

# 9<sup>th</sup> Symposium on Targeted Alpha Therapy

*PAŁAC PRYMASOWSKI  
ul. Senatorska 13/15, Warsaw, Poland  
May 19-22, 2015*

## **Organizers:**

**Alfred Morgenstern**  
**Frank Bruchertseifer**  
European Commission  
Joint Research Centre  
Institute for Transuranium Elements  
Karlsruhe, Germany

**Leszek Krolicki**  
**Jolanta Kunikowska**  
Department of Nuclear Medicine  
Medical University Warsaw

**Jan Schöpflin**  
Eckert & Ziegler Eurotope GmbH  
Berlin, Germany

## **Scientific committee:**

Dr. Christos Apostolidis  
Dr. Frank Bruchertseifer,  
Prof. Frederik Giesel  
Dr. Clemens Kratochwil  
Prof. Leszek Krolicki  
Dr. Jolanta Kunikowska  
Dr. Saed Mirzadeh  
Dr. Alfred Morgenstern

European Commission, JRC-ITU  
European Commission, JRC-ITU  
University Hospital Heidelberg  
University Hospital Heidelberg  
Medical University Warsaw  
Medical University Warsaw  
Oak Ridge National Laboratory  
European Commission, JRC-ITU

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European Commission  
Joint Research Centre  
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Transuranium  
Elements



Medical University  
Warsaw



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Department of Energy  
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POLATOM



Program of the  
**9<sup>th</sup> Symposium on Targeted Alpha Therapy**

*PAŁAC PRYMASOWSKI*  
*ul. Senatorska 13/15, Warsaw, Poland*  
*May 19-22, 2015*

**Tuesday May 19, 2015**

18:00 – 22:00 WELCOME RECEPTION AND REGISTRATION  
*PAŁAC PRYMASOWSKI*

**Wednesday May 20, 2015**

8:30 – 8:45 WELCOME / INTRODUCTION  
**Leszek Krolicki**  
*Head of Department of Nuclear Medicine, Medical University  
Warsaw*  
**Jean-Paul Glatz**  
*Head of Department of Nuclear Chemistry  
European Commission, Joint Research Centre, Institute for  
Transuranium Elements*

SESSION Ia CLINICAL EXPERIENCES  
Moderator: Leszek Krolicki, Alfred Morgenstern

8:45 – 9:10 **Targeted alpha therapy of glioblastoma multiforme:  
clinical experience with <sup>213</sup>Bi-substance P**  
*L. Krolicki<sup>1</sup>, F. Bruchertseifer<sup>2</sup>, J. Kunikowska<sup>1</sup>, H. Koziara<sup>3</sup>, B.  
Królicki<sup>3</sup>, M. Jakuciński<sup>4</sup>, R. Boll<sup>5</sup>, K. Murphy<sup>5</sup>, C. Apostolidis<sup>2</sup>, A.  
Morgenstern<sup>2</sup>*  
<sup>1</sup> Department of Nuclear Medicine, Medical University of Warsaw,  
Warsaw, Poland; <sup>2</sup> European Commission, Joint Research Centre,  
Institute for Transuranium Elements, Karlsruhe, Germany; <sup>3</sup>  
Department of Neurosurgery, Institute of Psychiatry and Neurology,  
Warsaw, Poland; <sup>4</sup> Department of Nuclear Medicine, Brodnowski  
Hospital, Warsaw, Poland; <sup>5</sup> Oak Ridge National Laboratory, Oak  
Ridge, USA

