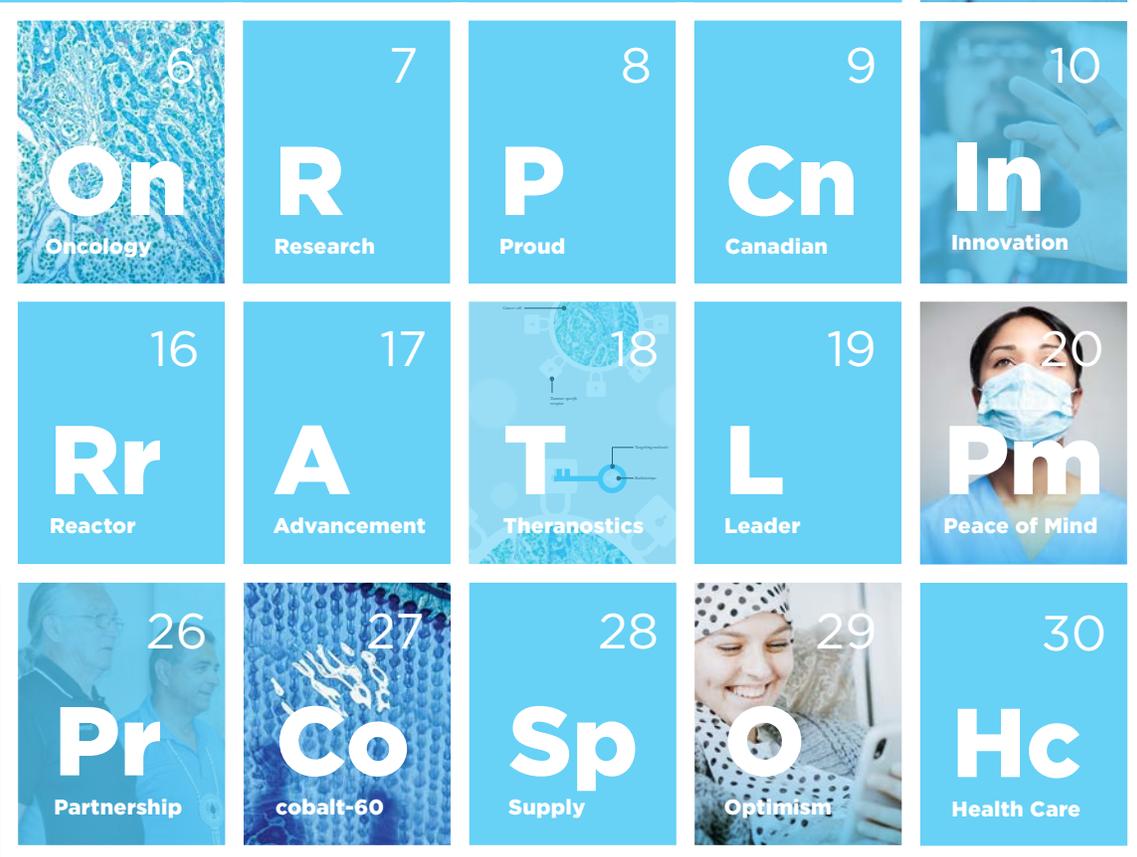


Essential elements of health care



Land Acknowledgement

The Bruce Power site is located within the Saugeen Ojibway Nation Territory, the shared treaty and traditional Territory of the Chippewas of Saugeen First Nation and Chippewas of Nawash Unceded First Nation (Neyaashiinigmiing).

Bruce Power is dedicated to honouring Indigenous history and culture and is committed to moving forward in the spirit of reconciliation and respect with the Indigenous communities we work with. We are committed to strong and respectful relationships with the Saugeen Ojibway Nation (SON), the Métis Nation of Ontario (Region 7) and Historic Saugeen Métis.

