

GOLD BASED NANOBRAHYTHERAPY SYSTEMS: LASER ABLATION IN LIQUID AS A TOOL

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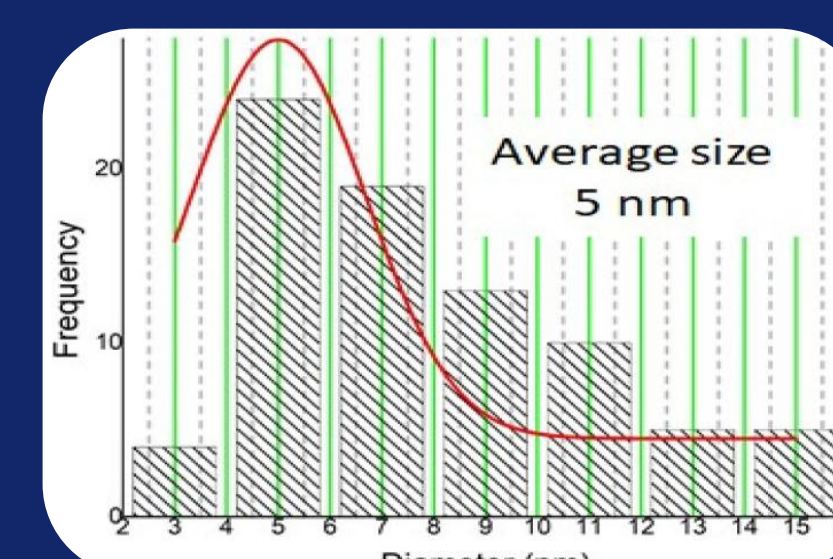
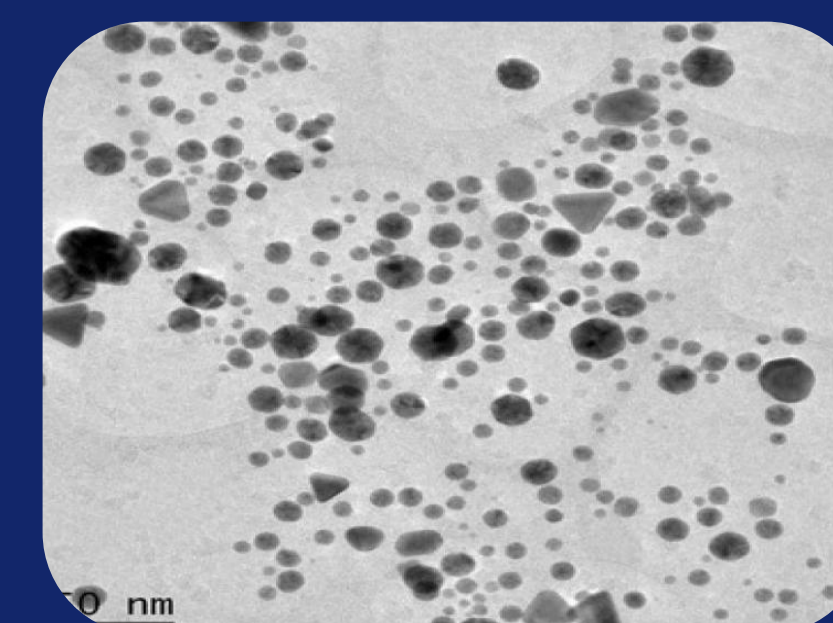