- 9:10 – 9:35 **Targeted alpha-therapy of low-grade gliomas: long-term observation**  
*Adrian Merlo<sup>a\*</sup>, Dominik, Cordier<sup>a\*</sup>, Helmut Mäcke<sup>a&</sup>, Frank Bruchertseifer<sup>+</sup>, Alfred Morgenstern<sup>+</sup>, Leszek Krolicki<sup>&#</sup>*  
 Neurosurgery\* and Nuclear Medicine<sup>&</sup>, Universities of Basel<sup>a</sup> and Warsaw<sup>#</sup>, Switzerland and Poland, <sup>+</sup>European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany
- 9:35 – 10:00 **Clinical experience with intra-arterial <sup>213</sup>Bi-DOTATOC in patients with liver confined neuroendocrine tumors**  
<sup>1</sup>*F.L. Giesel, <sup>2</sup>M. Rius, <sup>2</sup>F. Bruchertseifer, <sup>2</sup>C. Apostolidis, <sup>2</sup>A. Morgenstern, <sup>1</sup>C. Kratochwil*  
<sup>1</sup>University Hospital Heidelberg, Dept. Nuclear Medicine, Heidelberg, Germany; <sup>2</sup> European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany
- 10:00 – 10:25 **<sup>225</sup>Ac-DOTATOC – dose finding for alpha particle emitter based radionuclide therapy of neuroendocrine tumors**  
<sup>1</sup>*Clemens Kratochwil, <sup>2</sup>Frank Bruchertseifer, <sup>1</sup>Frederik L. Giesel, <sup>2</sup>Christos Apostolidis, <sup>1</sup>Uwe Haberkorn, <sup>2</sup>Alfred Morgenstern*  
<sup>1</sup>University Hospital Heidelberg, Dept. Nuclear Medicine, Heidelberg, Germany; <sup>2</sup> European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany
- 10:25 – 10:55 *Coffee break*
- SESSION Ib **CLINICAL EXPERIENCES**  
 Moderator: Leszek Krolicki, Alfred Morgenstern
- 10:55 – 11:20 **Targeted Alpha-Particle Therapy with Actinium-225 (<sup>225</sup>Ac)-Lintuzumab for Acute Myeloid Leukemia (AML) Alone and in Combination with Low-Dose Cytarabine (LDAC)**  
*Joseph G. Jurcic, Farhad Ravandi, John M. Pagel, Jae H. Park, B. Douglas Smith, M. Yair Levy, Todd L. Rosenblat, Michael R. McDevitt, Neeta Pandit-Taskar, Jorge Carrasquillo, George Sgouros, Alfred Morgenstern, Dennis Earle, Dragan Cicic, David A. Scheinberg*  
 Columbia University Medical Center, New York, NY; MD Anderson Cancer Center, Houston, TX; Swedish Cancer Institute, Seattle, WA; Memorial Sloan-Kettering Cancer Center, New York, NY; Johns Hopkins University, Baltimore, MD; Texas Oncology-Baylor University, Dallas TX; European Joint Commission, Joint Research Center, Institute for Transuranium Elements, Karlsruhe, Germany, and Actinium Pharmaceuticals, Inc., New York, NY

11:20 – 11:45

**First intravesical  $\alpha$ -radioimmunotherapy of human urothelial carcinoma in men – a promising new therapy for carcinoma in situ after BCG failure?**

*M. E. Autenrieth<sup>1</sup>, F. Kurtz<sup>1</sup>, T. Horn<sup>1</sup>, C. Seidl<sup>2</sup>, A. Morgenstern<sup>3</sup>, F. Bruchertseifer<sup>3</sup>, C. Apostolidis<sup>3</sup>, C. Pfob<sup>2</sup>, J.E. Gschwend<sup>1</sup>, R. Senekowitsch-Schmidtke<sup>2</sup>, K. Scheidhauer<sup>2</sup>*

<sup>1</sup>Dept. Urology, Technische Universität Muenchen, Munich, Germany; <sup>2</sup>Dept. Nuclear Medicine, Technische Universität Muenchen, Munich, Germany; <sup>3</sup>European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany

SESSION IIa

**PRECLINICAL STUDIES**

Moderator: Ekatarina Dadachova

11:50 – 12:10

**Combination of Alpha-Radioimmunotherapy and a novel Immunomodulatory agent for the treatment of multiple myeloma**

*Nolwenn Fichou<sup>1,2,3</sup>, Sébastien Gouard<sup>1,2,3</sup>, Fella Tamzalit<sup>1,2,3</sup>, Catherine Maurel<sup>1,2,3</sup>, Bjarne Bogen<sup>5</sup>, Alfred Morgenstern<sup>6</sup>, Frank Bruchertseifer<sup>6</sup>, Yannick Jacques<sup>1,2,3</sup>, Michel Chérel<sup>1,2,3,4</sup>, Erwan Mortier<sup>1,2,3</sup> and Joëlle Gaschet<sup>1,2,3</sup>*

<sup>1</sup> CRCNA-UMR 892 INSERM; <sup>2</sup> CNRS 6299; <sup>3</sup> Université de Nantes, France; <sup>4</sup> Institut de Cancérologie de l'Ouest, Saint-Herblain, France <sup>5</sup>Institute of Immunology, University of Oslo, Rikshospitalet-Radiumhospitalet Medical Center, Oslo, Norway; <sup>6</sup> European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany

12:10 – 12:30

**Evaluation of the therapeutic potential of alpha-radioimmunotherapy in combination with the adoptive transfer of tumor-specific T cells**

