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Guideline on core SmPC and Package Leaflet for Fludeoxyglucose (^{18}F)

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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Executive summary

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

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 fludeoxyglucose (^{18}F)[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 fludeoxyglucose (^{18}F) 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 for a radiopharmaceutical medicinal product containing fludeoxyglucose (^{18}F) should be submitted with the necessary scientific data and regulatory requirements in order to be approved.

2. Scope

The scope of this core SmPC and Package Leaflet covers fludeoxyglucose (^{18}F).

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 Fludeoxyglucose (^{18}F)

[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)

CORE SmPC and Package Leaflet for Fludeoxyglucose (^{18}F)

ANNEX I

SUMMARY OF PRODUCT CHARACTERISTICS

1. NAME OF THE MEDICINAL PRODUCT

{(Invented) name strength pharmaceutical form}

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

1 mL contains <**XXX>** MBq of fludeoxyglucose (^{18}F) at the date and time of calibration.

The activity per {container} ranges from <**XXX>** MBq to <**XXX>** 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 of maximum energy of 634 keV, followed by photonic annihilation radiations of 511 keV.

For the full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Solution for injection.

Clear, colourless or slightly yellow solution.

4. CLINICAL PARTICULARS

4.1 Therapeutic indications

This medicinal product is for diagnostic use only.

Fludeoxyglucose (^{18}F) is indicated for use with positron emission tomography (PET).

Oncology

In patients undergoing oncologic diagnostic procedures describing function or diseases where enhanced glucose influx of specific organs or tissues is the diagnostic target. The following indications are sufficiently documented (see also section 4.4):

Diagnosis

- *Characterisation of solitary pulmonary nodule*
- *Detection of cancer of unknown origin, revealed for example by cervical adenopathy, liver or bones metastases*
- *Characterisation of a pancreatic mass*

Staging

- *Head and neck cancers including assistance in guiding biopsy*
- *Primary lung cancer*
- *Locally advanced breast cancer*
- *Oesophageal cancer*
- *Carcinoma of the pancreas*
- *Colorectal cancer particularly in restaging recurrences*
- *Malignant lymphoma*
- *Malignant melanoma, Breslow >1.5 mm or lymph node metastasis at first diagnosis*

Monitoring of therapeutic response

- *Malignant lymphoma*
- *Head and neck cancers*

Detection in case of reasonable suspicion of recurrences

- *Glioma with high grade of malignancy (III or IV)*
- *Head and neck cancers*
  - *Thyroid cancer (non-medullary): patients with increased thyroglobulin serum levels and negative radioactive iodine whole body scintigraphy*
- *Primary lung cancer*
- *Breast cancer*
- *Carcinoma of the pancreas*
- *Colorectal cancer*
- *Ovarian cancer*
- *Malignant lymphoma*
- *Malignant melanoma*

Cardiology

In the cardiologic indication, the diagnostic target is viable myocardial tissue that takes-up glucose but is hypo-perfused, as it must be assessed beforehand using appropriate blood-flow imaging techniques.

- Evaluation of myocardial viability in patients with severe impaired left ventricular function who are candidates for revascularisation when conventional imaging modalities are not contributive.

Neurology

In the neurologic indication the interictal glucose hypometabolism is the diagnostic target.

- *Localisation of epileptogenic foci in the presurgical evaluation of partial temporal epilepsy*

Infectious or inflammatory diseases

In infectious or inflammatory diseases, the diagnostic target is tissue or structures with an abnormal content of activated white blood cells.
In infectious or inflammatory diseases, the following indications are sufficiently documented:

Localisation of abnormal foci guiding the aetiologic diagnosis in case of fever of unknown origin

Diagnosis of infection in case of:

- Suspected chronic infection of bone and/or adjacent structures: osteomyelitis, spondilitis, diskitis or osteitis including when metallic implants are present
- Diabetic patient with a foot suspicious of Charcot's neuroarthropathy, osteomyelitis and/or soft tissue infection
- Painful hip prosthesis
- Vascular prosthesis
- Fever in an AIDS patient

Detection of the extension of inflammation in case of:

- Sarcoidosis
- Inflammatory bowel disease
- Vasculitis involving the great vessels

Therapy follow-up:

Unresectable alveolar echinococcosis, in search for active localisations of the parasite during medical treatment and after treatment discontinuation.