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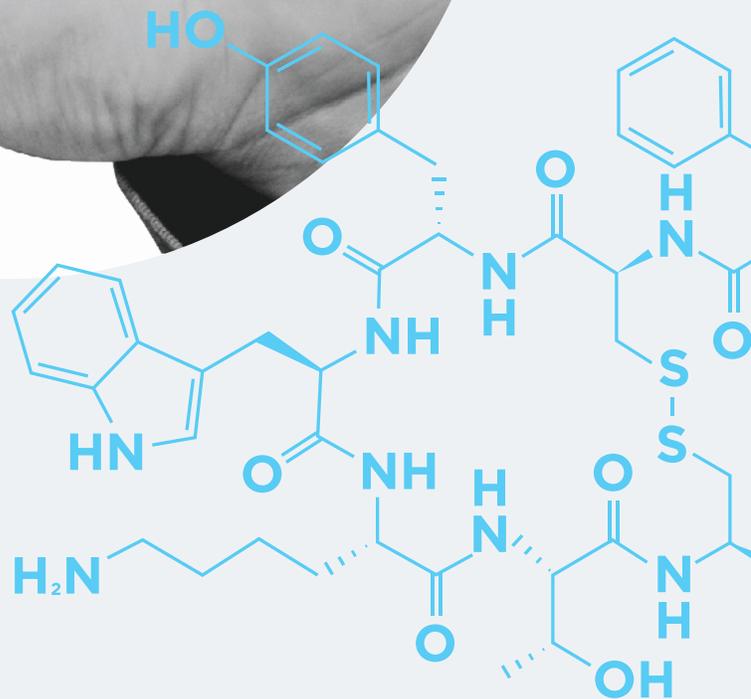
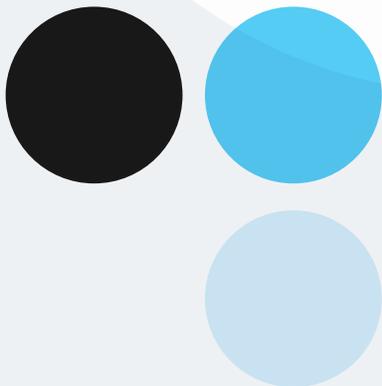
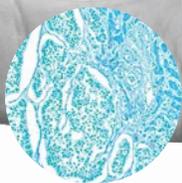
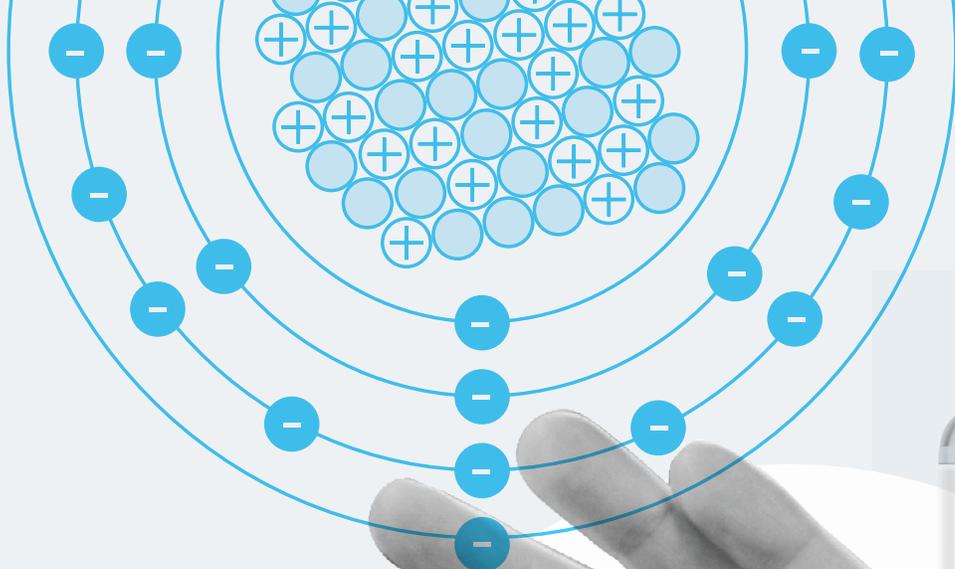
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Isotope i-so-tope | ɪ-sə-ɪtōp

noun

- 1 any of two or more species of atoms of a chemical element with the same atomic number and nearly identical chemical behaviour but with differing atomic mass or mass number and different physical properties.

There are both stable and non-stable isotopes. Non-stable isotopes, or radioisotopes, exhibit radioactive decay, emitting radiation to transform to the element's more stable form. Each isotope has a unique half-life, which is the time it takes for half of the atoms to undergo radioactive decay, ranging from nanoseconds to hundreds of thousands of years. These unique characteristics make radioisotopes useful in a variety of applications, from medicine, to food preservation, to powering batteries for space exploration.



Introduction

When people think about nuclear power, they think about the electricity that powers their daily lives. In addition to producing enough carbon-free electricity to power one third of the homes, businesses and hospitals in Ontario, Bruce Power contributes to the world's health care system through its decades of isotope production, a legacy it continues to build upon.

Bruce Power's isotopes are used every day — in the global fight against cancer, to keep our hospitals clean and safe, combat disease and sterilize food against pathogens.

As we look to the future, innovations in medical isotopes are providing a pathway for researchers and health care professionals to improve lives through targeted cancer therapies. These ground-breaking therapies use the power of medical isotopes to improve patient outcomes, by offering treatments tailored to the individual's unique diagnosis. Medical isotopes are providing a foundation to advance research in cancer treatments and procedures to help save lives.

Bruce Power is proud of the role it plays in powering medical innovation and fighting cancer. Together, scientists, researchers, doctors and the nuclear industry are building a better tomorrow.

“We’re extremely proud of our cancer-fighting isotope production, which continues to position Canada as a world leader in isotope innovation. Bruce Power’s commercial reactors are the first in the world to produce lutetium-177. Our ‘always on’ CANDU technology means we have tremendous reliability and capacity to scale production. And we’re also proud of the way we’ve developed our isotopes business, in historic partnership with Saugeen Ojibway Nation.”

Eric Chassard
President & CEO, Bruce Power



Medical isotopes

The nuclear industry plays an important role in the fight against cancer through the production of medical isotopes. For more than 50 years, Canada has been a global leader in the research, development and production of medical isotopes.

Medical isotopes are the cornerstone of a rapidly expanding field of nuclear medicine. Medical isotopes are used for diagnostic purposes in oncology, cardiology and neurology. Therapeutic applications for isotopes, particularly as a treatment for cancer, are a quickly growing area of nuclear medicine.

Worldwide, over 50 million nuclear medicine procedures are performed each year¹, with approximately 45 million for diagnostic nuclear medicine and five million for therapy. This number is expected to grow as demand for these powerful medical tools is harnessed and treatments are developed for an expanding list of cancers.