*Jérémy Ménager<sup>1,2,3</sup>, Jean-Baptiste Gorin<sup>1,2,3</sup>, Sébastien Gouard<sup>1,2,3</sup>, Catherine Maurel<sup>1,2,3</sup>, Michel Chérel<sup>1,2,3,4</sup>, Alfred Morgenstern<sup>5</sup>, Frank Bruchertseifer<sup>5</sup>, François Davodeau<sup>1,2,3</sup>, Yannick Guilloux<sup>1,2,3</sup> and Joëlle Gaschet<sup>1,2,3</sup>*

<sup>1</sup> INSERM , U892 - CRCNA, Nantes, France; <sup>2</sup> Université de Nantes, Nantes, France; <sup>3</sup> CNRS UMR 6299, Nantes, France; <sup>4</sup> Institut de Cancérologie de l'Ouest, Saint-Herblain, France; <sup>5</sup> European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany

- 12:30 – 12:50 **Anti-tumor efficacy of <sup>213</sup>Bi-labeled anti-MISR II 16F12 monoclonal antibody in ovarian cancer**  
*Riad Ladjohounlou<sup>1,2,3,4</sup>, Alexandre Pichard<sup>1,2,3,4</sup>, Vincent Boudousq<sup>1,2,3,4</sup>, Nicolas Chouin<sup>5</sup>, Frank Bruchertseifer<sup>6</sup>, Alfred Morgenstern<sup>6</sup>, Isabelle Navarro-Teulon<sup>1,2,3,4</sup> and Jean-Pierre Pouget<sup>1,2,3,4</sup>*  
 1 IRCM, Institut de Recherche en Cancérologie de Montpellier, Montpellier, F-34298, France; <sup>2</sup> INSERM, U1194, Montpellier, F-34298, France; <sup>3</sup> Université de Montpellier, Montpellier, F-34090, France; <sup>4</sup> Institut régional du Cancer de Montpellier, Montpellier, F-34298, France; <sup>5</sup> AMAROC, ONIRIS, Nantes 44300, France; <sup>6</sup> European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany.
- 12:50 – 14:00 *Working Lunch / Poster Session I*
- SESSION IIb PRECLINICAL STUDIES  
 Moderator: Marion Hendriks – DeJong
- 14:00 – 14:20 **Pretargeted radioimmunotherapy of CEA-expressing tumors using the alpha emitter bismuth-213**  
*Sandra Heskamp<sup>1</sup>, Reinier Hernandez<sup>2</sup>, Markus Essler<sup>3</sup>, Frank Bruchertseifer<sup>4</sup>, Alfred Morgenstern<sup>4</sup>, Wim J.G. Oyen<sup>1</sup>, Christof Seidl<sup>5</sup>, William McBride<sup>6</sup>, David M. Goldenberg<sup>6</sup>, Otto C. Boerman<sup>1</sup>*  
<sup>1</sup> Department of Radiology and Nuclear Medicine, Radboud university medical center, Nijmegen, The Netherlands; <sup>2</sup> Medical Physics Department, University of Wisconsin-Madison, Madison, WI, USA; <sup>3</sup> Klinik und Poliklinik für Nuklearmedizin, University of Bonn, Bonn, Germany; <sup>4</sup> European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany; <sup>5</sup> Nuklearmedizinische Klinik, Klinikum rechts der Isar der Technischen Universität München, Munich, Germany; <sup>6</sup> Immunomedics, Morris Plains, NJ, USA
- 14:20 – 14.40 **<sup>213</sup>Bi-[DOTA<sup>0</sup>,Tyr<sup>3</sup>]-octreotate as promising candidate for targeted alpha therapy: preclinical studies *in vivo* and *in vitro***  
*Ho Sze Chan<sup>1</sup>, Mark W. Konijnenberg<sup>1</sup>, Erik de Blois<sup>1</sup>, Tamara Anderson<sup>3</sup>, Monique Nysus<sup>3</sup>, Stuart Koelewijn<sup>1</sup>, Wouter A. Breeman<sup>1</sup>, Robert W. Atcher<sup>4</sup>, Alfred Morgenstern<sup>5</sup>, Frank Bruchertseifer<sup>5</sup>, Jeffrey P. Norenberg<sup>3\*</sup> and Marion de Jong<sup>1</sup>*  
<sup>1</sup>Department of Nuclear Medicine, Erasmus MC, Rotterdam, the Netherlands; <sup>2</sup>Department of Radiology, Erasmus MC, Rotterdam, The Netherlands; <sup>3</sup>Radiopharmaceutical Sciences Program, College of Pharmacy, University of New Mexico Health Sciences Center, Albuquerque, NM, United States; <sup>4</sup>Los Alamos National Laboratory, Los Alamos, NM, United States; <sup>5</sup>European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany

