



UW Medicine



糖尿病患者的脱氧葡萄糖正子 PET/CT FDG 扫描

此讲义为在华盛顿大学医疗中心、及西雅图癌症中心做脱氧葡萄糖正子扫描的糖尿病患者提供特别指示。请参看第6页这两个医疗机构的电话号码。

医生已经为您开了医嘱做脱氧葡萄糖正子扫描。如还没有“脱氧葡萄糖正子扫描”的说明资料，请向工作人员索取一份。

什么是 PET/CT FDG 脱氧葡萄糖正子扫描

- PET 是指正电子发射断层扫描。
- CT 是指电脑断层扫描。
- FDG 是指 2-脱氧-2-[18F]氟-D-葡萄糖。

这项检查使用氟-18 FDG，为放射性示踪剂，在体内的作用类似于葡萄糖（糖）。这种示踪剂帮助我们看到细胞正在使用多少能量。我们用脱氧葡萄糖的正子扫描来测量。

正子扫描拍摄 2 种类型的造影：

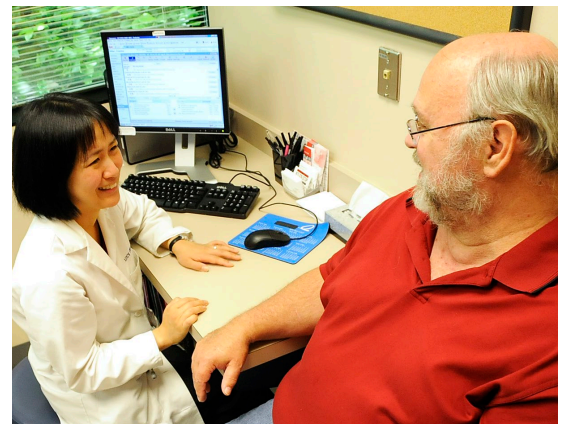
- 正子扫描-PET 显出示踪剂在体内的聚集位置。
- 电脑断层扫描-CT 提供身体结构的图片。

正子扫描-PET 和电脑断层扫描-CT 造影一起有助于医生看到细胞的变化。

如何准备

糖尿病患者在处理葡萄糖方面有困难。因此需要遵循特殊的扫描指示。

严格遵守本讲义中的所有指示。这有助于控制血糖，以便得到最清晰的扫描结果。



请在扫描前 2 周与您糖尿病的医疗提供者讨论。

- **在扫描前 2 周**请致电糖尿病医疗提供者，讨论为扫描做准备的最佳方式。与该医疗提供者一起讨论此讲义的说明。
- **在预约扫描前的 24 小时内不要做运动。**
- 在禁食 6 小时前的最后一餐必须是高蛋白，不含碳水化合物的食物。
- **多喝水**，以便保持水分充足。
- 预约时间前 6 小时开始：
 - **切勿经由全胃肠外营养 (TPN) 或静脉注射 (IV) 导管**摄取任何葡萄糖药物。
 - **切勿进食或喝饮料**。在这 6 小时禁食期间，您只能喝白开水。此扫描将安排在清晨，以减少需要禁食的时间。
- 如预约的时间不是在清晨，请致电做扫描地点的放射科/核医学科工作人员。他们会提供指示。(请见第 6 页的电话号码)。
- 在扫描当天上午 8 点之前，经过 6 小时的禁食后，血糖必须**低于 175mg/dL**。
 - 如不确定自己能做到这一点，请在预约前 3 天做 "预习" (请参阅见第 4 页)。
 - 如在预习后的早晨有任何困难使血糖水平低于 175 毫克/分升时，请致电预约的放射科/核医学科工作人员。(见第 6 页 "您有疑问吗？" 栏中的电话号码)。
- 如在扫描当天的血糖水平高于 175 毫克/分升，我们可能需要再另安排扫描的时间。
- 如在为准备扫描的禁食时段内，血糖水平低于 70 毫克/分升或出现**低血糖**症状 (低血糖)：
 - 以平常处理低血糖的方法来处理。不要让血糖低到不安全的程度!
 - 在血糖稳定后，给我们打电话重新安排扫描时间。

扫描前的食物和饮料

对于这次扫描，**务必**严格遵守第 3 页的指示。如不遵守或不能遵守这些指示，我们即需要重新安排扫描的时间。

如何做“预习”