Isotope Key
 Diagnosis
 Therapy

Stroke Imaging

¹⁸F, ^{99m}Tc, ¹⁵O

Parkinson's Disease

¹⁸F, ¹²³I

Epilepsy

¹²³I, ¹⁸F, ^{99m}Tc

Alzheimer's Disease

¹⁸F, ¹¹C

Leukaemia

³²P

Non-Hodgkin Lymphoma

¹¹¹In, ⁹⁰Y, ¹³¹I

Lung Ventilation

^{81m}Kr, ^{99m}Tc, ¹³³Xe

Lung Perfusion Imaging

^{99m}Tc

Liver Imaging

^{99m}Tc, ¹³N, ¹⁸F

Hepatocarcinoma

¹³¹I, ¹⁸⁸Re, ⁹⁰Y

Gastro-Intestinal Absorption

^{99m}Tc

Neuroendocrine Tumours

^{99m}Tc, ¹¹¹In, ¹⁸F, ⁶⁰Co, ⁶⁸Ga, ¹⁷⁷Lu

Kidney Diseases

⁹⁹Tc, ¹²³I, ¹³¹I

Adrenal Scintigraphy

⁹⁹Tc, ¹⁸F, ¹²³I, ¹³¹I

Bladder Imaging

^{99m}Tc

Prostate Cancer

¹⁸F, ⁶⁸Ga, ¹¹C, ¹¹¹In, ¹⁷⁷Lu

Brain Imaging

¹⁸F, ^{99m}Tc, ¹²³I, ¹³N, ¹⁵O, ¹¹C

Brain Tumours

⁶⁰Co

Imaging of the Salivary Glands and the Lackrymal Tract

^{99m}Tc

Thyroid Diseases

¹³¹I, ¹²³I, ¹³¹I, ⁹⁹Tc, ²⁰¹Tl

Blood Studies

^{99m}Tc, ²⁰¹Tl, ¹³N, ¹⁵O, ¹⁸F, ⁸²Rb

Cardiac Diseases

⁹⁹Tc, ²⁰¹Tl, ¹³N, ¹⁵O

Breast Cancer

^{99m}Tc, ¹⁸F

Spleen Diseases - Biliary Function

^{99m}Tc

Palliative Treatment Bone Metastases

³²P, ⁸⁹Sr, ¹⁵³Sm, ¹⁷⁷Lu, ¹⁸⁶Re, ²²³Ra

Bone Scintigraphy

^{99m}Tc, ¹⁸F

Cervix Cancer

^{99m}Tc

Deep Vein Thrombosis

⁹⁹Tc

Polycythaemia and Thrombocythaemia Treatment

³²P

Radiosynovectomy - Polyarthritits (knee, hand, shoulder, hip)

¹⁶⁹Er, ¹⁸⁶Re, ⁹⁰Y

Whole Body
Primary Tumours and Metastases
¹¹C, ¹⁸F, ⁶⁰Co, ⁶⁸Ga

Whole Body
Oncology Therapy
¹³¹I, ¹⁷⁷Lu, ¹⁶⁶Ho, ⁹⁰Y

Whole Body
Infectious Diseases
^{99m}Tc, ⁶⁷Ga, ¹⁸F

Source: Nuclear Medicine Europe, The Industry Association
<https://hygieia.nuclearmedicineeurope.eu>



History of isotopes at Bruce Power

Medical isotopes have been produced at the Bruce Power site for over 40 years, beginning with the production of cobalt-60 in the four Bruce B units, an isotope used worldwide to keep hospitals clean and safe and in innovative cancer treatments.

In 2022, Bruce Power took another leap forward in its isotope program, expanding capabilities to supply cancer-fighting isotopes to the world market through the installation of a first-of-a-kind Isotope Production System (IPS) for the production of a short-lived isotope, lutetium-177. This innovation was made possible through collaborations with Isogen (a



1986

First harvest of cobalt-60 at Bruce Power

Used to sterilize medical devices such as sutures, gloves and syringes.



2019

First harvest of medical-grade cobalt-60 at Bruce Power

Used worldwide in cancer treatment and radiation therapy for complex brain conditions.



July 2019

Bruce Power announces partnership with Kinectrics and Framatome

to develop an Isotope Production System (IPS) for use in Bruce Power reactors.

Kinectrics and Framatome company), which designed and manufactured the IPS, and with ITM, which processes and distributes medical isotopes.

In 2023, Bruce Power focused on innovations to its existing isotope program to increase production of cobalt-60 and lutetium-177 to meet growing worldwide demand.

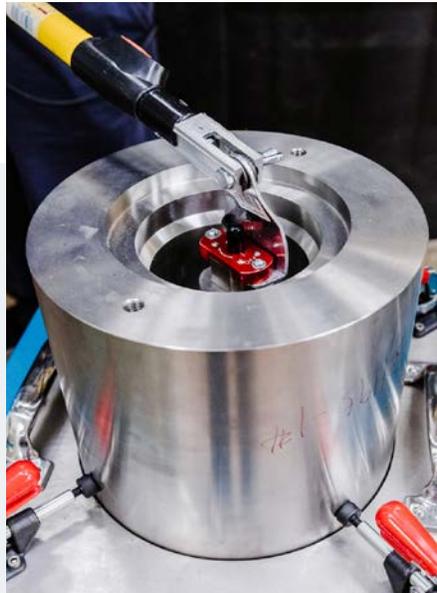
A new adjuster component configuration was installed to increase output of cobalt-60, and the first phase of innovations to increase the capacity of the IPS used were completed.

