

Report from the 1st World Congress on Gallium-68 and Peptide Receptor Radio Nuclide Therapy (PRRNT), Bad Berka (Germany), June 23–26, 2011

The first World Congress on Gallium-68 and Peptide Receptor Radio Nuclide Therapy (PRRNT) took place on 23–26 June 2011 in Bad Berka, Germany. The main aim of this international conference was the presentation of the new concept called “theranostic”, a new idea of using modern radiopharmaceuticals for diagnosis and therapy based on molecular targeting.

Over 350 participants from over 50 countries attended the meeting. During four days of scientific sessions chemists, physicians, and investigators dealt with PET radiochemistry, new isotope production technologies, mainly 68-Ga generators, molecular imaging, and radionuclide therapies. The participants had the possibility to get a fascinating insight into research on the newest concepts, in particular: Ge-68/Ga-68 generators, new Ga-68-labelled peptic tracers, Lu-177 and Y-90 production chemistry and pre-clinical evaluation, and PRRNT European and worldwide experiences. Many speakers emphasized that a new era of nuclear medicine imaging is coming. Firstly, developing and improving Ge-68/Ga-68 generators will give PET centres independence from cyclotron isotope production. Secondly, fusion of Ga-68 with targeting vectors by dedicated chelators will enable imaging of cell processes like apoptosis, carcinogenesis, peptide uptake, and inflammation in the earliest stages and in the most specific way. Many presentations were devoted to these topics. The group from Belgium presented site-specific Ga-68-labelled annexin-V and evaluated its suitability for apoptosis imaging. The Australians explored the ability of Ga-68 citrate ga-68 apo-transferring to detect infection of *Staphylococcus Aureus*. Cathy Cutler presented the efforts on developing site-directed imaging agents using peptide vectors and nanoparticles. Jae Min Jeong gave the idea of cancer hypoxia imaging with Ga-68-labelled nitroimidazole derivatives which demonstrated high affinity and selectivity for receptors overexpressed by a variety of human cancers such as breast, lung, pancreatic, and prostate. An excellent lecture was given by Helmut Maecke about Ga-68-labelled peptides targeting G-protein Coupled Receptors with the sur-

prising conclusion that antagonistic peptides may be superior to agonists.

Two sessions were devoted to Ga-68 imaging and clinical practice. Presenting worldwide experiences gave an opportunity to review the status of PET Ga-68 imaging in Europe, Latin and North America, India, Mexico, and Rest of the world. Future directions of PET/MR imaging were shown with the example of meningioma imaging. Other interesting PET studies revealed new advantages of Ga-68-labelled tracers in such studies as ventilation/perfusion lung scan, PET/CT guided biopsy, or beta-cell activity imaged by Ga-68-labelled exendin-4 in patients with diabetes mellitus. A novel Ga-68-labelled pteric acid-based PET tracer for imaging via the folate receptor was presented as an ideal target for oncological imaging. The molecule is highly overexpressed by several cancer forms such as ovary, cervix, endometrium, lung, kidney, and breast.

Imaging and radionuclide therapy of neuroendocrine tumours (NET) was one of the most important sessions. As Wolfram H. Knapp, President of EANM, said in his invitation speech, PRRNT is an excellent example of the theranostic idea coming to life and he is convinced it will spread to other diseases. He emphasized that there is a deep need of PRRNT standardisation, dosimetry improvement, and confirmation of effectiveness of radionuclide therapies by providing randomized multidisciplinary phase III clinical trials. It is obligatory for establishing the proper place of PRRNT among new upcoming “conventional” targeted therapies.

Sharing European experiences with a round table discussion was the most interactive session of the Congress. We are very pleased to note that Poland plays an important role on the map of the countries providing PRRNT. Jolanta Kunikowska from Warsaw Medical University presented Polish experiences in NET radionuclide therapy on behalf of the Polish Nuclear Medicine Society. She summarized data from ten Polish centres providing this procedure. The first PRRNT in a patient with a neuroendocrine tumour was performed in the Nuclear Medicine Department of Warsaw Medical University in April 2004. About 1200 therapies of DOTATATE-la-

belled with Y-90, Lu-177, and Y-90/Lu-177 were done and about 340 patients underwent PRRNT from that time. A group of 177 patients finalized Y-90 DOTATATE therapies with 17–44 months of PFS (Progression Free Survival) and 22–34 months of OS (Overall Survival), and a group of 44 patients had been given Y-90/Lu-177 therapy with 24–28 months of PFS and 50–53 months of OS. The protocol of usage of TANDEM of Y-90/Lu-177 isotopes was presented in the second J. Kunkowska paper showing a strong positive effect of such a kind of PRRNT in patients with disseminated NET. Two other Polish oral presentations were given. Anna Sowa-Staszczak from Jagiellonian University presented the possibility of neoadjuvant usage of PRRNT in treatment of patients with inoperable NET. Y-90-DOTATATE therapy enabled surgery in 6 of 47 patients with large tumours. Jarosław Ćwikła from Warsaw presented his experience in intra-arterial Y-90-DOTATATE injections in patients with clinical or radiological progression of NET.

A total of 61 papers were presented during poster sessions, with a few Polish ones. The Polish Institute of Atomic Energy

POLATOM showed a very efficient and easy to adopt method of post-elution concentration and acidity reduction of eluate obtained from SnO₂-based Ge-68/Ga-68 generator. J. Kunikowska showed the superiority of Ga-68-DOTATATE PET scans over Tc99m-Tectrotide SPECT visualization of metastatic foci lower than 12 mm in patients with disseminated NET.

There is no doubt that the First World Congress on Ga-68 and Peptide Receptor Radionuclide Therapy was a historical event and in the nearest future the “theranostic” idea will spread from NET by oncological to all fields of medicine. There were 5 cyclotrons with 7 PET centres in 1988, 13 cyclotrons and 31 PET centres in 1998, and 40 cyclotrons with 110 PET centres in 2008 in Germany. The Ga-68 PET scan became the “gold standard” in NET diagnosis and is the base for proper treatment of patients with this disease. There are two cyclotrons and about 15 diagnostic PET centres in Poland now.

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