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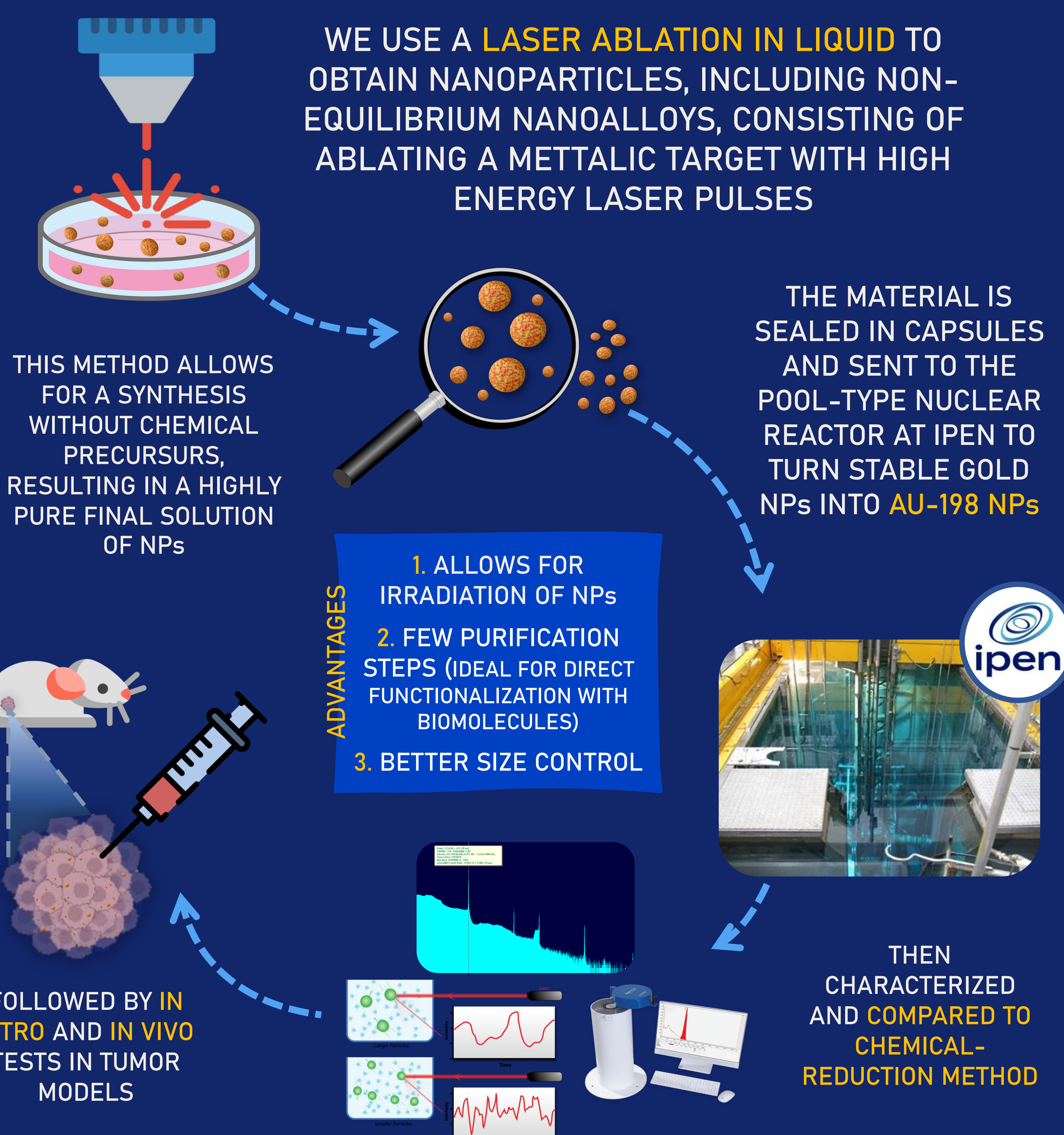
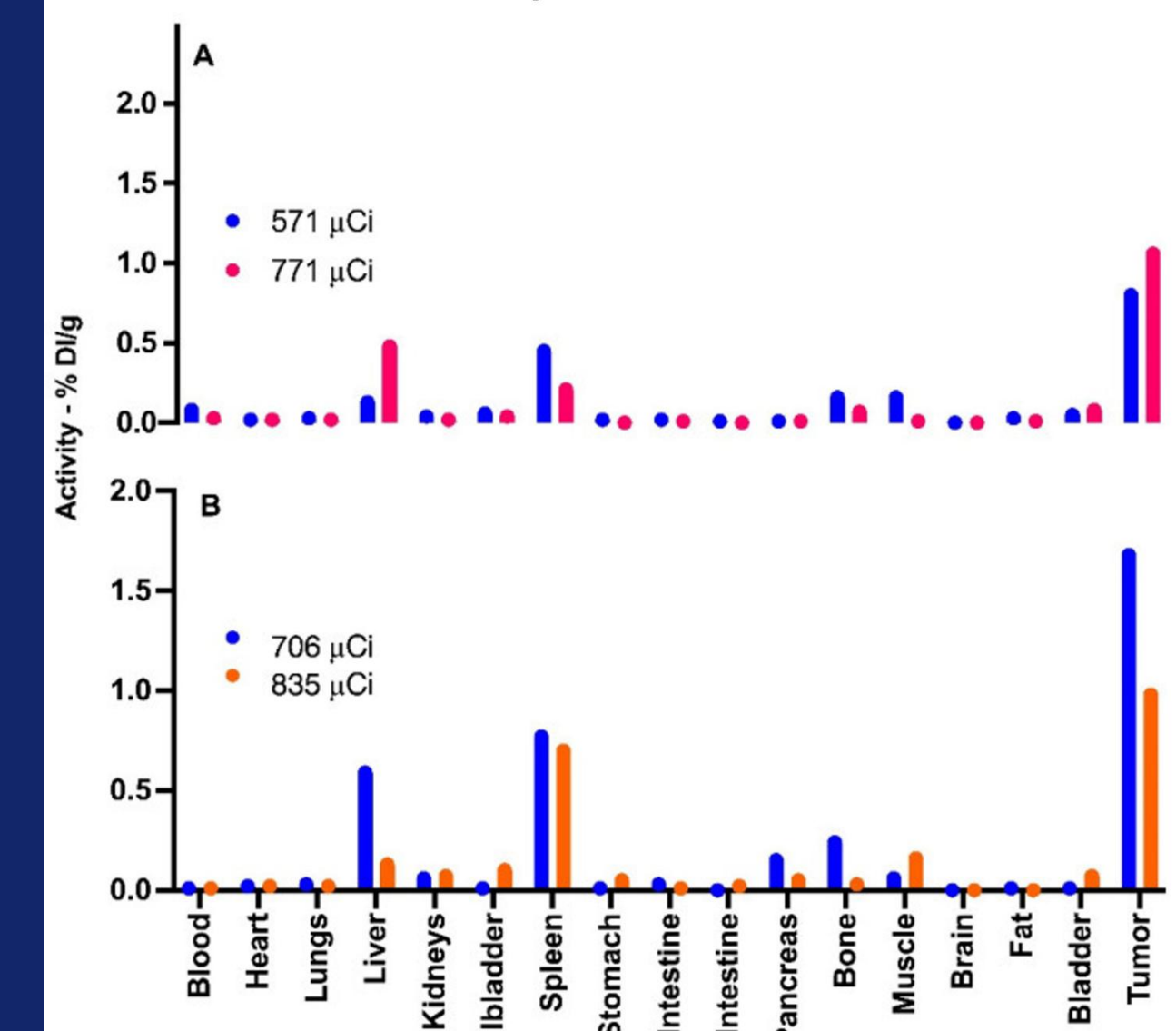