4.2 Posology and method of administration

Posology

Adults and elderly

The recommended activity for an adult weighing 70 kg is 100 to 400 MBq (this activity has to be adapted according to the body weight of the patient, the type of camera used and acquisition mode), administered by direct intravenous injection.

Renal and hepatic impairment

Extensive dose-range and adjustment studies with this medicinal product in normal and special populations have not been performed.

The pharmacokinetics of fludeoxyglucose (18F) in renally impaired patients has not been characterised.

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 activities to be administered to children and adolescents may be calculated according to the recommendations of the European Association of Nuclear Medicine (EANM) paediatric task group Dosage Card; the activity administered to children and to adolescents may be calculated by multiplying a baseline activity (for calculation purposes) by the body-mass-dependent coefficients given in the table below.

$$A[MBq]_{Administered} = \text{Baseline Activity} \times \text{Coefficient}$$

The Baseline Activity for 2D imaging is 25.9 MBq and for 3D imaging 14.0 MBq (recommended in children).

Weight [kg]	Coefficient	**Weight [kg]**	Coefficient	**Weight [kg]**	Coefficient
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

Method of administration

For patient preparation, see section 4.4.

The activity of fludeoxyglucose (^{18}F) has to be measured with activimeter immediately prior to injection.

The injection of fludeoxyglucose (^{18}F) must be intravenous in order to avoid irradiation as a result of local extravasation, as well as imaging artefacts.

Precautions to be taken before handling or administering the medicinal product

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

Image acquisition

The emission scans are usually started 45 to 60 minutes after the injection of fludeoxyglucose (^{18}F). Provided a sufficient activity remains for adequate counting statistics, fludeoxyglucose (^{18}F)-PET can also be performed up to two or three hours after administration, thus reducing background activity.

If required, repeated fludeoxyglucose (^{18}F) PET examinations can be reiterated within a short period of time.

4.3 Contraindications

Hypersensitivity to the active substance(s), to any of the excipients listed in section 6.1 <or {name of the residue(s)}> <or to any of the components of the labelled radiopharmaceutical.>

4.4 Special warnings and precautions for use

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.

Due to the major renal excretion of fludeoxyglucose (^{18}F), in patients with reduced kidney function, careful consideration of the indication is required since an increased radiation exposure is possible in these patients.

In the exploration of inflammatory bowel diseases, diagnostic performance of fludeoxyglucose (^{18}F) has not been directly compared with that of scintigraphy using labelled white blood cells which may be indicated prior to fludeoxyglucose (^{18}F) PET or after fludeoxyglucose (^{18}F) PET when inconclusive.

Paediatric population

Paediatric population, see section 4.2.
Careful consideration of the indication is required since the effective dose per MBq is higher in children than in adults (see section 11. "Dosimetry")

Patient preparation

{(Invented) name} should be given to sufficiently hydrated patients fasting for a minimum of 4 hours, in order to obtain a maximum target activity, since glucose uptake in the cells is limited ("saturation kinetics"). The amount of liquid should not be limited (beverages containing glucose must be avoided).

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.

- *Oncology and neurology and infectious diseases*

In order to avoid hyperfixation of the tracer in muscle, it is advisable for patients to avoid all strenuous physical activity prior to the examination and to remain at rest between the injection and examination and during acquisition of images (patients should be comfortably lying down without reading or speaking).

The cerebral glucose metabolism depends on the brain activity. Thus, neurological examinations should be performed after a relaxation period in a darkened room and with low background noise.

A blood glucose test should be performed prior to administration since hyperglycaemia may result in a reduced sensitivity of {(Invented) name}, especially when glycaemia is greater than 8 mmol/L. Similarly, PET with fludeoxyglucose (^{18}F) should be avoided in subjects presenting uncontrolled diabetes.

- *Cardiology*

Since glucose uptake in the myocardium is insulin-dependent, for a myocardial examination a glucose loading of 50 g approximately 1 hour prior to the administration of {(Invented) name} is recommended. Alternatively, especially for patients with diabetes mellitus, the blood sugar level can be adjusted by a combined infusion of insulin and glucose (insulin-glucose-clamp) if needed.