- 14.40 – 15:00      **Long-term toxicity of  $^{213}\text{Bi}$ -BSA in mice**  
*Laëtitia Dorso, Edith Bigot-Corbel, Jérôme Abadie, Sébastien Gouard, Frank Bruchertseifer, Alfred Morgenstern, Catherine Maurel, Michel Chérel, François Davodeau*  
 INSERM, Nantes, France; European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany
- 15:00 – 15:20      **Survival, dosimetry and RBE determination for external alpha particles and alpha-RIT of the radioresistant human pathogen *Cryptococcus neoformans***  
*E. Dadachova<sup>1</sup>, R. A. Bryan<sup>1</sup>, Alfred Morgenstern<sup>2</sup>, Christos Apostolidis<sup>2</sup>, Stephen A. Marino<sup>3</sup>, Igor Shuryak<sup>3</sup>*  
<sup>1</sup>Department of Radiology, Albert Einstein College of Medicine, Bronx, New York, USA; <sup>2</sup>European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany; <sup>3</sup>Center for Radiological Research, Columbia University Medical Center, New York, New York Radiological Research Accelerator Facility, Nevis Laboratories, Irvington, New York, USA
- 15:20 – 15:50      *Coffee break*
- SESSION IIc      PRECLINICAL STUDIES  
 Moderator: Michael Zalutsky
- 15:50 – 16:10      **Radioimmunotherapy with  $\alpha$ -emitting radioisotope  $^{211}\text{At}$**   
*Huizi Li, Sumitaka Hasegawa, Tadashi Kamada, Tsuneo Saga*  
 National Institute of Radiological Sciences, Japan
- 16:10 – 16:30      **Gold Nanoparticle–Substance P(5-11) Conjugate as a Carrier for  $^{211}\text{At}$  in Alpha Particle Therapy**  
*Ł. Janiszewska<sup>1</sup>, P. Koźmiński<sup>1</sup>, M. Pruszyński<sup>1</sup>, A. Bilewicz<sup>1</sup>, J. Jastrzębski<sup>2</sup>, J. Choiński<sup>2</sup>, A. Stolarz<sup>2</sup>, A. Trzecińska<sup>2</sup>, K. Szkliniarz<sup>3</sup>, W. Zipper<sup>3</sup>*  
<sup>1</sup>Institute of Nuclear Chemistry and Technology, Dorodna 16; 03-195 Warsaw, Poland; <sup>2</sup>Heavy Ion laboratory, University of Warsaw, 02-093 Warszawa, Poland; <sup>3</sup>Institute of Physics, Department of Nuclear Physics, University of Silesia, 40-007 Katowice, Poland
- 16:30 – 16:50      **The Happy Ending Story of Radiumtherapy**  
*Christof Seidl*  
 Department of Nuclear Medicine, Department of Obstetrics and Gynecology, Technische Universität München, München, Germany
- 16:50      ADJOURN
- 19:00 – 22:00      SYMPOSIUM BANQUET DINNER  
 Restaurant Ale Gloria, Plac Trzech Krzyży 3, Warszawa

# Thursday May 21, 2015

## SESSION III

## DOSIMETRY AND INSTRUMENTATION

Moderator: George Sgouros

8:30 – 8:50

### **Quantitative Single-Particle Digital Autoradiography and Imaging Applications of the iQID Alpha Camera**

*Brian Miller<sup>1,2</sup>, Matthias Miederer<sup>3</sup>, Christoph Brochhausen<sup>3</sup>, Michael Dion<sup>1</sup>, George Tabatadze<sup>4</sup>, Sergei Y. Tolmachev<sup>4</sup>, Sofia Frost<sup>5</sup>, Johnnie Orozco<sup>5</sup>, Oliver Press<sup>5</sup>, and Brenda Sandmaier<sup>5</sup>*

<sup>1</sup>Radiation Detection and Nuclear Sciences Group, Pacific Northwest National Laboratory (PNNL), Richland WA, USA; <sup>2</sup>College of Optical Sciences, The University of Arizona, Tucson, AZ, USA; <sup>3</sup>University Medical Center of the Johannes Gutenberg University Mainz, Germany; <sup>4</sup>United States Transuranium and Uranium Registries, College of Pharmacy, Washington State University Richland, WA, USA; <sup>5</sup>Fred Hutchinson Cancer Research Center, Seattle, WA, USA;

8:50 – 9:10

### **Ex vivo $\alpha$ -imaging and small-scale 3D-dosimetry reveal efficient targeting and high absorbed doses to sub-organ structures in canine tissue biopsies after <sup>211</sup>At-RIT conditioning for HCT**

