
Activity report TAT-12 conference – Matthijs Sevenois

The TAT-12 conference has been a real eye opener, meeting people from different backgrounds, all devoted to targeted alpha therapy (TAT). All sessions were attended from which some key insights were gained, from which the most important are listed.

First, the importance of voxel dosimetry was highlighted. The concept of mean absorbed dose needs to be carefully interpreted and it is of best interest to image the possible heterogeneous distribution of the radiopharmaceutical compound in different organs to be able to link to biological effects. Autoradiography will prove to be an important feature in our current project, not only to visualize the ^{211}At distribution, but to possibly link dose-effect of potential free circulating ^{210}Po contaminant as a consequence of administered ^{210}At . Furthermore, a comprehensive key note presentation was given by prof. dr. George Sgouros, highlighting the dosimetry of α -emitter radiopharmaceutical therapy: Identifying challenges, proposing solutions. Impressively, new results have been shown in which improved reconstruction algorithms are able to image alpha emitting radionuclides such as ^{225}Ac , implemented by prof. dr. Eric Frey, 'leaving no photon behind'. Interestingly, the way forward for α -RPT involves not only the implementation of quantitative SPECT, but also in the incorporation of gamma H2AX as a biomarker for patient-specific RBE. Prof. G. Sgouros presented a 2-step protocol for α -RPT in which after a first fixed activity (in case of ^{225}Ac) quantitative SPECT/CT and peripheral blood mononuclear cells (PBMC) gamma H2AX are evaluated to optimize the second administration of activity. This sparked my interest to get more acquainted with gamma H2AX in combination with quantitative imaging, to research whether this could also be implemented in the current project at the VUB. The clinical potential of ^{211}At was also highlighted: Japan exhibits a strong ^{211}At network enabling the initiation of clinical trials have started with [^{211}At]NaAt to treat thyroid cancer. Lastly, dr. Richard Zimmerman, proposed to bet on short half-life radionuclides including ^{212}Pb and ^{211}At rather than longer lived radionuclides and to think carefully about environmental issues and future concern for authorities which has a strong direct link to the current RASTA project initiated at the VUB, highlighting its relevance.

In between each session, the poster sessions were held in which interesting discussions were held from which the most notable are listed below:

- In-depth discussions with prof. dr. Stig Palm and prof. dr. Tom Bäck (University of Gothenburg). The different challenges of working with ^{211}At were highlighted ranging from the ^{210}Po challenge to accurately performing dosimetry in a preclinical setting, keeping in mind the ingrowth of ^{207}Bi component which will influence the measurement by well-counter. In addition, traceability and activity measurements including autoradiography were discussed.
- Interest was also shown by the industry: Ionetix, which focusses on the production of ^{225}Ac and ^{211}At . During the discussions, I highlighted the importance of the direct component of ^{210}Po and potential environmental/waste issues.
- Interesting ideas were also exchanged with Dr. Steffen Happel, the R&D and business development director, who is currently working on radiochemical separation

of ^{211}At by extraction chromatography. The importance of effectively separating the produced ^{210}Po was highlighted.

In conclusion, this conference has broadened my current view on TAT, from which the current RASTA project will benefit. Furthermore, contacts were exchanged with experts in the field and awareness about ^{210}Po was created during the different discussions.