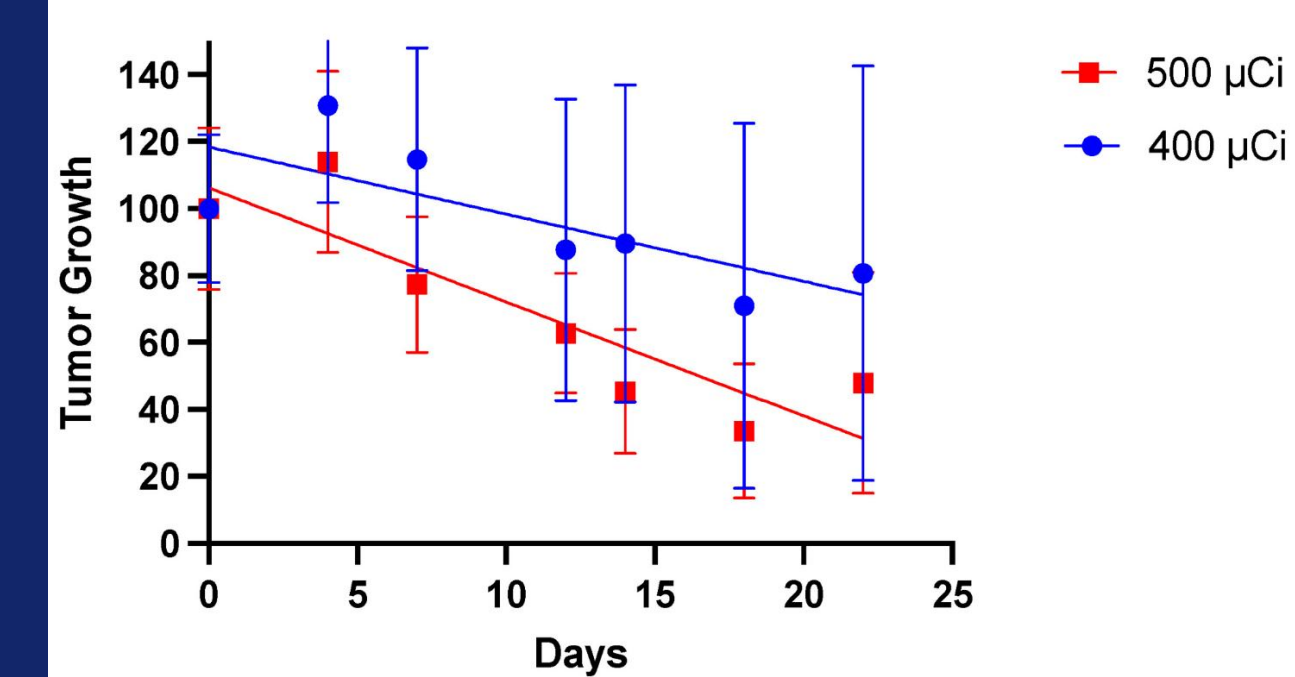
PROF. ROSTELATO HAS BEEN EXPLORING **NANOBRACHYTHERAPY** WITH AU-198 NANOPARTICLES SYNTHESIZED BY CHEMICAL REDUCTION FROM HOT METTALIC AU, ACTIVATED IN SITU IN THEIR POOL-TYPE NUCLEAR REACTOR.