*Sofia HL Frost<sup>1</sup>, Tom A Bäck<sup>2</sup>, Brian W Miller<sup>3,4</sup>, Erlinda B Santos<sup>1</sup>, Shani L Frayo<sup>1</sup>, Donald K Hamlin<sup>5</sup>, Oliver W Press<sup>1,5</sup>, D Scott Wilbur<sup>5</sup>, John M Pagel<sup>1,5</sup>, Brenda M Sandmaier<sup>1,5</sup>*

<sup>1</sup>Fred Hutchinson Cancer Research Center, Seattle, USA; <sup>2</sup>University of Gothenburg, Gothenburg, Sweden; <sup>3</sup>Pacific Northwest National Laboratory, Richland, USA; <sup>4</sup>College of Optical Sciences, The University of Arizona, Tucson, USA; <sup>5</sup>University of Washington, Seattle, USA

9:10 – 9:30

### **Small-scale dosimetry in tumors and kidneys for a pre-clinical model of metastatic prostate cancer using <sup>211</sup>At-YC-I-27, a PSMA-targeting ligand**

*Anders Josefsson<sup>1</sup>, Ana P. Kiess<sup>1</sup>, Il Minn<sup>1</sup>, Ronnie C. Mease<sup>1</sup>, Mary E. Brummet<sup>1</sup>, Kwamena Baidoo<sup>2</sup>, Martin Brechbiel<sup>2</sup>, George Sgouros<sup>1</sup>, Martin G. Pomper<sup>1</sup>, Robert F. Hobbs<sup>1</sup>*

<sup>1</sup> Johns Hopkins University, Baltimore MD, USA

<sup>2</sup> National Cancer Institute NIH, Bethesda MD, USA

9:30 – 09:50

### **Quantitative SPECT Imaging of Ra-223: A Phantom Study**

*J Yue, EC Frey, T Mouxion, A Josefsson, G Sgouros, RF Hobbs.*

Johns Hopkins University, Baltimore MD, USA

09:50 – 10:20

*Coffee break*



SESSION IV

LABELING APPROACHES

Moderator: tbd

10:20 – 10:40

**Conjugation of PSMA-targeting ligands to nanocarriers loaded with Actinium-225 enhances perinuclear localization and improves efficacy against tumor endothelial analogues**

*Charles Zhu<sup>1</sup>, Amey Bandekar<sup>1</sup>, Michelle Sempkowski<sup>1</sup>, Sangeeta Ray Banerjee<sup>2</sup>, Martin G. Pomper<sup>2</sup>, Frank Bruchertseifer<sup>3</sup>, Alfred Morgenstern<sup>3</sup>, Stavroula Sofou<sup>1</sup>*

<sup>1</sup>Departments of Chemical and Biochemical Engineering and Biomedical Engineering, Rutgers University, 599 Taylor Road, Piscataway, NJ 08854; <sup>2</sup>Russell H. Morgan Department of Radiology and Radiological Science, Johns Hopkins Medical School, Baltimore, MD 21287; <sup>3</sup>European Commission, Joint Research Centre, Institute for Transuranium Elements, Karlsruhe, Germany

10:40 – 11:00

**<sup>99m</sup>Tc and <sup>223</sup>Ra Labelled Hydroxyapatite Nanoparticles as Potential Theranostic Agents for Nuclear Medicine**

*P. Mičolová, E. Málková, E. Kukleva, M. Vlk, J. Kozempel*  
Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering, Department of Nuclear Chemistry, Břehová 7, CZ-11519 Prague

11:00 – 11:20

**Recoil Retention of Recoiling <sup>225</sup>Ac Daughters in Polymersomes**

*R.M. de Kruijff<sup>1</sup>, G. Wang<sup>1</sup>, A. Rol<sup>1</sup>, A. Morgenstern<sup>3</sup>, F. Bruchertseifer<sup>3</sup>, H.T. Wolterbeek<sup>1</sup>, A.G. Denkova<sup>1</sup>*

<sup>1</sup>Radiation Science and Technology, Delft University of Technology, Delft, the Netherlands; <sup>2</sup>Department of Chemical Engineering, Delft, the Netherlands; <sup>3</sup>European Commission, Institute for Transuranium Elements, Karlsruhe, Germany

11:20 – 11.40

**Automating Astatine Labeling of Biomolecules - from Activated Target Material to Radiopharmaceutical Product**

*Emma Aneheim<sup>1</sup>, Holger Jensen<sup>2</sup>, Sture Lindegren<sup>1</sup>*