In 2024, Bruce Power expanded the capabilities of the IPS installed in Unit 7, adding a second production line to effectively double the production potential of

lutetium-177 on site, to meet growing demand from the worldwide medical community. Through Bruce Power and Saugeen Ojibway Nation's partnership, Gamzook'aamin akoziwin, \$9M from the Strategic Innovation Fund supported the second production line.

As we look to the future, the unique design of the IPS enables scaling production to other units, opening the door to a wide range of research and development in the Canadian isotope landscape.

Bruce Power is crucial to the world isotope supply, helping make Canada a global leader in the production of medical isotopes used in the sterilization of medical equipment and in the diagnosis and treatment of certain forms of cancer, here at home and around the world.



2022
**Installation of IPS In
Bruce Power's Unit 7**

Lutetium-177 is the first medical isotope produced using the IPS, used to treat neuroendocrine tumours and has applications for prostate and breast cancer treatments.

2022
**Bruce Power becomes the first
commercial nuclear reactor in the
world to produce lutetium-177.**

2024
**Bruce Power expands the IPS
installed in Unit 7 to add an
additional production line,
doubling production capabilities
of lutetium-177.**



2024 SON leaders tour of the IPS (L-R): Ty Chegahno, Bruce Power high school co-op and SON member; Norma Tobey, Councillor, Chippewas of Nawash Unceded First Nation; Greg Nadjiwon, Councillor, Chippewas of Nawash Unceded First Nation; Theron Solomon, SON member; Conrad Ritchie, Chief, Saugeen First Nation.



Gamzook'aamin aakoziwin

Bruce Power's site is located in Saugeen Ojibway Nation (SON) Territory. SON is one Nation comprised of two Communities, both the Chippewas of Saugeen First Nation and the Chippewas of Nawash Unceded First Nation, who are rights and title holders at the Bruce Power site. SON are Anishinaabek People of the Great Lakes Region. SON describes both the Territory (lands and waters) and the People who have lived with and protected the Territory since time immemorial.



“Our government is proud to partner in the creation of the Canadian Medical Isotope Ecosystem, which includes support for the SON First Nations communities’ partnership with Bruce Power to innovate in the fight against cancer.”

Hon. François-Philippe Champagne
Minister of Innovation, Science and Industry



Gamzook’aamin aakoziwin — Anishnaabemowwin for “We are Fighting the Sickness Together” — represents a historic partnership between Saugeen Ojibway Nation (SON) and Bruce Power to grow together and realize a shared vision of better cancer treatment and stronger communities. Since 2019, this innovative partnership has allowed SON to benefit from the operations and industry on its territory and advance Bruce Power’s commitment to economic reconciliation.

In 2025, SON and Bruce Power significantly expanded the agreement and investment to ensure a stable, long-term source of additional revenues to contribute to SON self-determination for generations to come.

At the same time, SON will help in the global fight against cancer by investing in the production of a reliable supply of medical isotopes.

Above: The Partnership name was developed by Polly Keeshig-Tobias, Knowledge Keeper, language speaker (Chippewas of Nawash), and artwork was created by Emily Kewageshig (Saugeen First Nation) – representing a diversity of people working together towards healing.

Top left: Greg Nadjiwon, Councillor, Chippewas of Nawash Unceded First Nation; Eric Chassard, President and CEO, Bruce Power; Chief Conrad Ritchie, Saugeen First Nation and James Scongack, Chief Operating Officer and Executive Vice-President at the iPolitics CNIC awards.



Cobalt-60

Since 1986, the Bruce Power site has harvested cobalt-60, an isotope that emits gamma rays essential to the medical community.

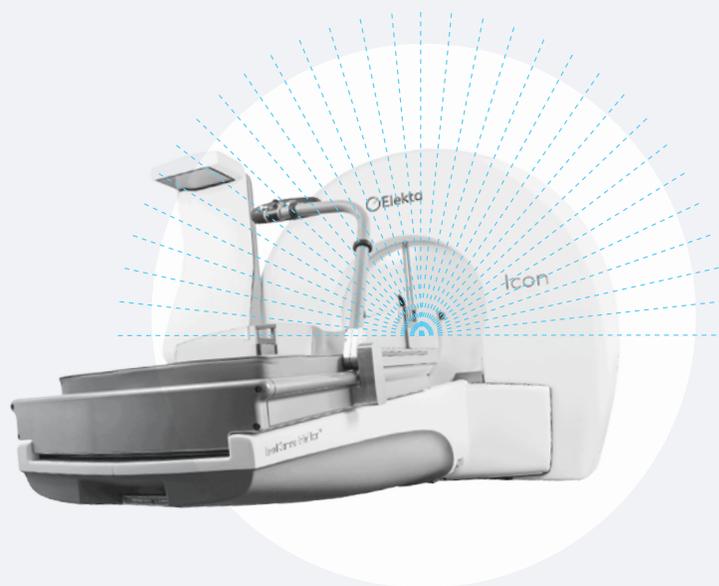
Cobalt-60 is an isotope used to sterilize over 30 per cent of the world's single-use medical equipment through gamma irradiation, a process which sterilizes equipment more quickly and in larger volumes than other forms of sterilization. Each harvest of cobalt-60 from Bruce Power sterilizes billions of single-use medical devices. Demand for cobalt-60 continues to grow to meet demand from the world's health care sector for syringes, gloves, surgical gowns and masks.

