

## Positron Emission Tomography - For Patients

A physician's written order is required for any PET-CT tests.

### **How should I prepare for my PET-CT?**

PET-CT is more complicated than most other tests you may be asked to prepare for. Therefore, your doctor should have given you written information and someone from the UAB Kirklín PET center may need to contact you. You should also contact the PET-CT specialists at PET-CT scheduling at (205) 801-7561 with any questions. If they cannot answer your question, they will contact a technologist or nuclear medicine physician who can help.

### **Eating before the test**

For most patients, you will be asked not to eat anything, including gum, mints and cough drops for five hours before a whole body PET/CT scan. While patients should drink water to be well hydrated, don't drink soft drinks, juices, energy drinks, medically administered tube feedings, Ensure/Boost or coffee, and tea. Food and caffeine alter the distribution of the PET tracer in your body and usually leads to a poor scan image that is deemed suboptimal or nondiagnostic. This could require the scan to be repeated on another day, so following **instructions regarding eating is very important.**

If you are diabetic, you need special instructions, see medications below. We will need to schedule your test around your eating and medication schedule. It is best to speak directly with the PET scheduling specialist.

Patients having multiple tests on the same day as their PET-CT should discuss this with the PET-CT scheduling specialist ahead of time. This will allow coordination with the preparations needed.

### **No exercise before the test**

Avoid strenuous exercise or heavy yard and house work for two to three days before the test. Exercising within two to three days before the test can cause the muscles to absorb the FDG radiopharmaceutical, keeping it from doing its job. With muscles blocking the image, they can mask abnormalities like tumors. A diagnosis could be missed or a poor image could make it necessary to repeat the scan another day.

If the exertion of walking is difficult for you, then it might qualify as too much exercise. Please let us know so wheelchair transportation can be arranged.

### **Diabetics**

We try and schedule the PET-CT at a time of day where the patient's sugar levels are normal or at least are less than 200 mg/dL (they **MUST** be less than 200 mg/dL to have an FDG PET-CT scan). High levels of glucose in the blood interfere with the accuracy of the FDG PET-CT scan.



**Knowledge that will change your world**

Very low blood sugar can also cause the test to be rescheduled for the patient's protection.

Diabetic medications, including oral tablets, insulin, and insulin pumps, alter the distribution of the FDG radiopharmaceutical in the body. Short-acting insulin is withheld at least two hours while long acting insulin is usually stopped 12 hours to a day in advance. Because changing insulin and eating schedules creates problems for many diabetics, it is important that the patient speak to one of our PET-CT scheduling specialists at (205) 801-7561, so we can make sure a procedure is set up that will keep the patient safe and give us accurate images.

#### Other Medications, Procedures, and Allergies

You should tell the technologist or physician about any medications you are taking or procedures you have had such as chemotherapy, radiation therapy, and recent surgery. Some medications can alter the appearance of your PET-CT.

The radiopharmaceuticals used in PET-CT do not usually cause allergic reactions or problems with kidney function the way iodinated contrast dyes from radiology/CT can. If CT contrast dye is planned for your exam, you should notify the technologist of any contrast, iodine, or seafood allergies, and your renal function will be checked ahead of time.

#### **Sedation**

If you are claustrophobic, experience pain while lying still for long periods of time, or if you have had surgery in the neck area, it may be necessary to arrange for some sedative medication with your physician. Usually patients will be given Ativan or Valium by their doctors. Patients are asked to bring this medicine with them.

They will be told when to take the medicine by the PET-CT technologist. It is not possible to receive this medication from the PET-CT center and because the FDG radiopharmaceutical dose is only good for a very short time, it is usually not possible to wait for you to get the medicine from your doctor while you are here for your appointment.

#### **Your appointment time**

It is critical to the success of your test to be on time. The radiopharmaceutical dose ordered for you is only good for minutes beyond your appointment time. If you do not arrive on time for your appointment, your dose may no longer be good and we may not be able to fit you in. You should plan on being in the registration area at least 15 minutes before your appointment.

Your appointment time is the time we have calibrated your dose for. After the injection, there is an "incubation" period (usually 45 to 60 minutes) where you must remain silent, inactive, and alone in our dosing rooms.

The scan itself takes around 40 to 45 minutes (less for brain-only scans).

After the images are acquired, they must be processed and sent to our physician reading stations. It takes several minutes for this to happen, so your doctor will not have the report available immediately. If you have an appointment with your doctor on the same day as the PET, you should notify the scheduler or technologist.

Patients will be at the PET-CT center typically for **two to three hours**.

## Who to bring

If the patient needs sedation, someone must accompany them home. Otherwise, the number of people brought to the test should be limited. No children or pregnant women should come to the test because of the radiation.

## Pregnancy, Breast Feeding and Children

Because this tests uses radiation, women should always inform their physician, the PET-CT scheduler, or the PET-CT technologist if there is a possibility they may be pregnant before test is scheduled or the radiopharmaceutical is injected.