<sup>1</sup>Targeted Alpha Therapy group, Department of Radiation Physics, Sahlgrenska Academy at the University of Gothenburg, SE41345 Gothenburg, Sweden; <sup>2</sup>PET and Cyclotron Unit, KF-3982, Copenhagen University Hospital, Copenhagen, Denmark

11:40 – 12:00

**Attempts to rationalize the in vivo instability of <sup>211</sup>At-benzoate compounds**

*David Teze<sup>1</sup>, Tahra Ayed<sup>2</sup>, Rémi Maurice<sup>1</sup>, Julie Champion<sup>1</sup>, Nicolas Galland<sup>2</sup>, David Deniaud<sup>2</sup>, Gilles Montavon<sup>1</sup>*

<sup>1</sup>Subatech, UMR CNRS 6457, IN2P3 Université et école des mines de Nantes, France; <sup>2</sup>CEISAM, UMR CNRS 6230, Université de Nantes, France

12:00 – 13:00

*Working Lunch / Poster Session II*

SESSION Va	<b>RADIOCHEMISTRY AND NUCLIDE PRODUCTION</b> Moderator: Frank Bruchertseifer
13:00 – 13:20	<p><b>Production and assessment of <math>^{209}\text{At}</math> as a novel SPECT isotope for the preclinical development of <math>^{211}\text{At}</math>-based therapies</b>  <i>Jason R Crawford<sup>1,2</sup>, Paul Schaffer<sup>1</sup>, Katie Dinelle<sup>3</sup>, Hua Yang<sup>1</sup>, Stephan Blinder<sup>3</sup>, Vesna Sossi<sup>3</sup>, and Thomas J Ruth<sup>1,2,3</sup></i>  <sup>1</sup>Nuclear Medicine Division, TRIUMF, Vancouver, BC, Canada;  <sup>2</sup>Dept. Physics and Astronomy, University of Victoria, Victoria, BC, Canada; <sup>3</sup>Dept. Physics and Astronomy, University of British Columbia, Vancouver, BC, Canada</p>
13:20 – 13:40	<p><b><math>\alpha</math> – emitting radionuclides from natural thorium irradiated with protons</b>  <i>Elena V. LAPSHINA<sup>1</sup>, Stanislav V. ERMOLAEV<sup>1</sup>, Boris L. ZHUIKOV<sup>1</sup>, Aleksandr N. VASILIEV<sup>1, 2</sup>, Valentina S. OSTAPENKO<sup>1, 2</sup>, Ramiz A. ALIEV<sup>2</sup>, Stepan N. KALMYKOV<sup>2</sup></i>  <sup>1</sup>Institute for Nuclear Research of Russian Academy of Sciences, 60th October Anniversary Prospect, 7a, Moscow 117312, Russia;  <sup>2</sup>Chemistry Department, Lomonosov Moscow State University, Leninskie Gory 1, Russia</p>
13:40 – 14:00	<p><b>Production and Radiochemical Isolation of <math>^{230}\text{Pa}/^{230}\text{U}</math> from Thorium using &gt;50 MeV Protons</b>  <i>V. Radchenko, J. W. Engle, J. J. Wilson, J. R. Maassen, E. R. Birnbaum, K. D. John, M. E. Fassbender, and F. M. Nortier</i>  Los Alamos National Laboratory, PO Box 1663, Los Alamos, New Mexico, US</p>
14:00 – 14:20	<p><b>Production of Actinium-225 isotope from long decayed U-233 and development of new technologies for the production of considerable amounts of Actinium-225</b>  <i>N.A. Nerozin<sup>1</sup>, V.V. Shapovalov<sup>1</sup>, S.V. Khamianov<sup>1</sup>, D.Yu. Chuvilin<sup>2</sup></i>  <sup>1</sup>State Scientific Center of the Russian Federation – Institute for Physics and Power Engineering (SSC RF - IPPE), 249033, Obninsk, Russian Federation; <sup>2</sup>RRC “Kurchatov Institute”, Moscow, Russian Federation</p>
14:20 – 14:40	<i>Coffee break</i>

SESSION Vb

RADIOCHEMISTRY AND NUCLIDE PRODUCTION

Moderator: Frank Bruchertseifer

14:40 – 15:00

**Tri-Lab (ORNL, BNL, LANL) Research Effort to Provide Accelerator-Produced  $^{225}\text{Ac}$  for Radioimmunotherapy**

*Eva R. Birnbaum (LANL), Roy Copping (ORNL), David Denton (ORNL), Jonathan W. Engle (LANL), Michael E. Fassbender (LANL), Mitch D. Ferren (ORNL, NIDC), Jonathan M. Fitzsimmons (BNL), Justin R. Griswold (ORNL), Kevin D. John (LANL), John W. Krueger (ORNL), Leonard F. Mausner (BNL), Dmitri G. Medvedev (BNL), Saed Mirzadeh (ORNL), Karen Murphy (ORNL), F. Meiring Nortier (LANL), Dennis R. Phillips (DOE), Phil Pile (BNL), Valery Radchenko (LANL), Wolfgang H. Runde (LANL, NIDC), Daniel W. Stracener (ORNL)*