Interpretation of the PET images withfludeoxyglucose (^{18}F)

Infectious and/or inflammatory diseases as well as regenerative processes after surgery can result in a significant uptake of fludeoxyglucose (^{18}F) and therefore lead to false positive results, when search for

infectious or inflammatory lesions is not the aim of the fludeoxyglucose (^{18}F) PET. In cases where fludeoxyglucose (^{18}F) accumulation can be caused by either cancer, infection or inflammation, additional diagnostic techniques for the determination of the causative pathologic alteration may be required to supplement the information obtained by PET with fludeoxyglucose (^{18}F). In some settings e.g. staging of myeloma, both malignant and infectious foci are searched for and may be distinguished with a good accuracy on topographic criteria e.g. uptake at extramedullary sites and/or bone and joint lesions would be atypical for multiple myeloma lesions and identified cases associated with infection. There are currently no other criteria to distinguish infection and inflammation by means of fludeoxyglucose (^{18}F) imaging.

False positive or false negative PET with fludeoxyglucose (^{18}F) results cannot be excluded after radiotherapy within the first 2-4 months. If the clinical indication is demanding an earlier diagnosis by PET with fludeoxyglucose (^{18}F), the reason for earlier PET with fludeoxyglucose (^{18}F) examination must be reasonably documented.

A delay of at least 4-6 weeks after the last administration of chemotherapy is optimal, in particular to avoid false negative results. If the clinical indication is demanding an earlier diagnosis by PET with fludeoxyglucose (^{18}F), the reason for earlier PET with fludeoxyglucose (^{18}F) examination must be reasonably documented. In case of chemotherapy regimen with cycles shorter than 4 weeks, the PET with fludeoxyglucose (^{18}F) examination should be done just before re-starting a new cycle.

In low-grade lymphoma, lower oesophagus cancer and suspicion of recurrent ovarian cancer, only positive predictive values have to be considered because of a limited sensitivity of PET with fludeoxyglucose (^{18}F).

Fludeoxyglucose (^{18}F) is not effective in detecting brain metastases.

The accuracy of fludeoxyglucose (^{18}F) PET imaging is better using PET/CT than PET cameras alone.

When a hybrid PET-CT scanner is used with or without administration CT contrast media, some artefacts may occur on the attenuation-corrected PET images.

<u>General warnings</u>

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.

<u>After the procedure</u>

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

<u>Specific warnings</u>

[*If applicable taking into account the dilution with sodium chloride*]: Depending on the time when you administer the injection, 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.

4.5 Interaction with other medicinal products and other forms of interaction

All medicinal products that modify blood glucose levels can affect the sensitivity of the examination (e.g. corticosteroids, valproate, carbamazepine, phenytoin, phenobarbital and catecholamines).

Under administration of colony-stimulating factors (CSFs), there is an increased uptake of fludeoxyglucose (^{18}F) in the bone marrow and the spleen for several days. This must be taken into account for the interpretation of PET imaging. Separating CSF therapy from PET imaging by an interval of at least 5 days may diminish this interference.

The administration of glucose and insulin influences the influx of fludeoxyglucose (^{18}F) into the cells. In the case of high blood glucose levels as well as low plasma insulin levels, the influx of fludeoxyglucose (^{18}F) into organs and tumours is reduced.

No formal studies on the interaction between fludeoxyglucose (^{18}F) and any contrast for computed tomography have been performed

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

Radionuclide procedures carried out on pregnant women also involve radiation dose to the foetus. Only imperative investigations should therefore be carried out during pregnancy, when the likely benefit far exceeds the risk incurred by the mother and foetus.

Breast-feeding

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 and pregnant women should be restricted during the initial 12 hours following injection.

Fertility

4.7 Effects on ability to drive and use machines

Not relevant.

4.8 Undesirable effects

Adverse reactions after the administration of fludeoxyglucose (^{18}F) have not been observed to date.

Exposure to ionising radiation is linked with cancer induction and a potential for development of hereditary defects. As the effective dose is 7.6 mSv when the maximal recommended activity of 400 MBq is administered these adverse reactions are expected to occur with a low probability.

