The Power of Astatine-211: From the COST- NOAR Success Story to Clinical Reality

[1]Jean-Francois Gestin, [2]Emma Aneheim, [3]Sture Lindegren, [1] François Guerard, [4]Joelle Gaschet, [5]Stig Palm, [6]Antero Abrunhosa, [7]Penelope Bouziotis, [8]Marek Pruzynski, [9]Dana Niculae, [10]Laurent Navarro, [11]Petra Kolenc, [12]Emilija Janevik-Ivanovska

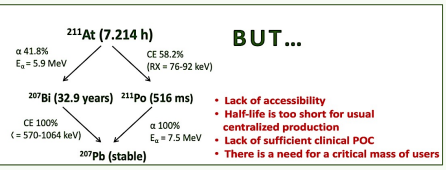
Presenter: Emilija Janevik-Ivanovska

[1] Université de Nantes, Inserm, CNRS, Centre de Recherche en Cancérologie et Immunologie Nantes—Angers (CRCINA)—UMR 1232, ERL 6001, Nantes, France
[2]Department of Medical Radiation Sciences, Institute of Clinical Sciences, the Sahlgrenska Academy, University of Gothenburg; 413 45 Gothenburg, Sweden
[3]Department of Medical Radiation Sciences, Institute of Clinical Sciences, the Sahlgrenska Academy, University of Gothenburg; 413 45 Gothenburg, Sweden
[4]Université de Nantes, CNRS, Inserm, CRCINA, 44000, Nantes, France
[5]Department of Medical Radiation Sciences, Institute of Clinical Sciences, the Sahlgrenska Academy, University of Gothenburg; 413 45 Gothenburg, Sweden
[6]ICNAS/CIBIT, Institute for Nuclear Sciences Applied to Health, University of Coimbra, Coimbra, Portugal
[7]Radiochemical Studies Laboratory, INRASTES, National Center for Scientific Research Demokritos, Aghia Paraskevi 15341 Athens, Greece
[8]Institute of Nuclear Chemistry and Technology, Dorodna 16, 03-195 Warsaw, Poland
[9]Radiopharmaceutical Research Centre, Horia Hulubei National Institute for Physics and Nuclear Engineering, 30 Reactorului Street, Măgurele, Ilfov, Romania
[10]Precirix, Brussels, Belgium
[11]Department of Nuclear Medicine, University Medical Centre Ljubljana, 1000 Ljubljana, Slovenia
[12]Goce Delcev University, Faculty of Medical Sciences, 2000 Stip, Republic of North Macedonia

P191
Abstract ID529

Objectives:

- Cyclotron, $^{209}Bi(\alpha,2n)^{211}At$
- Half-life 7,2h
- 1 alpha particle emitted
- Cheap raw material
- Scalable production
- Independence from unstable countries
- Mastered Patented Chemistry
- Ambulatory treatment
- Waste management is not an issue



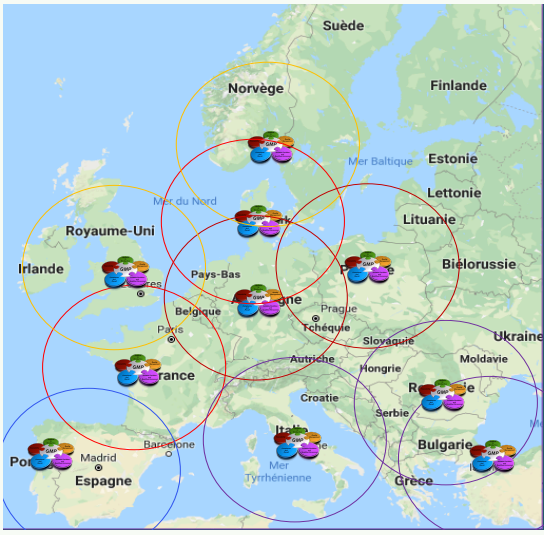
BUT…

- Lack of accessibility
- Half-life is too short for usual centralized production
- Lack of sufficient clinical POC
- There is a need for a critical mass of users

Astatine-211 is emerging as a transformative and promising option in cancer therapy due to its unique properties. The COST Action Network on Optimized Astatine-Labeled Radiopharmaceuticals (NOAR) aimed to establish Astatine-211 as the gold standard for the treatment of certain types of cancer in Europe.