15:00 – 15:20

**Extraction chromatographic behavior of actinium and REE**

*Valentina S. OSTAPENKO<sup>1,2</sup>, Aleksandr N. VASILIEV<sup>1,2</sup>, Elena V. LAPSHINA<sup>2</sup>, Stanislav V. ERMOLAEV<sup>2</sup>, Boris L. ZHUIKOV<sup>2</sup>, Ramiz A. ALIEV<sup>1,3</sup>, Stepan N. KALMYKOV<sup>1,3</sup>*

<sup>1</sup>Chemistry Department, Lomonosov Moscow State University, Leninskie Gory 1, Moscow, Russia; <sup>2</sup>Institute for Nuclear Research of Russian Academy of Sciences, 60th October Anniversary Prospect, 7a, Moscow, Russia; <sup>3</sup>National research center Kurchatov Institute, 1, Akademika Kurchatova p.l, Moscow, Russia

15:20 – 15:40

**Alternate Method for Production of  $^{225}\text{Ac}$  – Update**

*James Harvey*

NorthStar Medical Radioisotopes, LLC, Madison, WI, US

15:40 – 16:00

**9 years later: from concept to developing a reliable source of alpha particle for clinical use**

*Patrik Bourdet, Julien Torgue*

AREVA Med

16:00 – 16:15

SYMPOSIUM CLOSURE

**Friday May 22, 2015**

8:30 – 18:00

VISIT OF POLATOM SITE AND TRIP TO ZELAZOWA WOLA, FRYDERYK CHOPIN'S BIRTHPLACE

## Poster SESSION I

### **High-resolution alpha-imaging of historical liver samples from patients exposed to Thorotrast**

*Matthias Miederer<sup>1</sup>, Brian Miller<sup>2</sup>, Christoph Brochhausen<sup>3</sup>, Stephanie Pektor<sup>1</sup>, Mathias Schreckenberger<sup>1</sup>*

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### **L-Lysine Administration Reduce Nephrotoxicity In Targeted Alpha Therapy With <sup>213</sup>Bi-[DOTA<sup>0</sup>,Tyr<sup>3</sup>]-octreotate**

*Ho Sze Chan<sup>1</sup>, Mark W. Konijnenberg<sup>1</sup>, Tamara Anderson<sup>3</sup>, Monique Nysus<sup>3</sup>, Erik de Blois<sup>1</sup>, Wouter A. Breeman<sup>1</sup>, Robert W. Atcher<sup>4</sup>, Marion de Jong<sup>1,3</sup>, and Jeffrey P. Norenberg<sup>3</sup>*

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### **Application of nephron-based dosimetry model for <sup>225</sup>Ac-7.16.4 $\alpha$ -particle radiopharmaceutical therapy of a pre-clinical metastatic breast cancer model**

*Anders Josefsson<sup>1</sup>, Charles Zhu<sup>2</sup>, Sunju Park<sup>1</sup>, Diane Abou<sup>1</sup>, Hong Song<sup>1</sup>, David Huso<sup>1</sup>, Tom Bäck<sup>3</sup>, Frank Bruchertseifer<sup>4</sup>, Alfred Morgenstern<sup>4</sup>, Wesley E. Bolch<sup>5</sup>, George Sgouros<sup>1</sup>, Robert F. Hobbs<sup>1</sup>*

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### **Synthesis and characterization of lanthanum phosphate nanoparticles as carriers for <sup>225</sup>Ra and <sup>223</sup>Ra**

*J. V. Rojas<sup>1,2</sup>, J. Woodward<sup>2</sup>, N. Chen<sup>2,3</sup>, A.J. Rondinone<sup>2</sup>, S. Mirzadeh<sup>2</sup>*

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### **Substance P - nanozeolite labeled with <sup>223</sup>Ra – a new potential radiobioconjugate for internal alpha therapy**

*A. Bilewicz<sup>1</sup>, A. Piotrowska<sup>1</sup>, E. Leszczuk<sup>1</sup>, Ł. Janiszewska, P. Koźmiński<sup>1</sup>, A. Morgenstern<sup>2</sup>, F. Bruchertseifer<sup>2</sup>*

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**Evaluation of hydroxyapatite particles as carriers for  $^{223}\text{Ra}$  recovered from proton-irradiated thorium**

