

ISOTOPE



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Fluorine



Fluorine-18

The Cornerstone of
Advanced Medical Imaging



Feature of the Month

Fluorine-18

A revolutionary way to diagnose and stage complex diseases

How It Works:



Fluorine-18 (F-18) tracers serve as molecular probes that “light up” specific physiological processes, like areas of high glucose metabolism in a cancer tumor, or mapping biochemical changes in the brain or heart. F-18 is predominantly used in Positron Emission Tomography (PET) scans through radiopharmaceuticals like fluorodeoxyglucose (FDG), which helps to visualize cell glucose metabolism.



Cancer cells grow rapidly and consume glucose at a much higher rate than healthy cells. They "suck up" the FDG, appearing as bright "hot spots" on a PET scan.

This image is an example of the precision imaging that F-18 FDG PET scans provide to physicians.

Image “A” shows a red arrow identifying a mediastinal mass, and a yellow arrow identifying the axillary lymph nodes.

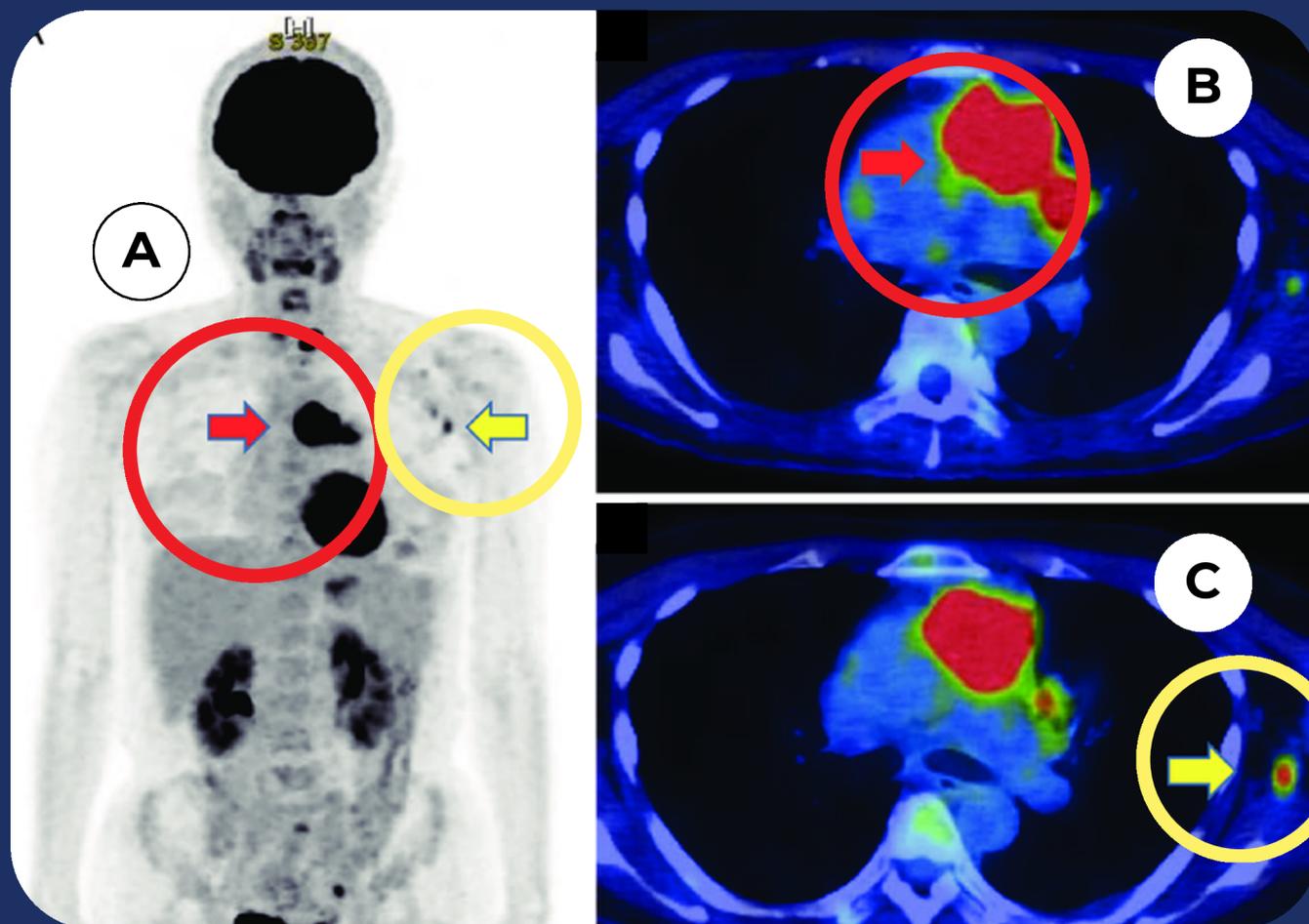


Image “B” shows a marked increase of F-18 uptake in the mediastinal mass.

Image “C” shows increased F-18 uptake in the axillary lymph nodes.

Fluorine-18

Production of F-18

F-18 is produced in Canada by our network of cyclotron facilities. Advancements in cyclotron technology have enhanced the efficiency of F-18 production, making it more accessible for widespread use.



109.8 minute half-life

F-18's short half-life is ideal for imaging as it minimizes patient radiation exposure while providing sufficient time for diagnosis.

Applications of F-18



Oncology

F-18 PET scans and FDG are instrumental in identifying malignant tumours, assessing the extent of cancer spread, and evaluating the response to therapy.



Neurology

F-18 radiotracers are used to study brain metabolism and receptor binding. For instance, F-18 is used to evaluate Alzheimer's disease, epilepsy, and Parkinson's disease.



Cardiology

PET scans that use F-18 radiopharmaceuticals can detect areas of the heart with reduced blood flow or damaged tissue, aiding in the management of coronary artery disease.

**DID YOU
KNOW?**



1 billion patients over the past 30 years have been scanned using F-18 tracers globally.

INTERESTING FACT

Fluorine-18

Case Study of Canada's Leadership

Canada's Cyclotron Excellence

Canadian healthcare relies on our cyclotron fleet for routine production of F-18. Cyclotron facilities are typically associated with hospitals, regional healthcare centers, or research institutes, and provide a direct supply of short-lived isotopes including F-18.



25 +

**Cyclotron and
Accelerator Facilities
in Canada**



Research

Cyclotron-produced F-18 is also utilized for research purposes, particularly the development of novel molecular imaging agents.

References

[American Society of Nuclear Cardiology - FDA Approves F-18 Flurpiridaz, Nuclear Cardiology's First New Radiotracer in Nearly 3 Decades](#)

[Isologic Innovative Radiopharmaceuticals - Facility Disclosure](#)

Kosaka, Takayuki & Nakazawa, Seshiru & Ibe, Takashi & Shirabe, Ken. (2022). Vanishing mediastinal mass associated with mRNA SARS-CoV-2 vaccination: a rare case report. AME Medical Journal. 7. 10.21037/amj-22-13.

[Open MedScience Imaging Health - Fluorine-18 Fludeoxyglucose: A Key Radiotracer in Positron Emission Tomography](#)

[Open MedScience Imaging Health - Fluorine-18: Modern Medical Imaging](#)

[Trend Tracker - Fluorine-18: Transforming Precision Imaging in Modern Nuclear Medicine](#)

[Society of Nuclear Medicine and Molecular Imaging - 18F-Fluciclovine \[Axumin®\] PET/CT Scan](#)