Gamma irradiation from cobalt-60 has applications that go beyond the medical industry, and is used in a wide range of industrial and commercial settings to safeguard our health. Cobalt-60 is used in the sterilization of pharmaceuticals, and to disinfect food and consumer products. From spices and cosmetics, to the elimination of invasive insects on tropical produce and the treatment of microorganisms such as salmonella on meat, gamma irradiation from cobalt-60 keeps consumer products safe without the need of exposure to chemical treatments which may leave traces and residue behind.

Bruce Power is one of only a small number of global producers of medical-grade cobalt-60, used in radiation therapy in the treatment of complex cancers and conditions through non-invasive procedures like the Leksell Gamma Knife®, and the GammaPod. Leksell Gamma Knife® is used for the non-invasive treatment of complex brain cancers, and delivers a single, high dose of radiation with a high degree of accuracy. This technology, which is growing in popularity, is used in over 360 hospitals worldwide, including three in Canada. Medical-grade cobalt-60 can also be used for the treatment of breast cancer through the GammaPod, a treatment which offers shorter treatment plans with high efficiency.

Decades of Partnership

Bruce Power has a long-standing partnership to supply cobalt-60 to Ottawa-based Nordion, a leading provider worldwide of medical isotopes and gamma irradiation technologies used for the prevention, diagnosis and treatment of disease and infection. Nordion supplies cobalt-60 products to more than 40 countries around the world, and is committed to safeguarding global health care.



Gamma Knife® Radiosurgery

Leksell Gamma Knife® radiosurgery is a type of radiation therapy used to treat tumours and other abnormalities in the brain.

In Gamma Knife® radiosurgery, specialized equipment focuses close to 200 tiny beams of radiation on a tumour or other target. Although each beam has very little effect on the healthy tissue it passes through, a strong dose of radiation is delivered to the site where all the beams meet.

The precision of Gamma Knife® radiosurgery results in minimal damage to healthy tissues surrounding the target. In some cases, radiosurgery may have a lower risk of side effects compared with other types of radiation therapy. Radiosurgery is usually a one-time therapy completed in a single day.

Skutterudite



Cobalt-60 production process

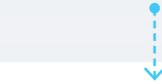
Cobalt-59 adjustor rods are irradiated for up to 24 months, when the resulting cobalt-60 can be harvested during planned reactor outages.



Manufacturer
Plant manufactures cobalt-59 pellets and slugs



Manufacturer
Plant inserts pellets and slugs into adjusters, which are delivered to reactors.



Nuclear Reactors
Adjusters are installed in the reactor core where cobalt-59 is irradiated to become cobalt-60.

During a planned maintenance outage, it is harvested and stored in the secondary fuel bay (right).