RESULTS ARE PROMISSING AS NPs DEMONSTRATED **LOW WHOLE BODY TOXICITY**, **GOOD TUMOR RETENTION** AND SIGNIFICANT **SIZE REDUCTION** ON A PROSTATE CANCER MODEL. PRELIMINARY DATA ON BREAST CANCER HAS SHOWN SIMILAR RESULTS AND AN ADDITIONAL **REDUCTION IN THE NUMBER OR DISTANT METASTASIS**.

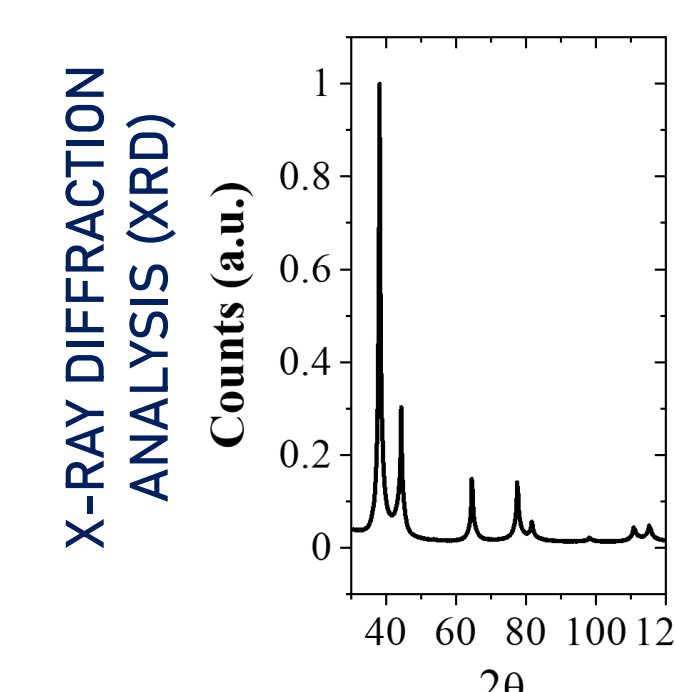
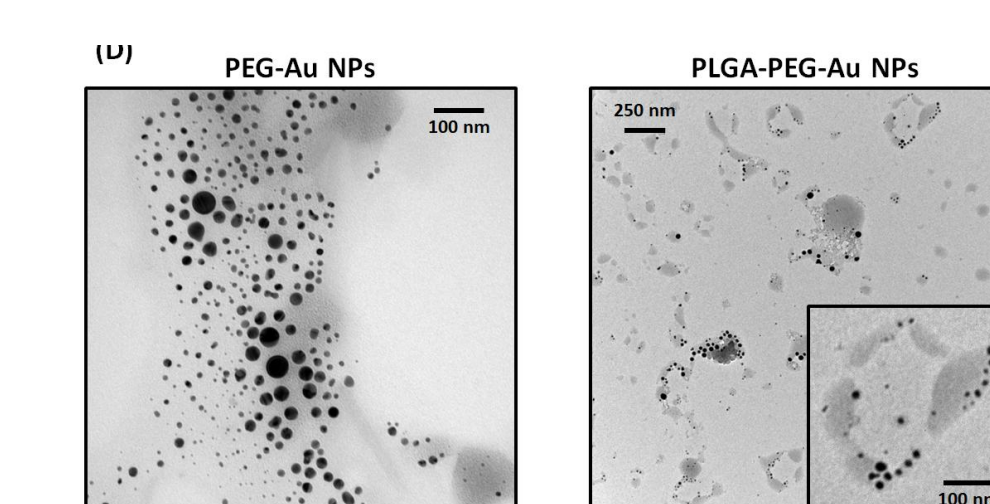
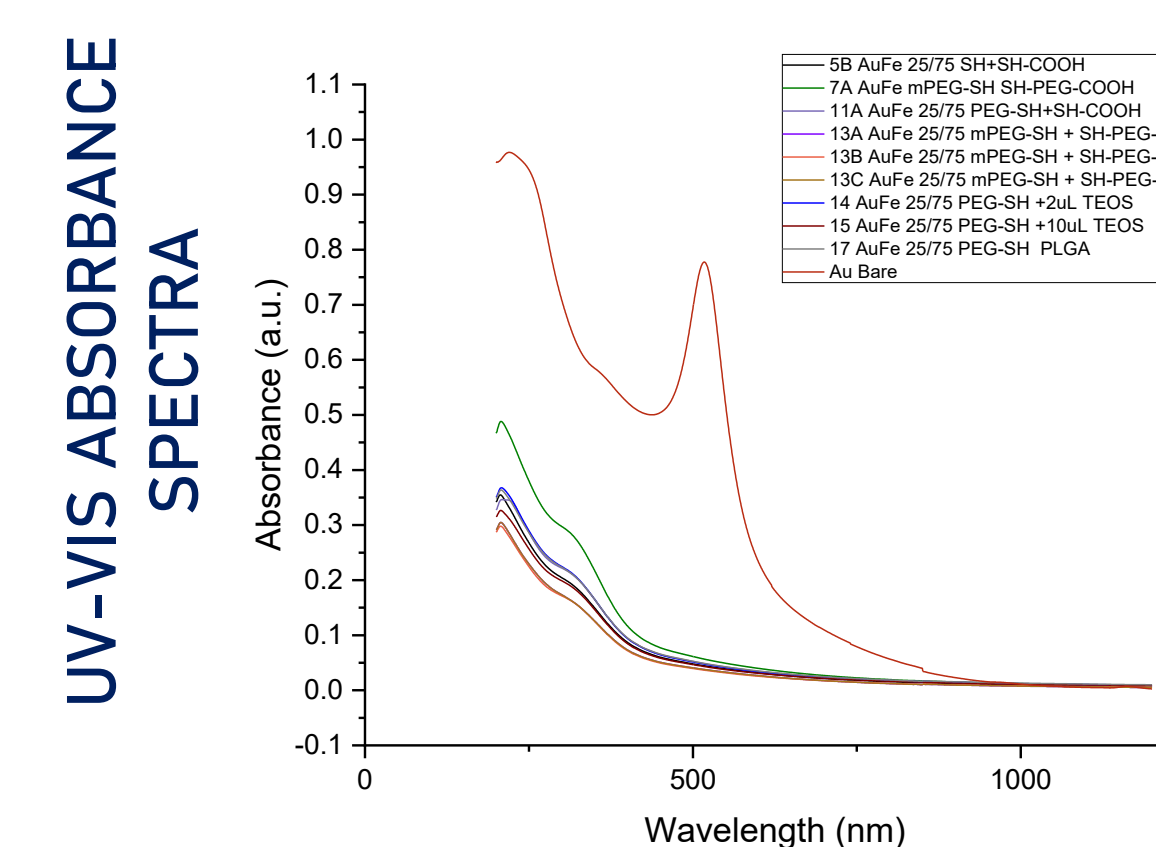