在扫描前至少 3 天检测血糖水平。

指南



6 小时禁食前的饮食

- 必须吃脂肪及蛋白质类的食物
- 切勿吃任何碳水化合物的食物。

食物:

- 原味肉（牛肉、牛排、猪肉、鸡肉或羊肉）、鱼和鸡蛋。如愿意，可以用油来煎。不要吃培根、预先烹熟的肉类或其他加工过的肉。
- 素食者：只吃用油煎熟的原味豆腐（需要添加脂肪）。

“原味”是指不含酱汁、调味料、调料或面包屑

饮料:

- 水

药物:

- 切勿使用咀嚼、液体或棒棒糖类的药物。用水服送所有其他药物。

6

扫描前6小时开始

- 禁食 - 不要吃任何东西。
- 可喝水。
- 切勿使用咀嚼、液体或棒棒糖类的药物。用水服送所有其他药物。

糖尿病的患者

- 在扫描前6小时开始，不要使用胰岛素或其他糖尿病药物。



请注意!

- 在开始 6 小时禁食前的最后一餐、您仅可吃蛋白质及脂肪。

- 在 6 小时禁食时段前的晚餐：
 - 如使用胰岛素，请在晚间用餐时按照平时的胰岛素剂量使用。
 - 如服用口服糖尿病药物或除胰岛素之外的糖尿病药物（品牌名称 Victoza 或 Byetta），请在预习的前一天晚上按照平时的剂量使用。
 - 夜间禁食 6 小时。
 - 在禁食期间，仅可喝白水。不要嚼口香糖、吃薄荷糖或糖果、或服用维生素。
- 在禁食 6 小时后的早晨，测试血糖水平。
- 请致电安排扫描的放射科/核医学科工作人员，让他们知道在 6 小时禁食预习后的血糖水平是多少。（请见第 6 页的电话号码）。
- 如在预习后早晨血糖水平高于 175 毫克/分升，请务必在扫描日前通知我们，以便可以向糖尿病医护提供者请示指导。
 - 早上的血糖水平低于 175 毫克/分升、即在按照预约时间做脱氧葡萄糖正子扫描-PET/CT FDG 的安全范围内。
- 在预习后的早晨，可以恢复正常的饮食和服药习惯，直到做扫描的前晚。

在扫描当天

- 在扫描前要禁食过夜 6 小时。关于使用胰岛素、口服糖尿病药物和除胰岛素外的其他糖尿病药物的说明，请参见第 5 和第 6 页。
 - 在禁食期间，**仅可喝白开水，不可喝其他饮料。**
 - **不可吃口香糖、薄荷糖或糖果。**
 - **不可服用任何维生素、咀嚼片或糖浆类药物，如止咳糖浆。**
- 不需要与食物一起服用的**非糖尿病药物**，可以在扫描当天早上用水服送这些药物。
- 在早晨禁食 6 小时后检查血糖水平：
 - **低于 175 毫克/分升**，按预约的时间来做扫描。
 - **低于 70 毫克/分升，或有低血糖的症状**，请按常规方法治疗低血糖。**不要忽略了低血糖而不治疗。**请致电重新安排扫描的时间。（请见第 6 页的电话号码）。
 - **高于 175 毫克/分升**，请致电给我们。可能需要重新安排扫描时间。

