BISPHOSPHONATES AND PSMA MOLECULE LABELED WITH ^{103}Pd FOR AUGER ELECTRON TARGETED THERAPY

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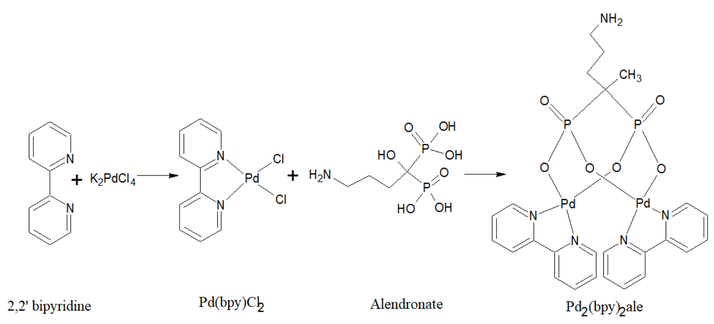
BACKGROUND

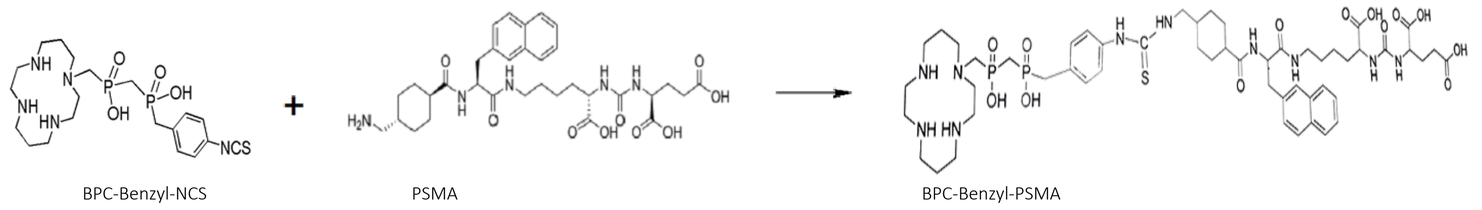
- Auger electron emitters are suitable for cancer metastasis because of their short range of energy deposition without damaging the bone marrow; hence ^{103}Pd/^{103m}Rh *in vivo* generators are promising for such therapy.
- Bisphosphonates are analogues of pyrophosphate, a natural inhibitor of bone demineralization. Radiolabeled bisphosphonates are a class of radiopharmaceuticals that are used for the treatment of bone therapy.
- PSMA (Prostate-Specific Membrane Antigen) is used for targeted therapy of prostate cancer, where radioactive molecules bind to cancer cells and destroy them. Such treatment, allows for precise cancer elimination while minimizing damage to healthy tissues

OBJECTIVE

- The main goal of the work was to synthesize the mixed complex of ^{103}Pd with bisphosphonate, and with PSMA molecules, which will accumulate in cancer cells, pass through the nuclear membrane, enter the DNA, and intercalate into it.

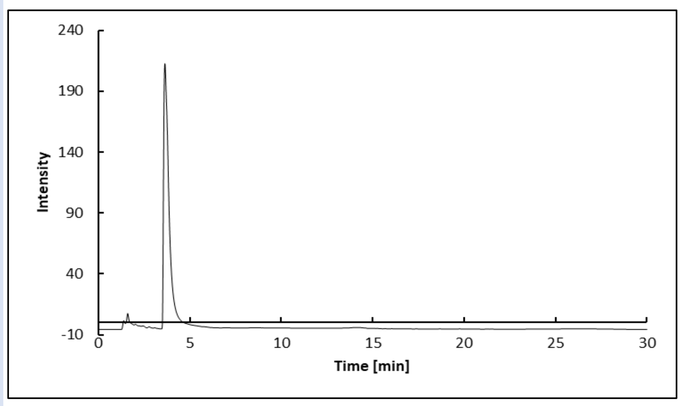
SYNTHESIS OF THE COMPLEXES





CHARACTERIZATION AND INVITRO TOXICITY

HPLC



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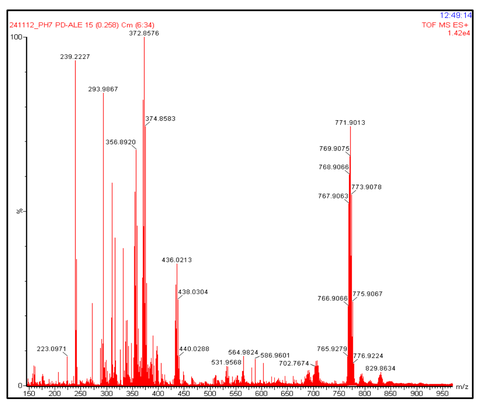

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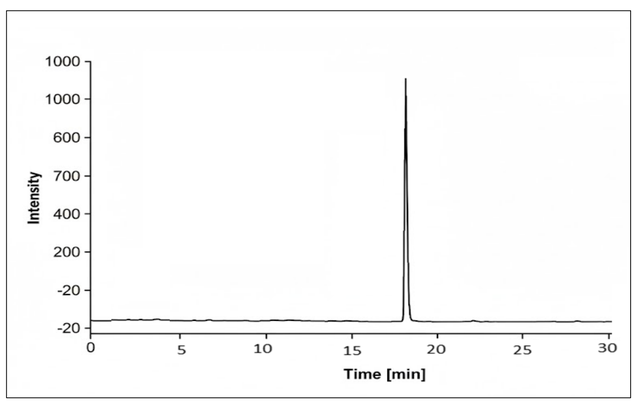

