

PARLIAMENT QUESTION: NATIONAL NUCLEAR MEDICINE EXPANSION PROGRAMME

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Bhabha Atomic Research Centre (BARC), a Research & Development (R&D) unit of Department of Atomic Energy (DAE) is contributing in the field of nuclear medicine through its clinical patient services units at Radiation Medicine Centre (RMC), Mumbai and Radiation Medicine Research Centre (RMRC), Kolkata for diagnostic and therapeutic services for cancer treatment.

At Variable Energy Cyclotron Centre (VECC), a R&D Unit of DAE, the 30 MeV medical cyclotron is operated for commercial production of radioisotopes/ radiopharmaceuticals for cancer diagnostics. The radioisotopes / radiopharmaceuticals, produced at the Medical Cyclotron Facility of VECC, are being delivered on regular basis to various hospitals/ Nuclear Medicine Centres.

Tata Memorial Centre (TMC), an Aided Institute under the administrative control of the DAE has established following diagnostic and therapeutic services by utilizing nuclear techniques in the fight against cancer:

1. Gamma Camera and its associated radiopharmacy lab:

This Unit is equipped to perform multiple types of functional imaging helping with cancer staging with scans such as ^{99m}Tc PSMA (Prostate-specific Membrane Antigen) etc. other imaging services help with assessing the function such as Multigated Acquisition (MUGA) imaging to assess cardiac function etc.

2. Positron Emission Tomography-Computed Tomography (PETCT) and its radiopharmacy lab:

This Unit primarily works for cancer staging, most commonly used radioactive pharmaceutical is ^{18}F FDG (Fluorodeoxyglucose) which is used in majority of cancers for staging such as for evaluation of carcinoma lung, carcinoma oesophagus, breast cancer, lymphoma, etc.

Radioactive Pharmaceuticals such as Ga^{68} DOTANOC, Ga^{68} FAPI - Fibroblast Activation Protein Inhibitor (all prepared and quality checked in house) are utilized for evaluation of various cancers [such as prostate cancer, Neuroendocrine Tumors, Mucinous and Signet Gastro intestinal (GI) cancers etc.]

3. High dose Radionuclide therapy ward and its radiopharmacy lab:

6 bedded high dose therapy ward has been designed as per Atomic Energy Regulatory Board (AERB) guidelines with appropriate layout and provision of a delay tank to contain radioactive sewage for proper disposal of contaminated patient sewage.

Iodine-131 (I-131) is utilized for treatment of thyroid cancer, Lutetium-177 (Lu-177) PSMA and Lu-177 DOTANOC for management of prostate cancer, neuroendocrine cancer and other Somatostatin Receptor (SSTR) expressing malignancies.

TMC also works on project conception, development of product for known medical and healthcare uses. After development by the laboratory, testing and solutions for errors and noncompliance are addressed till the first version is built. It is put to field use and tested and subsequent versions are developed.

Example:

- Development of medical devices like 90Y Bhabhspheres for Trans arterial radio embolization: conceived, developed and tested and upgraded by Bhabha Atomic Research Centre/Board of Radiation & Isotope Technology (BARC/BRIT) & TMC.
- Development of Blood Irradiator.
- Development of Bhabhatron.
- Development of Radio protectors by BARC, and testing and Drugs Controller General of India (DCGI) approval done by TMC.

Currently radioisotopes are produced through research reactors and cyclotrons. Radioisotopes like Ruthenium-106, Caesium-137, and Strontium-90 milked into Yttrium-90 are recovered through reprocessing of High-Level Liquid Waste (HLLW). A dedicated Isotope Production Reactor (IPR) is being constructed for enhancing domestic production of medical isotopes. The reactor is proposed to be established at BARC, Visakhapatnam. Operationalisation of IPR can make India self-reliant in the field of radioisotopes. BARC also regularly produces radioisotopes and radiopharmaceuticals and supplies them through BRIT to nuclear medicine centres across India, thereby supporting timely availability for diagnostic and therapeutic applications.

DAE is strengthening capacity-building in nuclear medicine through specialised training programmes. BARC conducts programmes such as Doctor of Medicine in Nuclear Medicine, Master of Science in Nuclear Medicine & Molecular Imaging Technology (NM&MIT), Master of Science in Nuclear Medicine Technology & Hospital Radio-Pharmacy (NMT&HRP), and Diploma in Radiological Physics (DipRP). Doctors and technologists trained through these courses are employed in nuclear medicine centres in India. These initiatives support the availability of trained manpower for the growing use of radioisotopes and radiopharmaceuticals in nuclear medicine and cancer care.

TMC has been conducting the following courses to strengthen training and capacity building in the field of Nuclear Medicine

Doctor of Medicine (MD) Nuclear Medicine – 3 year course Nuclear Theranotics – 2 years fellowship

Masters in Science (M.Sc) – Nuclear Medicine and Molecular Imaging Technology (NMMIT) – 2 years

At present no such proposal is received in the Department of Atomic Energy (DAE).

This information was given by Union Minister of State for Prime Minister's office and Personnel, Public Grievances and Pensions, Atomic Energy and Space, Dr. Jitendra Singh, in a written reply in the Lok Sabha today.

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