Contribution ID: **239** Type: **Invited Lecture**

INVITED LECTURE - Radiochemistry of Astatine-211: Application to Alpha Particle Targeted Radiotherapeutics

Monday 17 September 2012 15:20 (20 minutes)

The heavy halogen 211At, first proposed for use in α-particle targeted radiotherapy more than 30 years ago, continues to be one of the most promising radionuclides for this purpose. Its 7.2-h half life provides some flexibility with regard to the range of molecular carriers with compatible pharmacokinetics including antibody fragments, peptides, affibodies and organic molecules. Its diverse chemistry, possessing both halogen and metallic characteristics has permitted its incorporation into a wide array of targeting vehicles. Most strategies have relied on its chemical similarity to iodine to provide a useful point of departure, with astatodemetallation reactions being a notable example. However, the relatively low carbon-astatine bond strength is challenging, and has lead to the exploration of alternative approaches including those involving higher oxidation states of astatine, complex formation and the labelling of boron clusters. Another important issue from a radiochemistry perspective is the need to compensate for radiolysis-mediated effects including destruction of reactants, reaction with solvent, and alteration in astatine oxidation state, that can occur at the activity levels required for targeted radiotherapy in patients. For protein-based targeting vehicles, specific activity also can be a critical particularly in situations where the average number of receptors per tumor cell is relatively low and heterogeneous dose deposition can be problematic. Finally, if 211At-labeled radiopharmaceuticals are to have a meaningful impact, the ability to produce clinically relevant levels of 211At that can be shipped to remote locations in chemically tractable form must be demonstrated. Hopefully, advances in the radiochemistry of 211At will facilitate the initiation of more clinical trials involving this promising α-particle emitting radionuclide. Our own efforts in that regard currently are directed at developing the methodologies required to initiate clinical evaluation of meta-[211At]astatobenzylguanidine and 211At-labeled trastuzumab in patients with neuroblastoma and breast cancer neoplastic meningitis, respectively.

Primary author: Prof. ZALUTSKY, Michael (Duke University, USA)

Co-author: Dr PRUSZYNSKI, Marek (Duke University)

Presenter: Prof. ZALUTSKY, Michael (Duke University, USA)

Session Classification: Session 2 (cn't of Session 1) - Radiopharmaceutical Chemistry (radiodiagnostics, radiotherapy, theragnostics)

Track Classification: Radiopharmaceutical chemistry, radiodiagnostics, radiotherapy, theragnostics