Contribution ID: **97** Type: **not specified**

# HOPE FOR PATIENTS WITH PROSTATE CANCER WITH BONE METASTASES

In Oncology Regional Hospital Ternopil in 2015 -2017

Supervisors:

ABSTRACT: The process of treatment of patients with metastatic castrate-resistant prostate cancer (mCRPC) is pushing the boundaries of oncological treatments. The Ukrainian Society of Nuclear Medicine under the European Commission, Joint Research Centre has agreed on radium-223 chloride ((223) RaCl2) for the treatment of mCRPC patients whose metastases are limited to the bones. Radium 223 is a mildly radioactive form of the metal radium. It used to be called Alpharadin and now has the brand name Xofigo and accumulates in the bone.
BACKGROUND:
The concept of targeted alpha-therapy (TAT) is that Alpha-particle-emitting radionuclides are a subject of importance for investigation in cancer treatment. The reality of these models is that it is possible to sterilize individual cancer cells solely from self-irradiation with alpha-particle emitters, a result that is not possible to obtain with beta-particle emitters given dose-deposition characteristics, achievable radiopharmaceutical specific activity, tumor-cell antigen expression levels and the need to avoid prohibitive toxicity

METHOD
The aim was to see if there were better results in asymptomatic patients at baseline compared to symptomatic patients for early treatment with radium-223.Three men with ages 69, 72 and 53 diagnosed with metastatic castrate-resistant prostate cancer (mCRPC). Two approaches of targeting were used to in the treatment, The Mab J591, against the external domain of prostate-specific membrane antigen (PSMA) and PAI-2, a natural protein inhibitor of urokinase plasminogen (uPA) activator that binds to uPA bounds to surface receptor uPAR on prostate cancer cells. Each targeting molecule requires a bifunctional chelator that reacts both with the carrier molecule and the radioisotope.
RESULTS:
Among the three patients that had previously not responded to available standard treatments, including surgery, external radiation, hormonal and chemotherapy, have received 225Actinium-PSMA-617 as treatment. Several months into the therapy, PSA values have dropped below the detection limit (0.1 ng/ml) from values initially surpassing 3000 ng/ml, 647 ng/ml and 419 ng/ml respectively. To date, 9 months, 17 months and 12 months after their respective treatments, all patients have very satisfactory health status. Prior to the treatment, their life expectancy was of 2-4 months. The therapeutic responses observed in the majority of patients to date indicate that TAT with 225Actinium-PSMA-617 has the potential to change the future treatment of metastatic prostate cancer. It can be confirmed that a dose of 100 kBq/kg body weight is safe and effective with the only side effect being xerostomia. The survival rate is TAT is higher than other methods and also 82% had their tumor shrunk and had lower PSA.
CONCLUSION
In this abstract, we highlight the recent developments in α-particle therapy that have enabled me and my supervisors over the years to exploit this highly potent form of therapy by targeting tumor-restricted molecular biomarkers.
Keywords: 223Ra, α-particle therapy, molecular radiotherapy, nuclear medicine, radioimmunotherapy

## Funding Agency

I do not require Travel Bursaries. I will be sponsored by my parents, who always sponsor my travels

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## Presentation Type

Contributed Oral

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