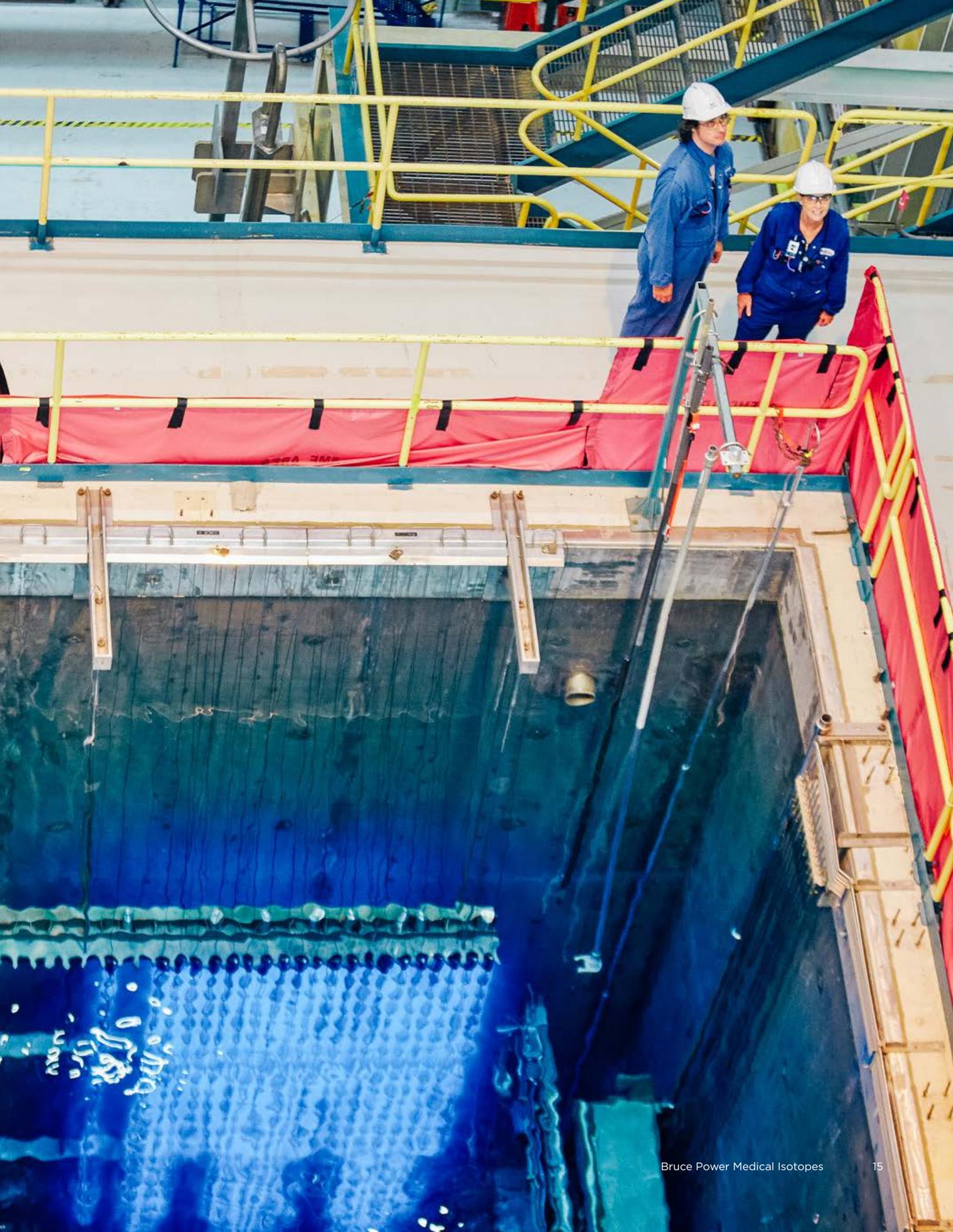


The cobalt-60 is removed from the fuel bay and shipped to the processing facility.



Isotope Processors
At the facility, the cobalt-60 is processed into sources for industrial or medical use.

Global Distribution
The sources are shipped globally.





Lutetium-177

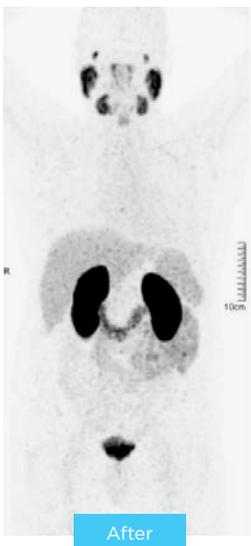
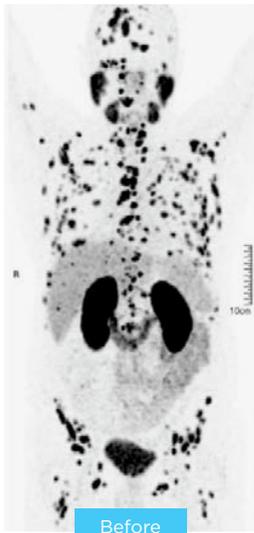
Bruce Power is the first commercial nuclear power reactor in the world to produce lutetium-177, a short-lived medical isotope, using a first-of-a-kind Isotope Production System (IPS).

Lutetium-177 produced at Bruce Power is used in precision oncology for targeted therapy of prostate cancer. Lutetium-177 treatments are designed to deploy nuclear medicine that precisely targets malignant cells while sparing surrounding healthy tissues.

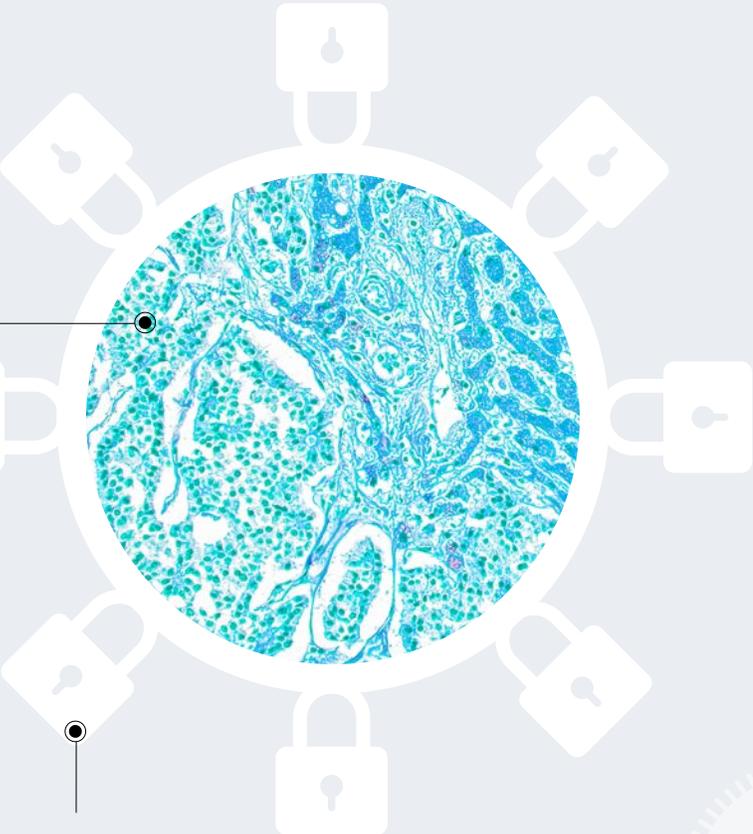
Bruce Power's lutetium-177 is sent to ITM Isotope Technologies Munich SE (ITM) in Germany for processing to yield high-quality, pharmaceutical-grade no-carrier-added lutetium-177 (n.c.a. lutetium-177). ITM is a supplier of n.c.a. lutetium-177 to health care facilities around the world, and the isotope has been successfully used in various clinical and commercial radiopharmaceutical cancer treatments.

This advancement in isotope production further cements Bruce Power as a worldwide leader in the production of medical isotopes, and matures Canada's status as a leader among the international medical isotope community.