4.9 Overdose

In the event of administration of a radiation overdose with fludeoxyglucose (^{18}F) 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: diagnostic radiopharmaceuticals, other diagnostic radiopharmaceuticals for tumour detection, ATC code: V09IX04

At the chemical concentrations used for diagnostic examinations, fludeoxyglucose (^{18}F) does not appear to have any pharmacodynamic activity.

5.2 Pharmacokinetic properties

Distribution

Fludeoxyglucose (^{18}F) is a glucose analogue which is accumulated in all cells using glucose as primary energy source. Fludeoxyglucose (^{18}F) is accumulated in tumours with a high glucose turnover.

Following intravenous injection, the pharmacokinetic profile of fludeoxyglucose (^{18}F) in the vascular compartment is biexponential. It has a distribution time of 1 minute and an elimination time of approximately 12 minutes.

In healthy subjects, fludeoxyglucose (^{18}F) is widely distributed throughout the body, particularly in the brain and heart, and to a lesser degree in the lungs and liver.

Organ uptake

The cellular uptake of fludeoxyglucose (^{18}F) is performed by tissue-specific carrier systems which are partly insulin-dependent and, thus, can be influenced by eating, nutritional condition and the existence of a diabetes mellitus. In patients with a diabetes mellitus a reduced uptake of fludeoxyglucose (^{18}F) into the cells occurs due to a changed tissue distribution and glucose metabolism.

Fludeoxyglucose (^{18}F) is transported via the cell membrane in similar fashion to glucose, but only undergoes the first step of glycolysis resulting in formation of fludeoxyglucose (^{18}F)-6-phosphate which remains trapped within the tumour cells and is not further metabolised. Since the following dephosphorylation by intracellular phosphatases is slow, fludeoxyglucose (^{18}F)-6-phosphate is retained in the tissue over several hours (trapping-mechanism).

Fludeoxyglucose (^{18}F) passes the blood-brain barrier. Approximately 7 % of the injected dose are accumulated in the brain within 80-100 minutes after injection. Epileptogenic foci exhibit a reduced glucose metabolism in the seizure free phases.

Approximately 3 % of the injected activity is taken-up by the myocardium within 40 minutes. The distribution of fludeoxyglucose (^{18}F) in normal heart is mainly homogenous, however, regional differences of up to 15 % are described for the interventricular septum. During and after a reversible myocardial ischemia, an increased glucose uptake occurs into the myocardial cell.

0.3 % and 0.9 - 2.4 % of the injected activity are accumulated in pancreas and lung.

Fludeoxyglucose (^{18}F) is also bound to a lesser extent to ocular muscle, pharynx and intestine. Binding to muscle may be seen following recent exertion and in the event of muscular effort during the examination.

Elimination

Elimination of fludeoxyglucose (^{18}F) is chiefly renal, with 20 % of activity being excreted in urine in the 2 hours following injection.

Binding to renal parenchyma is weak, but because of renal elimination of fludeoxyglucose (^{18}F), the entire urinary system, particularly the bladder, exhibits marked activity.

5.3 Preclinical safety data

Toxicological studies have demonstrated that with a single intravenous injection of fludeoxyglucose (^{18}F) and 50-fold human dose in dogs and the 1000-fold human dose in mice no deaths were observed. This medicinal product is not intended for regular or continuous administration.
Mutagenicity studies and long-term carcinogenicity studies have not been carried out.

6. PHARMACEUTICAL PARTICULARS

6.1 List of excipients

[Product specific]

6.2 Incompatibilities

This medicinal product must not be mixed with other medicinal products except those mentioned in section 12

6.3 Shelf life

[Product specific]

[*It should be indicated at the end of the fabrication time*]

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

[Product specific]
One {container}contains <**X>** to <**XXX>** mL of solution, corresponding to <**XXX>** to <**XXX>** MBq at calibration time.
<Not all pack sizes may be marketed>

6.6 Special precautions for disposal and other handling

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

8. MARKETING AUTHORISATION NUMBER(S)

9. DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

10. DATE OF REVISION OF THE TEXT

11. DOSIMETRY

The table below shows the dosimetry as calculated according to ICRP 106 Publication.