Barbezán et al.
Nanotheranostics 2024.

Evaluation of the Effectiveness of *in vivo* Treatment with Radioactive AuNPs BSA

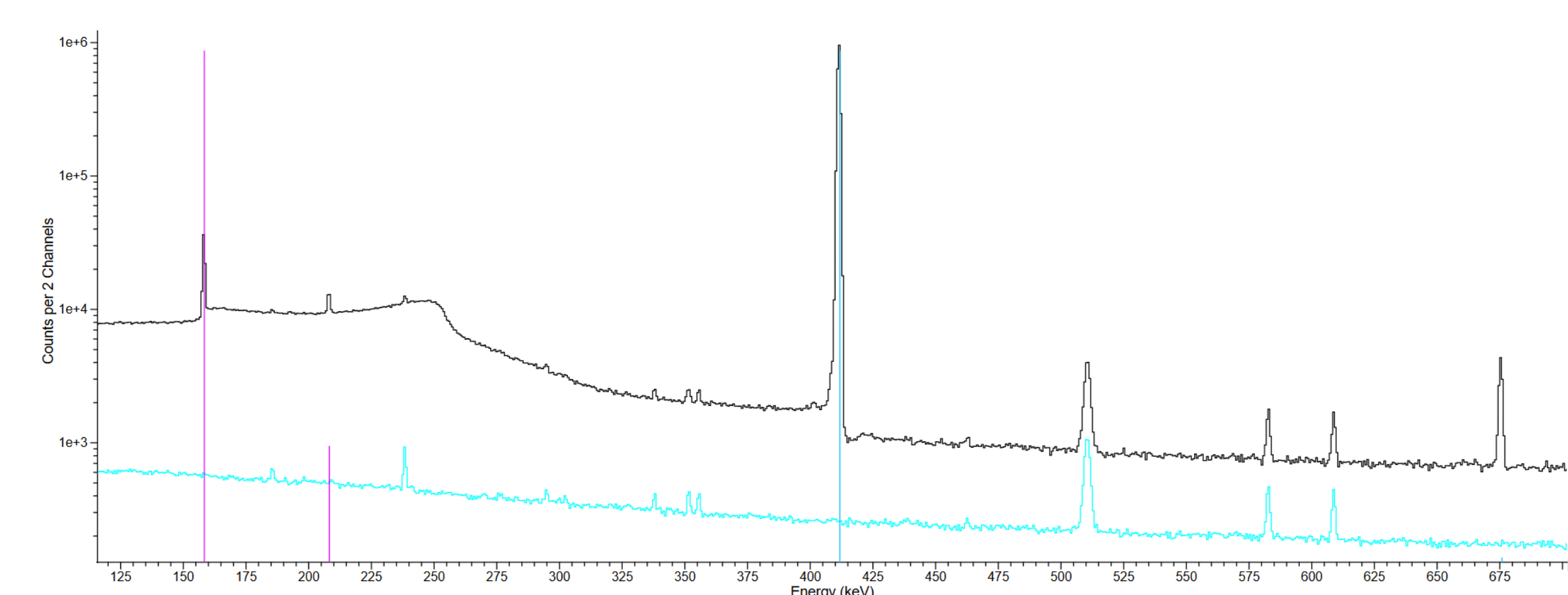


LASER ABLATION IN LIQUID (LAL) COLD AU NPs



Stable Au NPs are obtained through laser ablation in liquid (LAL) synthesis, with an average size of 5 nm (without coating), 9 nm (PLGA-PEG) and 14 nm (PEG). They show a plasmon band at 520 nm, characteristic of spherical Au NPs.

Glass capsules containing liquid NPs solution were irradiated in the EA-R1 nuclear reactor for 24h. After 2d, samples were opened in a hot cell. A wash of the glass was used to collect the gamma emission spectra of the NPs, in which there is a clear emission of Au and no contaminant was found.