Lutetium-177 has unique properties which make it increasingly popular in nuclear medicine for therapeutic cancer treatments. Lutetium-177 emits sufficient gamma radiation for imaging, while its beta radiation allows for the therapeutic treatment of tumours. Lutetium-177 is combined with a targeting molecule that delivers the radiation to biomarkers given off by a tumour. This offers more precise radiation and preserves more healthy tissues when compared to chemotherapy or conventional radiation. This can help reduce the severity of side effects.



Cancer treatment with lutetium-177²



Cancer cell



Tumour-specific receptor

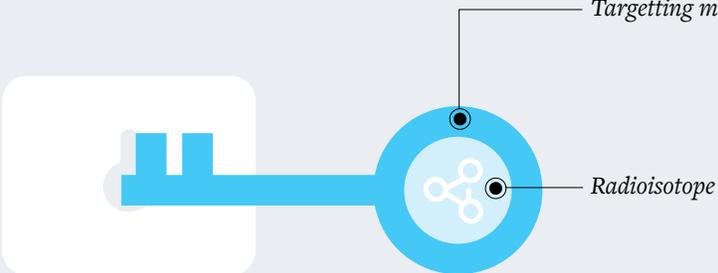
Theranostics

Some cancer cells have unique “locks” on their surface — proteins that set them apart from healthy cells.

Scientists design special “keys” — molecules that fit only those cancer “locks.”

These keys carry powerful medicine to the cells — destroying them from within.

Because of this precision, healthy tissue is largely spared.

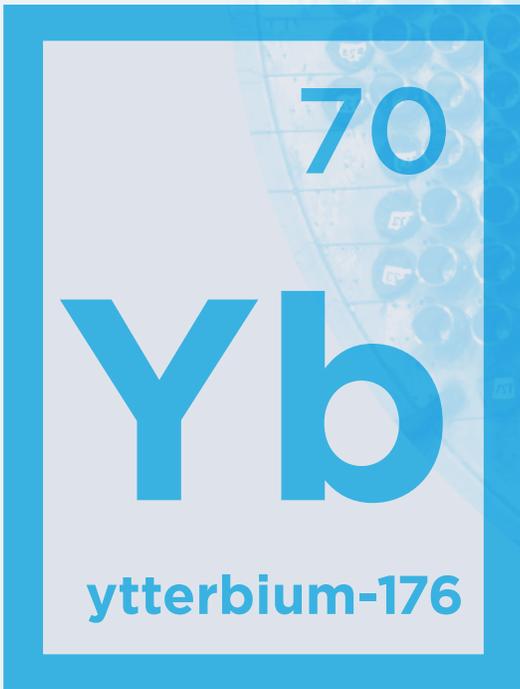


Targetting molecule

Radioisotope

Lutetium-177 production process

In Bruce Power's Unit 7, ytterbium-176 is irradiated in the Isotope Production System, becoming lutetium-177. Targets are inserted and harvested while the unit remains online.



Germany-based ITM sends ampules of ytterbium-176 to Isogen

The targets are loaded into the nuclear core and irradiated to lutetium-177

Isogen encases ampules in target carriers, which are shipped to Bruce Power

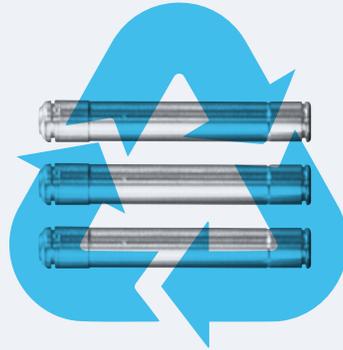
Targets are extracted from the core and packaged for transportation



Actual size



Remaining
ytterbium-176 that can
be recovered is recycled
for use in subsequent
irradiation



Packages are
transported
to ITM in
Germany for
processing



Pharmaceutical-grade
lutetium-177 is shipped
to customers across the
world to treat patients

ITM processes
targets into
highly pure,
pharmaceutical-
grade, no-
carrier-added
lutetium-177





Isotope Production System

The installation of a groundbreaking Isotope Production System (IPS) was completed at Bruce Power in 2022, and commercial production of lutetium-177 began later that year, making Unit 7 the first commercial power reactor in the world capable of producing short-lived medical isotopes.

Commercial production of lutetium-177 is the culmination of a multi-year project among a dynamic, international partnership which began in 2019.

As demand for lutetium-177 grows, Bruce Power continues to take steps to increase the production capabilities of the IPS. In 2024, a second production line was added to the IPS in Unit 7, effectively doubling its capacity to produce lutetium-177.

In 2025, Hon. Timothy Hodgson, Minister of Energy and Natural Resources, announced plans to expand a new Isotope Production

System (IPS) to Unit 6, with commissioning targeted for 2027.

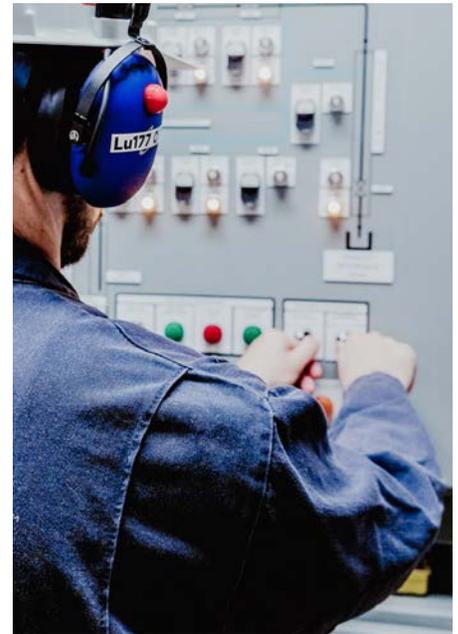
The IPS is a game-changer in the global medical isotope supply chain, providing unprecedented capacity for isotope production within existing Bruce Power nuclear infrastructure. Historically, most medical isotopes are produced in smaller research reactors with non-continual operation. Bruce Power's continual operations 24 hours a day, seven days a week offers unmatched production capacity, reliability and scaling potential for isotopes compared to traditional research reactors.