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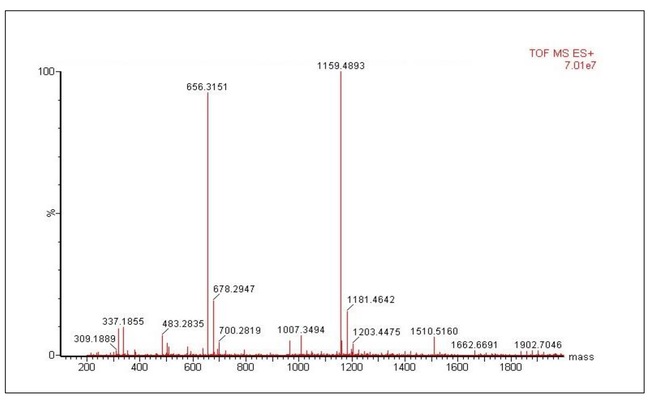
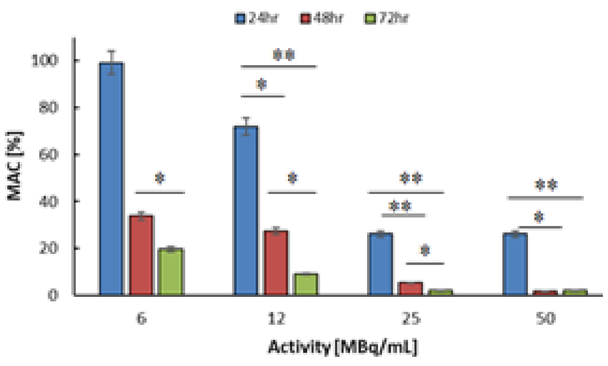
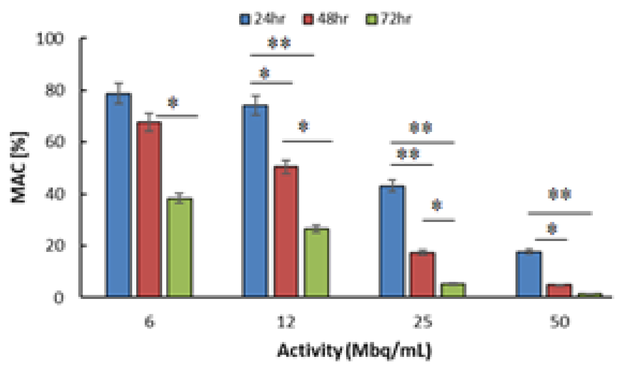
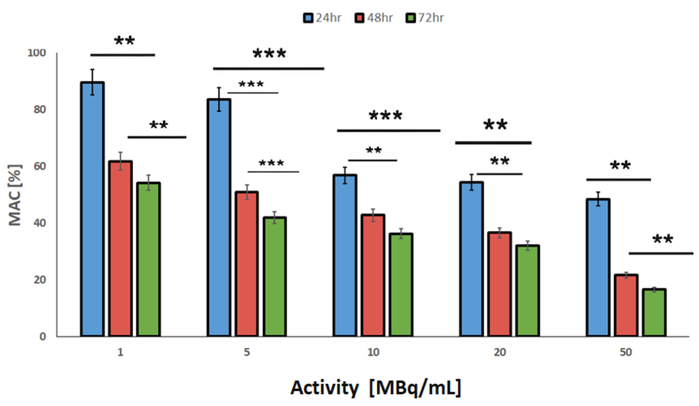


CYTOTOXICITY OF ^{103}Pd$_2$(bpy)$_2$ale COMPLEX USING SKOV-3 AND DU145 CELL LINE

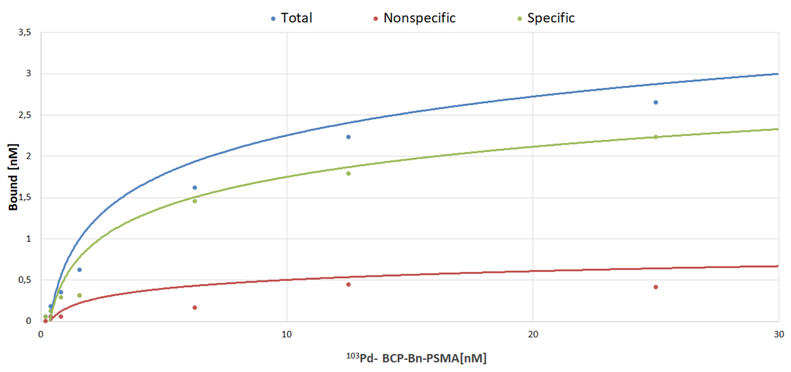




CYTOTOXICITY OF ^{103}Pd- BCP-Bn-PSMA COMPLEX USING LNCaP CELL LINE



BINDING



DISCUSSION

- Both compounds were stable in physiological conditions.
- Obtained $Pd_2(bpy)_2$ale complex was confirmed by mass spectroscopy with m/z ratio of 771.9 and ^{103}Pd- BCP-Bn-PSMA with m/z ratio of 1158.
- The retention time for 103Pd- BCP-Bn-PSMA is 18.5 minutes and for $Pd_2(bpy)_2$ale is around 5 min

FUNDING

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CONCLUSION

- The complex ^{103}Pd$_2$(bpy)$_2$ale and ^{103}Pd- BCP-Bn-PSMA was successfully synthesized.
- ^{103}Pd$_2$(bpy)$_2$ale and ^{103}Pd- BCP-Bn-PSMA exhibits mutimodel toxicity by emiting radiation and demonstrate chemotoxicity.
- ^{103}Pd- BCP-Bn-PSMA The complex primarily binds specifically to LNCap cells.