Contribution ID: **1010** Type: **Verbal**

Production of cyclotron-based Gallium-68 radioisotope and related radiopharmaceuticals

Tuesday, 17 May 2022 09:10 (20 minutes)

Radioisotope 68Ga is used for radiopharmaceuticals synthesis word wide and its application is increasing every year. 68Ge/68Ga generator are the main source of 68Ga for radiolabeled radiopharmaceuticals products such as 68Ga-DOTATOC and 68Ga-PSMA. The price of the generator is quite expensive and due to decaying of 68Ge it is necessary to buy a new one nearly every half year. Another limitation of the all available on market generator is its maximum produced activity up to 50 mCi (1.85 GBq). Half-life of 68Ge is 271 days it means that after half year is as little as 1.15 GBq. The yield of 68Ga elution and radiolabeling could be between 80-50 % and for PET examination is necessary about 150-300 MBq radioactivity. Production of 68Ga using cyclotron from enriched 68Zn using 68Zn(p,n)68Ga reaction can be easily prepare with activity as much as 10-100 GBq suitable for radiolabeling. There are two possible way of production 68Ga from point of targetry –from solid target, where the layer of 68Zn could be prepared by pressing of Zink powder or by electrodeposition. The second possibility is liquid target, where the 68Zn is dissolved in nitric acid. Anyway, many technical details have to be solved. The choice of proper proton energy, solid target preparation with suitable amount of zinc used to get proper thickness for proton absorption, dissolution of solid target, optimal concentration of 68Zn in nitric acid solution, separation chemical procedure for zinc removal with high efficiency (Zn decreasing concentration more than several thousand times). Besides of chemical separation processes in which specific sorbents are used and high concentration of hydrochloric acidic solutions. On the other side there is a problem with high acidic solutions for radiolabeling. The main cycle for 68Ga preparation, target preparation, proton irradiation of enriched 68Zn, dissolution, separation and labeling procedure for following radiopharmaceuticals –68Ga-DOTATOC, 68Ga-DOTANOC and 68Ga-PSMA11 will be presented.

Primary author: Prof. RAJEC, Pavol (BIONT a.s. Bratislava, Slovakia)

Co-authors: Mr LEPORIS, Marek (BIONT a.s., Bratislava); Mr SZÖLLŐS, Ondrej (BIONT a.s., Bratislava); Ms BRISUDOVÁ, Simona (BIONT a.s., Bratislava); Mr ONDREJKOVIČ, Rastislav (BIONT a.s., Bratislava); Mr KASSAI, Zoltán (BIONT a.s., Bratislava); Mr TARANDA, Miroslav (BIONT a.s., Bratislava)

Presenter: Prof. RAJEC, Pavol (BIONT a.s. Bratislava, Slovakia)

Session Classification: Radiopharmaceuticals

Track Classification: Radiopharmaceutical Chemistry, Labelled Compounds