Meet the team

It takes a dedicated team to turn nuclear fission into better cancer care and stronger communities. Isotope supporters and supply chain partners include:

IsoGen, a joint venture between Kinectrics and Framatome, which designed, manufactured, and installed the Isotope Production System at Bruce Power and supports ongoing lutetium-177 production before and after irradiation.

ITM, headquartered in Germany, ITM produces high-quality radiopharmaceutical isotopes such as no-carrier-added lutetium-177 by irradiating ytterbium-176. ITM distributes



its products globally and recycles target materials like ytterbium-176 for reuse in future production cycles.

Nordion, a Canadian company that uses harvested cobalt-60 to sterilize single-use medical equipment — such as surgical masks, gowns, syringes, and gloves — and supplies medical-grade cobalt-60 for cancer treatment through radiation therapy.

The Government of Canada, which provided Strategic Innovation Fund support in 2023 to enable SON's investment.



Canadian leadership in the global isotope sector

Advancements in research and cancer treatments have led to a surge in global demand for medical isotopes, the market for which is expected to grow to between \$14 billion and \$33 billion US by 2031. For the Canadian isotope sector to maintain its leadership position, and take advantage of this growth, it can only do so with the right policy, financial, logistical and infrastructure supports.

Bruce Power plays an active role in the Canadian Nuclear Isotope Council, Nuclear Isotope Innovation Council of Ontario and the Southwestern Ontario Isotope Coalition, which aim to advance each region's leading role in the global medical isotope sector.

Canadian Nuclear Isotope Council

The Canadian Nuclear Isotope Council (CNIC) is a not-for-profit organization consisting of representatives from various levels within

the Canadian health sector, nuclear industry and research bodies, convened specifically to advocate for our country's role in the production of the world's isotope supply.

A secure supply of a diverse portfolio of isotopes is essential to maintaining and improving our standard of living. Isotopes are used every day to verify the safety of our roadways, discover and develop natural resources, test industrial products, and support research in mental health and aging.

Isotopes are critical in the health care sector, where they are used to diagnose and treat diseases and sterilize medical supplies.

The CNIC serves as a voice in safeguarding the continued availability of isotopes, ensuring our public policies are risk-informed and science-based, and support the highest levels of public health and safety. Leveraging existing infrastructure and expertise will have a significant positive impact on human health across the globe, keeping hospitals clean and safe while expanding Canada’s leadership role in the global community by supporting new and innovative treatments.

Nuclear Isotope Innovation Council of Ontario

On July 30, 2025, at Sunnybrook Hospital in Toronto, Hon. Stephen Lecce, Minister of Energy and Mines, announced the formation of the Nuclear Isotope Innovation Council of Ontario (NIICO), surrounded by health-care professionals who have seen the amazing benefits of medical isotopes for cancer treatments.

James Scongack, Bruce Power Chief Operating Officer and Executive Vice-President, was named Chair of the

council, which aims to make Ontario and Canada a global isotope superpower.

Southwestern Ontario Isotope Coalition

Ontario is an important piece of Canada’s broader isotope ecosystem, with Southwestern Ontario playing a key role with large-scale isotope production at Bruce Power, and a network of companies and organizations supporting the isotope sector in the region.

Formed in 2023, the Southwestern Ontario Isotope Coalition (SOIC) is a partnership between regional leaders, including the City of Owen Sound and the Nuclear Innovation Institute (NII), in collaboration with the CNIC.

Through its activities, the Coalition aims to unite southwestern Ontario’s isotope community and foster future opportunities to leverage the region’s many strengths. To achieve this, the Coalition will develop a strategic plan to support expansion in the region, increase local awareness of Southwestern Ontario’s role in Canada’s isotope ecosystem, facilitate future public and private investment, and explore ways to grow the region’s role in the global supply.

Regional Collaborative Partners of the Southwestern Ontario Isotope Coalition





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- 1 Reference: World Nuclear Association <https://world-nuclear.org/information-library/non-power-nuclear-applications/radioisotopes-research/radioisotopes-in-medicine>



- 2 How clinical imaging can assess cancer biology https://www.researchgate.net/figure/Theranostic-in-oncology-with-PSMA-177-Lu-PSMA-radioligand-therapy-in-a-67-year-old-man_fig6_331518755





Things you'll use. Periodically.



With every Elements item purchased, \$1 will go to both the Pediatric Oncology Group of Ontario and Brain Tumour Foundation of Canada to support their important work.

Support Saugeen Ojibway Nation community initiatives with the purchase of Gamzook'aamin aakoziwin items.



Each piece features artwork representing people from all directions coming together to "fight cancer together". This design was created by artist Emily Kewageshig.



[Visit isotopem merch.com to purchase.](http://isotopem merch.com)



Gamzook'aamin aakoziwin
FIGHTING CANCER TOGETHER



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INSTAGRAM



LINKEDIN

Scan the QR codes to follow our journey on social. Learn more at fightingcancertogether.ca



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