

عنوان مقاله:

On the Optimization of the Protocol for Automated Radiosyntheses of $[^{68}\text{Ga}]\text{Ga-Pentixafor}$, $[^{68}\text{Ga}]\text{Ga-FAPI-}\epsilon$ and $[^{68}\text{Ga}]\text{Ga-DOTATATE}$ in a Modular-Lab Standard

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خلاصه مقاله:

Objective: The present work describes the automated radiochemical syntheses of different PET tracers like $[^{68}\text{Ga}]\text{Ga-Pentixafor}$, $[^{68}\text{Ga}]\text{Ga-FAPI-}\epsilon$ and $[^{68}\text{Ga}]\text{Ga-DOTATATE}$ using optimized single protocol in the non-cassette based Eckert & Ziegler (EZ) Modular Lab (fixed tubing system) without any modification in the inbuilt human machine interface (HMI) software. Recently, PET agents viz. $[^{68}\text{Ga}]\text{Ga-Pentixafor}$ and $[^{68}\text{Ga}]\text{Ga-FAPI-}\epsilon$ are gaining prominence for the diagnosis of overexpressed Chemokine Receptor- ϵ (CXCR ϵ) and Fibroblast Activation Protein (FAP) receptor, respectively, in the microenvironment of numerous cancer types. The promising results observed with the clinical usage of $[^{68}\text{Ga}]\text{Ga-DOTATATE}$ produced using the automated protocol, provided impetus for the clinical translation of $[^{68}\text{Ga}]\text{Ga-Pentixafor}$ and $[^{68}\text{Ga}]\text{Ga-FAPI-}\epsilon$ using the in-house developed automated radiolabeling protocol. **Methods:** Herein we report a single radiolabeling protocol for the automated preparation of $[^{68}\text{Ga}]\text{Ga-Pentixafor}$ and $[^{68}\text{Ga}]\text{Ga-FAPI-}\epsilon$ in the non-cassette based EZ Modular-Lab Standard radiochemistry module, without any changes in schematic, graphical user interface (GUI) software and time list, from that used for routine production of $[^{68}\text{Ga}]\text{Ga-DOTATATE}$ in our centre, since 2015. Physico-chemical quality control and in-vitro stability analyses were carried out using radio-TLC and radio-HPLC. **Results:** The automated protocol yielded reliable and consistent non-decay corrected (ndc) radiochemical yield (RCY) of $(84.4 \pm 0.9)\%$ and $(85.5 \pm 1.4)\%$ respectively, for $[^{68}\text{Ga}]\text{Ga-Pentixafor}$ and $[^{68}\text{Ga}]\text{Ga-FAPI-}\epsilon$, with RCP > 98%, which are comparable to the RCY of $(84.4 \pm 1.2)\%$ and RCP $(99.1 \pm 0.3)\%$ for $[^{68}\text{Ga}]\text{Ga-DOTATATE}$. The biological quality control studies confirmed the formulations to be of ready-to-use pharmaceutical grade. **Conclusion:** The consistent and reliable RCY and RCP of multiple ^{68}Ga -labeled PET tracers by single optimized automated radiochemistry protocol exhibits the versatility of the EZ Modular Lab

کلمات کلیدی:

$[^{68}\text{Ga}]\text{Ga-Pentixafor}$, $[^{68}\text{Ga}]\text{Ga-FAPI-}\epsilon$, $[^{68}\text{Ga}]\text{Ga-DOTATATE}$, Modular-Lab Standard, PET/CT

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