If you are breastfeeding or have children at home, some special instructions will be given based on the type of scan you are having. In general, breastfeeding should be stopped for several hours after the radiopharmaceutical is injected.

## When the scan begins

You will be positioned on an examination table. (A person who is very obese may not fit into the opening of a conventional PET/CT unit.)

If necessary, a nurse or technologist will insert an **intravenous (IV)** line into a vein in your hand or arm. Depending on the type of nuclear medicine exam you are undergoing, the dose of radiotracer is then injected intravenously.

It will take approximately 60 minutes for the radiotracer to travel through your body and to be absorbed by the organ or tissue being studied. You will be asked to rest quietly, avoiding movement and talking.

You may be asked to drink some contrast material that will settle in the intestines and help the radiologist interpreting the study.

You will then be moved into the PET/CT scanner and the imaging will begin. You will need to remain still during imaging. The CT exam will be first, followed by the PET scan.

On occasion, a second CT scan with intravenous contrast will follow the PET scan. The actual CT scanning takes less than two minutes. The PET scan takes 20 to 40 minutes.

Total scanning time is approximately 30 to 45 minutes.

Depending on which organ or tissue is being examined, additional tests involving other tracers or drugs may be used, which could lengthen the procedure time to three hours. For example, if you are being examined for heart disease, you may undergo a PET scan both before and after exercising or before and after receiving intravenous medication that increases blood flow to the heart.

When the examination is completed, you may be asked to wait until the technologist checks the images in case additional images are needed. Occasionally, more images are obtained for clarification or better visualization of certain areas or structures. The need for additional images does not necessarily mean there was a problem with the exam or that something abnormal was found, and should not be a cause of concern for you. You will not be exposed to more radiation during this process.

If you had an intravenous line inserted for the procedure, it will usually be removed unless you are scheduled for an operating room procedure that same day.

## **What will I experience?**

Most nuclear medicine procedures are painless and are rarely associated with significant discomfort or side effects.

If the radiotracer is given intravenously, you will feel a slight pin prick when the needle is inserted into your vein for the intravenous line. When the radioactive material is injected into your arm, you may feel a cold sensation moving up your arm, but there are generally no other side effects.

When swallowed, the radiotracer has little or no taste. When inhaled, you should feel no differently than when breathing room air or holding your breath.

With some procedures, a catheter may be placed into your bladder, which may cause temporary discomfort.

It is important that you remain still while the images are being recorded. Though nuclear imaging itself causes no pain, there may be some discomfort from having to remain still or to stay in one particular position during imaging.

If you are claustrophobic, you may feel some anxiety while you are being scanned.

Unless your physician tells you otherwise, you may resume your normal activities after your nuclear medicine scan. If any special instructions are necessary, you will be informed by a technologist, nurse, or physician before you leave the nuclear medicine department.

Through the natural process of radioactive decay, the small amount of radiotracer in your body will lose its radioactivity over time. It may also pass out of your body through your urine or stool during the first few hours or days following the test. You may be instructed to take special precautions after urinating, to flush the toilet twice and to wash your hands thoroughly. You should also drink plenty of water to help flush the radioactive material out of your body as instructed by the nuclear medicine personnel.

## **Who interprets the results?**

A radiologist who has specialized training in nuclear medicine will interpret the images and forward a report to your referring physician within 24 hours.

If your physician has ordered a diagnostic CT, a radiologist with specialized training in interpreting CT exams will report the findings of the CT and forward a report to your referring physician.

## **What are the risks vs. benefits of the exam?**

### Benefits

The information provided by nuclear medicine examinations is unique and often unattainable using other imaging procedures.

For many diseases, nuclear medicine scans yield the most useful information needed to make a diagnosis or to determine appropriate treatment, if any.

Nuclear medicine is less expensive and may yield more precise information than exploratory surgery.

By identifying changes in the body at the cellular level, PET imaging may detect the early onset of disease before it is evident on other imaging tests such as CT or MRI.

For additional benefits of CT exams, see Computed Tomography (CT).

The benefits of a combined PET/CT scanner include:

- Greater detail with a higher level of accuracy; because both scans are performed at one time without the patient having to change positions, there is less room for error.
- Greater convenience for the patient who undergoes two exams (CT & PET) at one sitting, rather than at two different times.

## Risks

Because the doses of radiotracer administered are small, diagnostic nuclear medicine procedures result in low radiation exposure, acceptable for diagnostic exams. Thus, the radiation risk is very low compared with the potential benefits.

Nuclear medicine diagnostic procedures have been used for more than five decades, and there are no known long-term adverse effects from such low-dose exposure.

Allergic reactions to radiopharmaceuticals may occur but are extremely rare and are usually mild. Nevertheless, you should inform the nuclear medicine personnel of any allergies you may have or other problems that may have occurred during a previous nuclear medicine exam.

Injection of the radiotracer may cause slight pain and redness which should rapidly resolve.

Women should always inform their physician or radiology technologist if there is any possibility that they are pregnant or if they are breastfeeding their baby.