*Aleksandr N. VASILIEV<sup>1,2</sup>, Valentina S. OSTAPENKO<sup>1,2</sup>, Elena V. LAPSHINA<sup>1</sup>, Alexander V. Severin<sup>2</sup>, Stanislav V. ERMOLAEV<sup>1</sup>, Boris L. ZHUIKOV<sup>1</sup>, Stepan N. KALMYKOV<sup>2,3</sup>*

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**Triggered interstitial release of diffusing forms of Actinium-225 by non-targeted liposomes improves killing efficacy in large spheroids**

*Charles Zhu<sup>1</sup>, Timothy Holleran<sup>1</sup>, Frank Bruchertseifer<sup>2</sup>, Alfred Morgenstern<sup>2</sup>, Stavroula Sofou<sup>1</sup>*

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**Hypoxia induced OPN -CD44 signaling pathway is crucial for the survival and radiation resistance in glioblastoma multiforme**

*Elżbieta Rosiak<sup>1</sup>, Henryk Koziara<sup>2</sup>, Renata Matyskiel<sup>1</sup>, Bartosz Królicki<sup>2</sup>, Leszek Królicki<sup>1</sup>*

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<sup>2</sup> Department of Neurosurgery, Maria Skłodowska-Curie Memorial Cancer Center and Institute of Oncology, Warsaw, Poland

**Hyperpolarized [ $^{13}\text{C}$ ]-Pyruvate metabolism in LN18 glioblastoma cancer cells under treatment with alpha-lipoic acid**

*Benedikt Feuerecker, Christian Hundshammer, Markus Schwaiger*

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Poster SESSION II

**Production of Actinium-225 at Oak Ridge National Laboratory**

*Shelley Van Cleve, Susan Hogle, Rose Boll, Karen Murphy, David Denton, Saed Mirzadeh*  
Oak Ridge National Laboratory (ORNL), Oak Ridge, TN 37831

**Production of Thorium-229 at the ORNL High Flux Isotope Reactor (HFIR)**

*Susan Hogle, Rose Boll, Karen Murphy, David Denton, Allison Owens, Saed Mirzadeh, and Shelley Van Cleve*

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**Production of the  $^{211}\text{At}$  Radioisotope Using the Warsaw Heavy Ion Cyclotron**

*K. Szkliniarz<sup>(2)</sup>, J. Jastrzębski<sup>(1)</sup>, A. Bilewicz<sup>(3)</sup>, J. Choiński<sup>(1)</sup>, A. Jakubowski<sup>(1)</sup>,  
E. Janiszewska<sup>(3)</sup>, E. Leszczuk<sup>(3)</sup>, M. Łyczko<sup>(3)</sup>, M. Sitarz<sup>(1)</sup>, A. Stolarz<sup>(1)</sup>, A. Trzcińska<sup>(1)</sup>,  
B. Wąs<sup>(4)</sup>, W. Zipper<sup>(2)</sup>*

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<sup>4</sup>Niewodniczański Institute of Nuclear Physics PAN, 31-342 Kraków, Poland

**Development of a  $^{211}\text{Rn}/^{211}\text{At}$  generator using a wet chemistry approach for targeted alpha therapy applications**

*K. Washiyama<sup>1</sup>, R. Amano<sup>1</sup>, E. Maeda<sup>2</sup>, N. Yamada<sup>2</sup>, T. Taniguchi<sup>2</sup>, A. Yokoyama<sup>2</sup>, I. Nishinaka<sup>3</sup>, A. Toyoshima<sup>3</sup>, H. Makii<sup>3</sup>, K. Hashimoto<sup>4</sup>*

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**Precursor for direct At-211 astatination of proteins - chemistry and evaluation of shelf-life**

*Sture Lindegren<sup>1</sup>, Holger Jensen<sup>2</sup>, Emma Aneheim<sup>1</sup>*

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**Simplifying wet chemistry isolation of At-211 using PEG column separation**

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**Radiochemical challenges in receptor-mediated targeted alpha therapy in mice**

*Ho Sze Chan<sup>1</sup>, Erik de Blois<sup>1</sup>, Mark W. Konijnenberg<sup>1</sup>, Alfred Morgenstern<sup>3</sup>, Frank Bruchterseifer<sup>3</sup>, Marion de Jong<sup>1,2</sup> and Wouter A.P. Breeman<sup>1</sup>*

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**Binding of Bismuth, Actinium and Yttrium by benzoazacrown ether in aqueous solutions**

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**Assessment of  $^{223}\text{Ra}$  radionuclidic purity by extraction paper chromatography**

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