Organ	**Dose absorbed per unit of activity administered (mGy/MBq)**				
	Adult	**15 year old**	**10 year old**	**5 year old**	**1 year old**
Adrenals	0,012	0,016	0,024	0,039	0,071
Bladder	0,130	0,160	0,250	0,340	0,470
Bone surfaces	0,011	0,014	0,022	0,034	0,064
Brain	0,038	0,039	0,041	0,046	0,063
Breasts	0,009	0,011	0,018	0,029	0,056
Gallbladder	0,013	0,016	0,024	0,037	0,070
Gastrointestinal tract:					

Stomach	0,011	0,014	0,022	0,035	0,067
Small intestine	0,012	0,016	0,025	0,040	0,073
Colon	0,013	0,016	0,025	0,039	0,070
Upper large intestine	0,012	0,015	0,024	0,038	0,070
Lower large intestine	0,014	0,017	0,027	0,041	0,070
Heart	0,067	0,087	0,130	0,210	0,380
Kidneys	0,017	0,021	0,029	0,045	0,078
Liver	0,021	0,028	0,042	0,063	0,120
Lungs	0,020	0,029	0,041	0,062	0,120
Muscles	0,010	0,013	0,020	0,033	0,062
Oesophagus	0,012	0,015	0,022	0,035	0,066
Ovaries	0,014	0,018	0,027	0,043	0,076
Pancreas	0,013	0,016	0,026	0,040	0,076
Red marrow	0,011	0,014	0,021	0,032	0,059
Skin	0,008	0,010	0,015	0,026	0,050
Spleen	0,011	0,014	0,021	0,035	0,066
Testes	0,011	0,014	0,024	0,037	0,066
Thymus	0,012	0,015	0,022	0,035	0,066
Thyroid	0,010	0,013	0,021	0,034	0,065
Uterus	0,018	0,022	0,036	0,054	0,090
Remaining organs	0,012	0,015	0,024	0,038	0,064
Effective dose (mSv/MBq)	**0,019**	**0,024**	**0,037**	**0,056**	**0,095**

For {(Invented) name}, the effective dose resulting from the administration to an adult of an activity of 400 MBq is about 7.6 mSv

For this activity of 400 MBq, the radiation doses delivered to the critical organs, bladder, heart and brain are respectively: 52 mGy, 27 mGy and 15 mGy.

12. INSTRUCTIONS FOR PREPARATION OF RADIOPHARMACEUTICALS

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

The medicinal product may be diluted with sodium chloride 9 mg/mL solution for injection.

Withdrawals should be performed under aseptic conditions. The vials must not be opened before 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 {container}is compromised, the product should not be used.

The solution should be inspected visually prior to use. 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>

B. PACKAGE LEAFLET FOR FLUDEOXYGLUCOSE (^{18}F)

Package leaflet: Information for the <patient> <user>

{(Invented) name strength pharmaceutical form}
Fludeoxyglucose (^{18}F)

Read all of this leaflet carefully before you will be administered 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 who has supervised the procedure. 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.

The active substance contained in X is fludeoxyglucose (^{18}F) and is designed for the capture of diagnostic images of some parts of your body.

Once a small amount of X has been injected, medical images that are obtained with a special camera will enable the doctor to capture images and to see where your illness is or how it is progressing.

2. What you need to know before X is used

X **must not be used**

- if you are allergic to fludeoxyglucose (^{18}F) or any of the other ingredients of this medicine (listed in section 6)

Warnings and precautions

- if you are a diabetic and your diabetes is currently not equilibrated
- if you have an infection or an inflammatory disease
- if you are affected by kidney problems

Inform your nuclear medicine doctor in the following cases;
- if you are pregnant or believe you may be pregnant
- if you are breast-feeding

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, have recently taken or might take any other medicines, since they may interfere with your doctor's interpretation of the images:

- any medicine that may induce a modification of the blood sugar rate (glycemia), such as medicines having an effect on inflammation (corticosteroids), medicines against convulsions (valproate, carbamazepine, phenytoin, phenobarbital), medicines affecting the nervous system (adrenalin, noradrenalin, dopamin…),
- glucose,
- insulin,
- factors increasing the production of blood cells.

