between XX GBq or MBq and XX GBq or MBq.

Marketing Authorisation Holder and Manufacturer
{Name and address}
<{tel}>
<{fax}>
<{e-mail}>

This medicinal product is authorised in the Member States of the EEA under the following names:

This leaflet was last revised in <{MM/YYYY}><{month YYYY}>.

Detailed information on this medicine is available on the European Medicines Agency web site: http://www.ema.europa.eu<, and on the website of {name of MS Agency (link)}>. <There are also links to other websites about rare diseases and treatments.>

<This leaflet is available in all EU/EEA languages on the European Medicines Agency website.>

The following information is intended for healthcare professionals only:

The complete SmPC of X is provided as a separate document in the product package, with the objective to provide healthcare professionals with other additional scientific and practical information about the administration and use of this radiopharmaceutical.

Please refer to the SmPC (SmPC should be included in the box)