# Practical Consideration Regarding Stability of F-18 2-Deoxy-2-[$^{18}$F] Fluoro-D-Glucose, Procured from a Distant Commercial Production Site

Sir,

F-18 2-deoxy-2-[$^{18}$F] fluoro-D-glucose (F-18 FDG) is the most widely used positron emission tomography (PET) radiopharmaceutical.[1,2] Due to rapidly increasing PET scanners' installation and hence demand of F-18 FDG, large-scale commercial production of F-18 FDG has grown considerably. Synthesis of F-18 FDG on large scale for commercial supply poses challenges to the radiochemist, especially in terms of stability of the radiopharmaceutical. According to literature, the shelf-life of F-18 FDG is 8 h, but at higher radioactive concentrations, radiochemical stability of F-18 FDG is reported to decrease significantly with time.[3,4] Hereby, we share the practical experience regarding stability issues of F-18 FDG when the production facility is situated at long distances from the end users.

Due to ongoing upgradation of medical cyclotron facility at our center, commercially synthesized F-18 FDG was procured for continuity of patient services. The PET scans performed with commercially procured F-18 FDG showed increased tracer uptake in the skeleton and degenerative processes including osteophytes. The logistics of supply were reviewed, and samples were subjected to radiochemical purity testing to look for free F-18. The radioactive fluorine (F-18) was produced using $^{18}$O (p, n) $^{18}$F reaction, and F-18 FDG was synthesized in an automated synthesis module. A total of 2400 mCi of F-18 FDG in 6 ml was dispatched for supply via road transport to a distance of approximately 300 km. There was a gap of 6 h between the end of synthesis till first dose administration. The radiochemical purity at the time of dispatch in all batches was >99%. However, at user end, the radiochemical purity was observed to be suboptimal and decreased with time leading to increased free F-18 content. For preparation with <90% radiochemical purity, purification was done using solid-phase extraction-based alumina cartridge (Waters, USA) shown in Figure 1. The difference in the radiochemical purity is also appreciable from the biodistribution of F-18 FDG (supplied by the commercial supplier) and repurified F-18 FDG in a patient [Figure 2]. Measures to increase the shelf life of commercially available F-18 FDG are required, considering the time lag between production and tracer administration. Quality control should be done if any alteration in radiotracer distribution is suspected.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

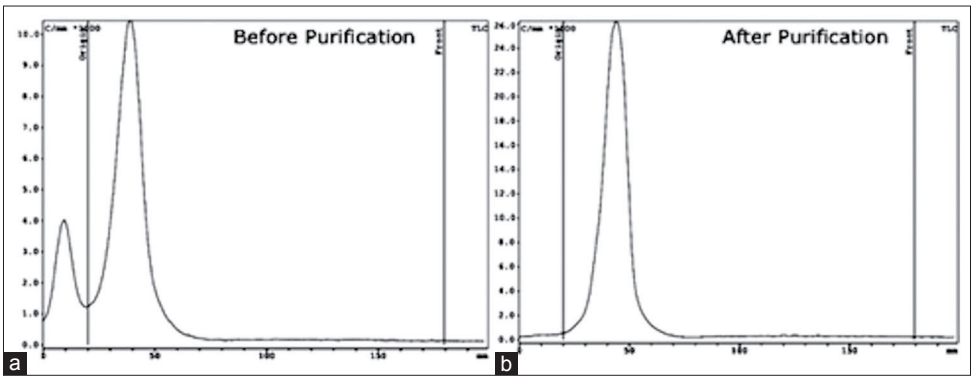


**Figure 1: Instant thin layer chromatography (ITLC) chromatogram of F-18 2-deoxy-2-[$^{18}$F] fluoro-D-glucose using 95% acetonitrile (ACN) as mobile phase (a) before purification showing two peaks (F-18 $R_f$ 0 and F-18 FDG $R_f$ 0.4) and (b) after purification with alumina column showing single peak of F-18 2-deoxy-2-[$^{18}$F] fluoro-D-glucose**

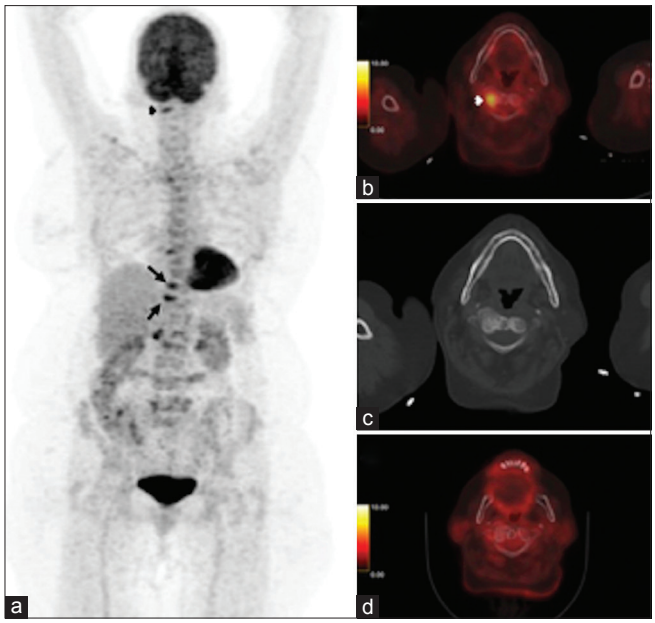


**Figure 2: A 66-year-old female diagnosed with ovarian carcinoma underwent F-18 2-deoxy-2-[$^{18}$F] fluoro-D-glucose positron emission tomography/computed tomography post neoadjuvant chemotherapy and surgery for response evaluation. Increased tracer uptake was noted in multiple osteophytes (arrow) and right atlantoaxial joint (arrowhead) on maximum intensity projection image (MIP) (a) and axial positron emission tomography/computed tomography (b) image with degenerative changes and osteophyte noted on corresponding CT image (c). Due to high tracer uptake in osteophytes which is not commonly seen with F-18 2-deoxy-2-[$^{18}$F] fluoro-D-glucose, possibility of free F-18 was considered and regional images of neck were repeated using purified F-18 2-deoxy-2-[$^{18}$F] fluoro-D-glucose which revealed no 2-deoxy-2-[$^{18}$F] fluoro-D-glucose uptake in right atlantoaxial joint region (d) denoting absence of disease activity**

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