- 在扫描当天，必须保持空腹，直到扫描结束，除非血糖水平低于 70 毫克/分升或有低血糖症状。扫描将持续约 2 小时。

使用糖尿病药物的说明

如服用口服或注射胰岛素以外的糖尿病药物

如正在服用糖尿病药物（胰岛素、口服药物或除注射胰岛素外的糖尿病药物），请遵循以下说明：

<p>扫描前一天</p>	<ul style="list-style-type: none"> • 按常规服用常用的口服糖尿病药物或除注射胰岛素外的糖尿病注射药物（品牌为 Victoza 或 Byetta）。 • 在扫描前一天和晚上正常进餐。 • 扫描前一夜禁食 6 小时 • 在禁食期间不可嚼口香糖，吃薄荷糖或糖果，或服用维生素。
<p>扫描当天的上午</p>	<ul style="list-style-type: none"> • 不可服用早上的口服糖尿病药物。 • 不可注射 Victoza 或 Byetta。
<p>扫描后</p>	<p>二甲双胍（一些品牌名称：<i>Fortamet, Glucophage, Glucophage XR, Glumetza, Riomet</i>）。</p> <ul style="list-style-type: none"> • 如做 CT 扫描时使用了显影剂，可能会告诉患者在肾脏功能检测正常之前不要恢复任何含有二甲双胍的药物。患者将在扫描当天收到有关指示。 <p>对于二甲双胍以外的口服糖尿病药物（二甲双胍品牌名称请见上文）。</p> <ul style="list-style-type: none"> • 在午餐时：服用早上常用的口服糖尿病药物。注射常用的 Victoza 或 Byetta。 • 此后、恢复到平时的剂量。 <p>如有任何问题，请与糖尿病科得医疗提供者讨论。</p>

如使用胰岛素

如使用胰岛素、请遵循下列说明：

扫描前一天	<ul style="list-style-type: none">在扫描的前一天，可以在平常吃饭的时候注射平常的胰岛素剂量。如在睡前注射胰岛素，可以按照医嘱，但一定要在禁食 6 小时前吃高蛋白、无碳水化合物的点心。在预约前禁食 6 小时。
扫描当天的上午	<ul style="list-style-type: none">不可在扫描当天的早上注射胰岛素。如通常在早上注射长效（基础）胰岛素，如 Lantus 或 Levemir，可能需要在扫描前的晚上注射。糖尿病患者的医疗提供者会协助在扫描前调整胰注射胰岛素时间表。请记住：在扫描前 2 周向糖尿病医护提供者咨询早上的胰岛素剂量。告诉这位提供者在扫描的早上不能注射胰岛素。（如果患者使用的是胰岛素泵，可能会有例外）。将总共禁食约 8 小时，包括扫描时间。如有任何疑问，请致电安排扫描的放射科/核医学科工作人员。（见左栏“您有疑问吗？”框中的电话号码）。
扫描后	<ul style="list-style-type: none">如对扫描后如何恢复使用胰岛素有任何疑问，请咨询糖尿病医疗提供者。

您有疑问吗？

我们很重视您的提问。当您有疑问或顾虑时请致电您的医生或糖尿病科的医护提供者。

☐ 华大医疗中心造影科：
206.598.6200

☐ 西雅图癌症中心：
206.606.7200

UW Medicine



PET/CT FDG Scan for Patients with Diabetes

This handout gives special instructions for patients with diabetes who are having a PET/CT FDG scan at UW Medical Center, Harborview Medical Center, or Seattle Cancer Care Alliance.

Your provider has ordered an exam for you called a *PET/CT FDG scan*. Please ask for the handout called “PET/CT FDG Scan” if you do not already have it.

What is a PET/CT FDG scan?

- PET stands for *positron emission tomography*.
- CT stands for *computed tomography*.
- FDG stands for *2-Deoxy-2-[¹⁸F]fluoro-D-Glucose*.

This exam uses fluorine-18 FDG, a *radioactive tracer* that acts like glucose (sugar) in the body. The tracer helps us see how much energy your cells are using. We measure this with a FDG PET/CT scan.

A PET/CT camera takes 2 types of pictures:

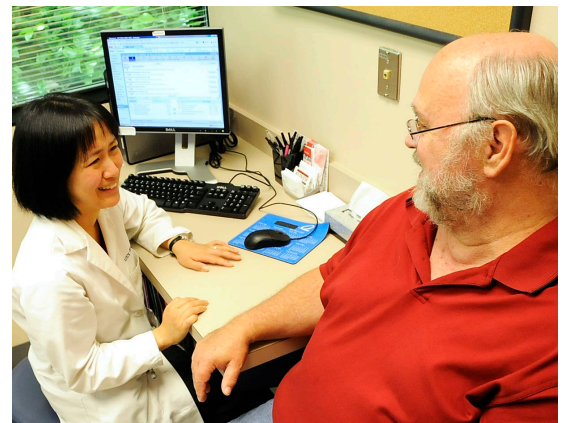
- The **PET scan** shows where the tracer has collected in your body.
- The **CT scan** provides pictures of your body structures.

Together, the PET and CT images will help your doctor see changes in your cells.