X with food and drink

This medicine can only be injected in patients who have been fasting for at least 4 hours.
Blood sugar should be measured before administering the medicine; indeed a high blood glucose concentration (hyperglycemia) can make the doctor's interpretation more difficult.

Pregnancy and breast-feeding <and fertility>

You must inform your 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.

If you are pregnant
Your doctor will only consider this examination during your pregnancy in case of absolute necessity.

If you are breast-feeding
You must stop breast-feeding for 12 hours after the injection and the maternal milk pumped must be discarded.
Resuming breast-feeding should be in agreement with the nuclear medicine doctor who will supervise the procedure.

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 taking this medicine.

Before X **administration you should:**

- avoid all important physical activity
- drink water abundantly during the 4 hours preceding the test
- be fasting for at least 4 hours

Driving and using machines

It is considered unlikely that X will affect your ability to drive or to use machines.

X contains {name the excipient(s)}

According to the time of conditioning injection for the patient, the content of sodium may in some cases be greater than 1 mmol (23 mg). This should be taken into account in patient on low sodium diet.

3. How X will be used

There are strict laws on the use, handling and disposal of radiopharmaceutical products. X will only be used in a hospital. 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.
The quantity to be administered usually recommended for an adult ranges from 100 to 400 MBq (depending on the patient's body mass, the type of camera used for imaging and the acquisition mode).
Megabecquerel (MBq) is a metric measurement unit of radioactivity.

Use in children <and adolescents>>
In case of use in children, the quantity to be administered will be adapted to the child's body mass.

Administration of X and conduct of the procedure
X is administered intravenously.
One injection is sufficient to conduct the test that your doctor needs.
After injection, you will be offered some water and asked to urinate immediately preceding the test.

During the test, you will need **to be completely at rest, lying down comfortably, without reading nor talking.**

Duration of the procedure
Your Nuclear medicine doctor will inform you about the usual duration of the procedure.
X is administered as a single injection in a vein, 45-60 minutes before the imaging acquisition takes place. The imaging acquisition with the camera, lasts 30 to 60 minutes.

If you have been given more X **than you should**
An overdose is almost impossible because you will only receive a single dose of X precisely controlled by the Nuclear medicine doctor supervising the procedure. However, in the case of an overdose, you will receive the appropriate treatment. In particular, the Nuclear medicine doctor in charge of the procedure may recommend that you drink abundantly in order to facilitate the elimination of X from your body (indeed the principle way of elimination of this medicine is renal, in the urine).

If you have any further question on the use of X, please ask your Nuclear medicine doctor who supervises the procedure.

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

4. Possible side effects

Like all medicines, this medicine can cause side effects, although not everybody gets them.
This radiopharmaceutical product will deliver low amount of ionising radiation with very low 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.

If you get any side effects, talk to your nuclear medicine doctor who supervises the procedure. This includes any possible side effects not listed in this leaflet.

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 information is intended for the specialist only.

This medicine will not be used after the expiry date which is stated on the <label> <carton> <bottle> <...> <after {abbreviation used for expiry date}.> <The expiry date refers to the last day of that month.>

<This medicine will not be used if it is noticed {description of the visible signs of deterioration}.>

6. Contents of the pack and other information

What X contains

- The active substance is fludeoxyglucose (^{18}F). 1 mL solution for injection contains <XXX> MBq fludeoxyglucose (^{18}F) at the date and time of calibration.
- The other ingredients are: [*Product specific]*

What X looks like and contents of the pack

The activity per {container}ranges from <XXX> MBq to <XXX> MBq at the date and time of calibration.

Marketing Authorisation Holder and Manufacturer

Detailed information on this medicine is available on the European Medicines Agency web site: http://www.ema.europa.eu <There are also links to other websites about rare diseases and treatments.>

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

This leaflet was last revised on {MM/YYYY}.

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<The following information is intended for medical or healthcare professionals only:>
The complete SmPC of {(Invented) name} is provided <as a separate document> <as a tear-off section at the end of the printed leaflet> 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)