**What is a PET scan and how does it work?**

Positron Emission Tomography (PET) is an imaging technique used in Nuclear Medicine to assess the metabolic activity of tissues. Organs and tissues can have normal or abnormal metabolic activity, depending on the various processes occurring on the surface of or inside the cells. These processes can be imaged using substances called “tracers” which are targeted to a specific metabolic process under investigation. For example, cancer cells have a higher than normal level of glucose receptors on their cells and can be imaged with a substance which is biochemically almost identical to glucose, called fluorodeoxyglucose (FDG). The tracers are radioactive, which makes their presence and location visible to a detector outside of the body (the PET scanner). The signal is then transferred to a computer which displays a three dimensional picture of the body and the metabolic activity in the organs and tissues can be interpreted by a Nuclear Medicine specialist. A low dose CT scan is performed at the same time as the PET scan, to improve the technical quality of the PET image and provide a more detailed anatomical correlation within the body.

**Are there any side effects from a PET scan?**

The amount of tracer injected is tiny and it will not cause any physiological changes inside your body. You will not feel any different during or after the injection. The tracer itself is not allergenic and an allergic reaction to the tracer is not expected. Allergic reactions to any reagents used in the production of the tracer are extremely rare.

Iodine contrast is not routinely used unless a diagnostic quality CT scan is performed at the same time as the PET. You will be informed if this is planned and your signed consent will be required. Patients with poor kidney function can safely undergo a PET scan.

Additional medication is sometimes administered in conjunction with the scan, for example Valium, and a reaction to this medication may occur, as with any medication. You will be informed and aware if any additional medication is necessary for your scan and you will be asked about your known allergies.

**What is the preparation for a PET scan?**

Depending on the tracer which we are using, you may need to fast for 6 hours prior to the scan. During this time you are also not allowed lollies or chewing gum. You can drink unlimited amounts of plain water, but nothing else. Not all tracers used require this fasting period. You will be advised if you need to fast for your scan when your appointment is made.

You should wear comfortable clothing with no metal zippers, clips or belts. Please avoid strenuous exercise the day before.

You can take all your regular medications with water. If you are a diabetic, there are separate instructions.

**What if I have diabetes?**

Your diabetes will only interfere with FDG PET scans, as it utilises a glucose-like substance. Both high blood glucose (>12mmol/L) and injection of Insulin before the scan can interfere with the study, often resulting in images which are not diagnostic. If we know that you are a diabetic, we will issue you with fasting and medication instructions tailored to your specific situation, to ensure that the best scan is achieved. If your blood glucose is high on the day of the scan, we will take measures to lower it before imaging, however, this is sometimes not possible and we may have to reschedule your appointment.

**How long does a PET scan take?**

The length of the scan depends on the tracer used and the specific protocol which is customised to your medical condition, for example if delayed images are needed. On average, the entire appointment takes up to 3 hours.

When you arrive in the Department you will be checked in by the administrative staff, your height and weight and basic observations will be recorded by the nurses, a cannula (IV line) will be inserted and you will be seen by a doctor to take a full medical history. This takes about 30-45 minutes. Following the tracer injection there is usually an ”uptake” period during which you will rest comfortably in a room for 45-60 minutes. The scan itself will take approximately 30 minutes and you need to lie still for the pictures. We do our best to make you comfortable during the scan. There is no unpleasant loud noise coming from the scanner. The PET scanner looks like a donut, similar to a CT scanner but a little longer. It is not as enclosed as an MRI scanner. Most patients with claustrophobia are able to cope with the scan, but may require a small dose of Valium.

You can have someone accompany you for the scan, although they will not be able to stay with you at all times, unless this is specifically required. Pregnant women and children should not come with you.

**What happens after the scan?**

If you are an outpatient, you will be able to go home immediately after the scan and resume normal activities. Unless you are given Valium with the scan, you will be able to drive.

**What about the radiation?**

PET scanning uses small amounts of radiation which comes in the form of a radioactive tracer. The amount of radiation you receive depends on the type of scan and the injected activity. We take utmost care to make the radiation dose as low as possible and in general terms the dose you receive from a PET scan is roughly equivalent to a CT scan. There are no specific precautions you need to take in regards to your interactions with children or pregnant women, however, we advise that there is no prolonged close contact (cuddling or sitting on your lap) for 2 hours after the scan has finished.

If you are pregnant or breastfeeding, following a consultation by one of our physicists you will be given advice and instructions which are specific to your circumstances.

**How long does it take to get the results of a PET scan?**

Final results are usually available within 24 hours of the scan, as reporting takes time and is double checked by two Nuclear Medicine consultants prior to release. Urgent reporting can be arranged if you have an appointment with your doctor soon after the scan. You will leave the department with a disc containing your pictures. Please keep this disc in a safe place and take it to your appointments with doctors and for any future scans. The report is faxed and posted to your referring doctor the next day. Copies can be sent to other doctors that you nominate. As a rule, we cannot discuss your results with you when you complete your scan, as this needs to be done in an appropriate setting by your treating doctor.

**How will a PET scan change my treatment?**

PET scan will show the extent and aggressiveness of your tumour. It also images a large portion of your body, which may not be included in the field of view of other scans. The additional information which may not be visible on conventional imaging (CT, MRI, or ultrasound) is likely to influence the treatment you receive by demonstrating if your disease is suitable for surgery, chemotherapy or radiotherapy, or other novel treatment methods. PET scan also offers prognostic information on the likely future behaviour of your tumour.

**Is PET scan covered by Medicare?**

Australian Medicare is very specific on the indications for PET scanning which are covered by MBS and only selected cancers with specific circumstances are covered. Your referring doctor is familiar with the Medicare indications and whether your scan will be covered. If it is covered, you will be Bulk Billed for your scan. If it is not covered, there is an out-of-pocket charge ranging from $400 to $1500, depending on the specific scan type. You will be informed of this charge at the time of the booking. If you cannot afford this charge, please discuss your circumstances with your referring doctor.