How to Prepare

People with diabetes have trouble processing glucose. This means you need to follow special instructions for your scan.

Closely follow all instructions in this handout. This will help keep your blood sugar under control and give us the clearest results from this scan.



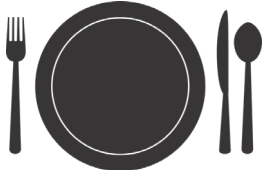
Talk with your diabetes care provider 2 weeks before your scan.

- Call your diabetes care provider **2 weeks before your scan** to talk about the best way to prepare for your scan. Review the instructions in this handout with this provider.
- **Do NOT exercise for 24 hours** before your scan appointment.
- The last meal before your 6-hour fast must be high-protein and have NO carbohydrates.
- **Drink plenty of water** so that you stay hydrated.
- Starting 6 hours before your appointment time:
 - Do **not** take any dextrose medicines by *total parenteral nutrition* (TPN) or *intravenous* (IV) line.
 - **Do NOT eat or drink.** You may only drink plain water during this 6-hour fast. Your scan will be early in the morning to reduce the amount of time you need to fast.
- If your appointment is not set for early morning, please call the Radiology/Nuclear Medicine staff where your scan is scheduled. They will give you instructions. (See phone numbers on page 6.)
- By 8 a.m. on the morning of your scan, after your 6-hour overnight fast, your blood glucose (blood sugar) must be **below 175 mg/dL**.
 - If you are not sure you can do this, try a “practice run” 3 days before your appointment (see page 4).
 - Call the Radiology/Nuclear Medicine staff where your scan is scheduled if you have any problems reaching a blood glucose level below 175 mg/dL in the morning after your practice run. (See phone numbers in the “Questions” box on page 6.)
- If your blood glucose level is above 175 mg/dL on the day of your scan, we may need to reschedule your scan.
- If you have a blood glucose level lower than 70 mg/dL or symptoms of *hypoglycemia* (low blood glucose) while fasting for the scan:
 - Treat your low blood sugar in your usual way. Do not let your blood sugar go so low that you are unsafe!
 - After your blood sugar is stable, call us to reschedule your scan.

Food and Drink Before Your Scan

For this scan, you **must** strictly follow the instructions on page 3. If you do not or cannot follow these instructions, we will need to reschedule your scan.

Instructions



In the meal **BEFORE**
your 6-hour fast

- You **MUST** eat fats and proteins.
- Do **NOT** eat any carbohydrate foods.

Eat **ONLY**:

- Plain meat (beef, steak, pork, chicken, or lamb), fish, and eggs. You may cook the meat in oil, if you wish. **NO** bacon, deli meats, or other processed meats.
- **VEGANS**: Eat **ONLY** plain tofu that has been cooked in oil (added fat is needed).

“Plain” means NO sauces, seasonings, dressings, or breading.

Drink **ONLY**:

- Water

Medicines:

- **NO** chewable, liquid, or lollipop medicines. Take all other medicines with water.

6

Starting 6 **HOURS**
BEFORE your scan

- **FAST** – do **NOT** eat anything.
- You may drink water.
- Do **NOT** take any chewable, liquid, or lollipop medicines. Take all other medicines with water only.

If you have diabetes:

- Starting 6 hours before the study, do **NOT** take insulin or other diabetes medicines.



IMPORTANT!

- You **MUST** eat **ONLY** proteins and fats in your last meal before your 6-hour fast.

How to Do a “Practice Run”

Check your blood glucose levels for at least 3 days before your scan.

- Evening meal before your 6 hour fast:
 - If you take insulin, take your usual evening insulin dose with your evening meal.
 - If you take oral diabetes medicine or a diabetes medicine *besides* insulin that you inject (brand names Victoza or Byetta), take your usual dose of these the evening before your practice run.
 - Fast for 6 hours overnight.
 - During your fast, you may drink **only** plain water. Do **not** chew gum, eat mints or candy, or take vitamins.
- Check your blood glucose level in the morning after your 6-hour fast.
- Call the Radiology/Nuclear Medicine staff where your scan is scheduled to let them know what your blood glucose level was after your 6-hour practice-run fast. (See phone numbers on page 6.)
- If your morning blood glucose level after your practice run was higher than 175 mg/dL, we need to know this well before the day of your scan so we can ask your diabetes care provider for instructions.