GAMMA EMISSION SPECTRUM OF HOT LAL AU NPs

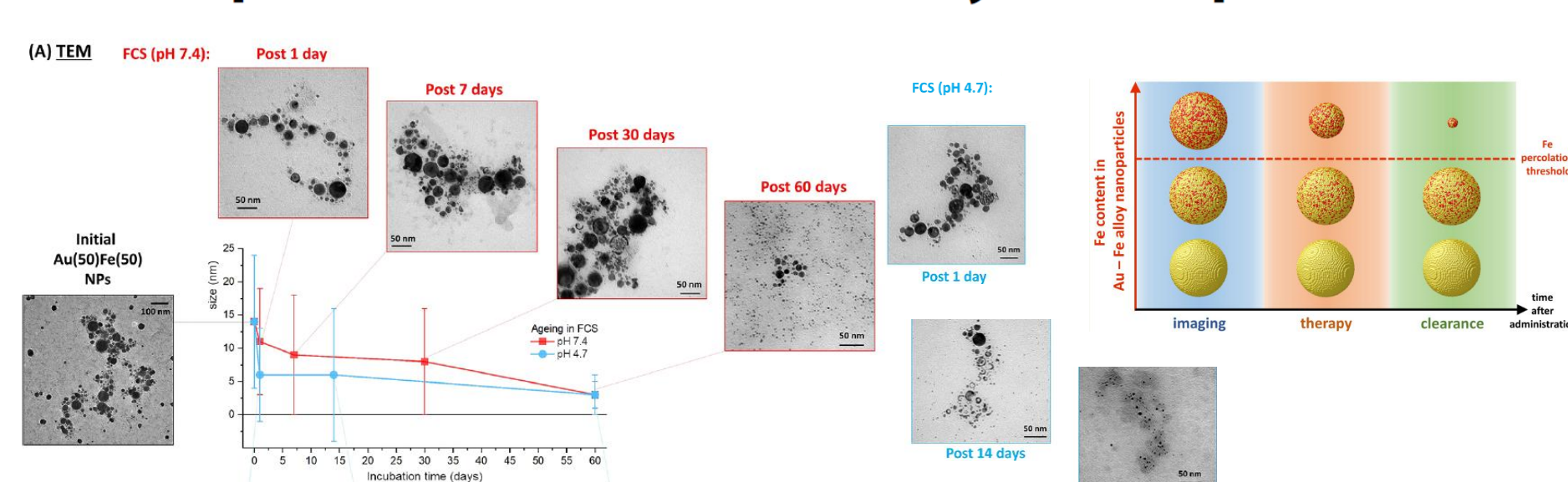
NP CHARACTERIZATION

PREVIOUS WORK FROM LASP

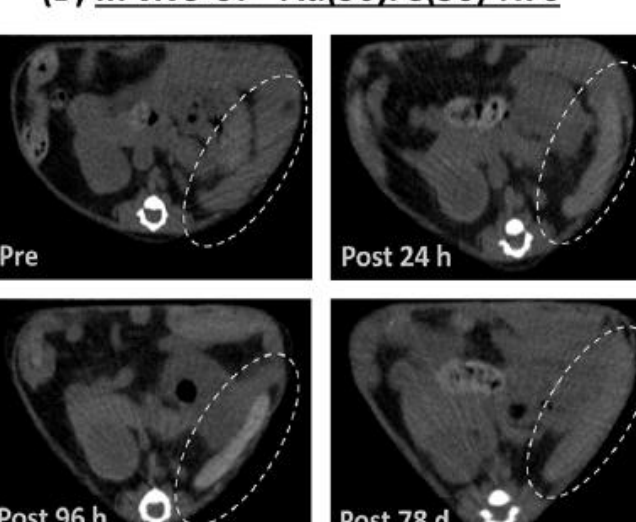
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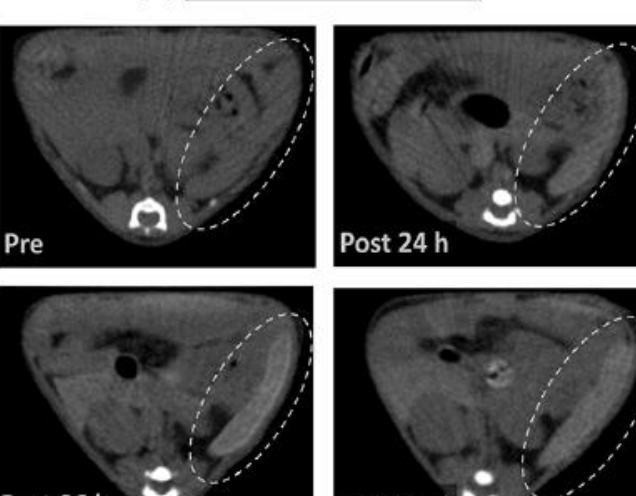
4D Multimodal Nanomedicines Made of Nonequilibrium Au-Fe Alloy Nanoparticles



(B) In vivo CT - Au(50)Fe(50) NPs



(C) In vivo CT - Au NPs



SYNTHESIS AND CHARACTERIZATION OF AU198 NPs BY LASER ABLATION IN LIQUID (LAL)

EFFICACY OF NPS *IN VITRO* AND *IN VIVO*

EXPLORING OTHER COMPOSITIONS AND USING HOT TARGETS FOR LAL

Effective synthetic procedure to generate highly-pure Au NPs allowing its irradiation in nuclear reactor without the production of other radioactive species.
Current challenges: production of capsules that can be irradiated and then opened under safety conditions.

Future steps: Functionalization with different coatings and in vitro/in vivo testing

Evaluate the feasibility of other materials and alloys, including non-equilibrium nanoparticles that can only be produced by LAL.
Using hot materials to produce LAL targets.

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AIRC AMENDOLA