This initiative brought together leading European and International laboratories, manufacturing centers, hospitals, industries, and patient associations from over 22 countries in Europe, creating a comprehensive and innovative value chain that spans production, chemistry, radiochemistry, biology, preclinical and clinical research, and the delivery of radiopharmaceuticals to patients.

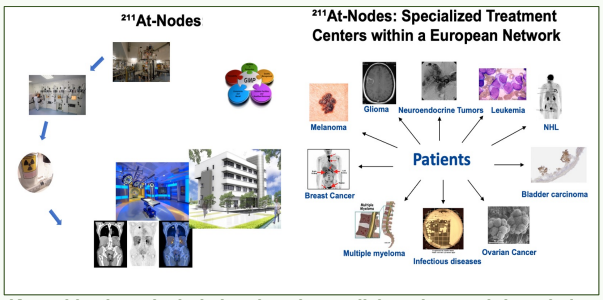
The goal of this project was to demonstrate that Astatine-211used in targeted alpha therapy (TAT), could be established as the European standard for cancer treatment. Its alpha-emitting properties minimize damage to healthy tissue while maximizing therapeutic effects, offering a safer, more comfortable alternative for patients due to its short half-life of 7.2 hours, potential for outpatient treatment, and improved waste management.



Vision of the COST Action 19114: to build a European Network

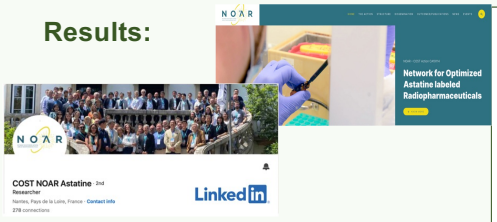
Methods:

The project involved the creation of a European network of dedicated Astatine-211 Treatment Nodes (ATNodes), integrating manufacturing, chemical processing, radiopharmaceutical synthesis, and clinical facilities with uniform quality standards.



Key objectives included enhancing collaboration and knowledge sharing between European and international stakeholders.

Results:



This work was also funded by the horizon 2020 Framework Programme of the European Union under the COST Action NOAR "Network for Optimized Astatine labeled Radio-pharmaceuticals" (CA19114)

Conclusions:

The COST NOAR action has facilitated efficient interdisciplinary, cross-sectoral, and international knowledge exchange, promoting collaboration between European and international stakeholders to advance the medical applications of Astatine-211.

The initiative has led to increased interest in production capacity, optimized transport conditions, advances in radiolabeling chemistry, and progress in the development of new radiopharmaceuticals. These results were presented during the COST NOAR Global meeting in Nantes, France (***https://astatine-net.eu/events/cost-third-global-meeting-from-1-to-3-october-2024-in-nantes/***).

European action within NMEu (***https://nuclearmedicineeurope.eu/)*** associated to the strength of the NOAR community have led to 2 IHI grants, Thera4care (***https://www.ihi.europa.eu/projects-results/project-factsheets/thera4care***) and Accelerate.eu (***https://www.ihi.europa.eu/projects-results/project-factsheets/acceleratеeu***) and the announcement of a partnership agreement between IBA and FRAMATOME (***https://www.framatome.com/medias/framatome-and-iba-to-partner-to-develop-an-astatine-211-cyclotron-network-in-europe-and-the-us/***) to build a ^{211}At pilot facility in Nantes area, France, first step for an European ATNodes network. This has led to increased interest from academics and industry and has reassured them of the accessibility of ^{211}At thanks to the establishment of various 211At cyclotrons in Europe, Japan, South Korea, China and South Africa, and of the feasibility of targeted alpha therapy with 211At in the very near future.

COST NOAR ended in October 2024, and NOAR EUrope took up mission in Europe, integrated within the World Astatine Community.