A morning blood glucose level below 175 mg/dL is a safe range for your PET/CT FDG scan appointment.

- In the morning after your practice run, you may return to your normal routines of eating and taking medicine until the evening before your scan.

On the Day of Your Scan

- Fast overnight for 6 hours before your scan. See the instructions on pages 4 and 5 for taking insulin, oral diabetes drugs, and other diabetes drugs besides insulin that are injected.
 - You may drink **only** plain water during your fast – **no other drinks**.
 - You may **not** have gum, mints, or candy.
 - Do **not** take any vitamins, chewable tablets, or syrup-based medicines such as cough syrup.
- You may take your **non-diabetes medicines** with water on the morning of your exam if you do not need to take them with food.

- Check your blood glucose level in the morning after your 6-hour fast. If your blood glucose is:
 - **Below 175 mg/dL**, go to your appointment as scheduled.
 - **Below 70 mg/dL or you have symptoms of hypoglycemia**, treat your low blood glucose in your usual way. **Do not let low blood glucose go untreated.** Call to reschedule your scan. (See phone numbers on page 6.)
 - **Above 175 mg/dL**, call us. We may need to reschedule your scan.
- On the day of your scan, you **must** keep fasting until your scan is over, unless you have a blood glucose level lower than 70 mg/dL or symptoms of hypoglycemia. Your scan will last about 2 hours.

Instructions for Diabetes Medicines

If You Take Oral or Diabetes Drugs *OTHER THAN* Insulin That You Inject

If you are taking diabetes medicines (insulin, oral drugs, or diabetes drugs other than insulin that you inject), follow these instructions:

<p>Day before your scan</p>	<ul style="list-style-type: none"> • Take your usual oral diabetes drugs or diabetes drugs besides insulin that you inject (with brand names Victoza or Byetta). • Eat regular meals the day and evening before your scan. • Fast for 6 hours overnight before your scan. • Do not chew gum, eat mints or candy, or take vitamins during your fast.
<p>Morning of your scan</p>	<ul style="list-style-type: none"> • Do not take your morning oral diabetes drugs. • Do not inject Victoza or Byetta.
<p>After your scan</p>	<p>For metformin (some brand names: <i>Fortamet, Glucophage, Glucophage XR, Glumetza, Riomet</i>):</p> <ul style="list-style-type: none"> • If you have a contrast CT scan done, you may be told not to resume any drugs that contain metformin until your kidney function is tested and is normal. You will receive instructions about this on the day of your scan. <p>For oral diabetes drugs other than metformin (see above for metformin brand names):</p> <ul style="list-style-type: none"> • At lunch: Take your usual morning oral diabetes drug. Inject your usual Victoza or Byetta. • After this, return to your usual doses. <p>Talk with your diabetes care provider if you have any questions.</p>

If You Take Insulin

If you take insulin, follow these instructions:

Day before your scan	<ul style="list-style-type: none">• Take your usual insulin doses with your usual meals the day before your scan. If you take a bedtime dose of insulin, you may take this as ordered, but be sure to have a high-protein, no-carbohydrate snack before your 6-hour fast.• Fast for 6 hours before your appointment.
Morning of your scan	<ul style="list-style-type: none">• You cannot inject insulin on the morning of your scan. If you normally inject long-acting (basal) insulin such as Lantus or Levemir in the morning, you may need to take it the evening before your scan. Your diabetes care provider will help you adjust your insulin schedule before your scan.• Remember: Ask your diabetes care provider about your morning insulin doses 2 weeks before your scan. Tell this provider you cannot inject insulin the morning of your scan. (Exceptions may be made if you are on an insulin pump.)• You will be fasting for a total of about 8 hours, including scan time.• If you have any questions, please call the Radiology/ Nuclear Medicine staff where your scan is scheduled. (See phone numbers in the “Questions?” box on the left.)
After your scan	<ul style="list-style-type: none">• Check with your diabetes care provider if you have any questions about resuming your insulin after your scan.

Questions?

Your questions are important. Call your doctor or diabetes care provider if you have questions or concerns.

- UWMC - Montlake Imaging Services: 206.598.6200
- Seattle Cancer Care Alliance: 206.606.7200