

Functional Personalized Complex Combination Nano Therapy for Osteosarcoma

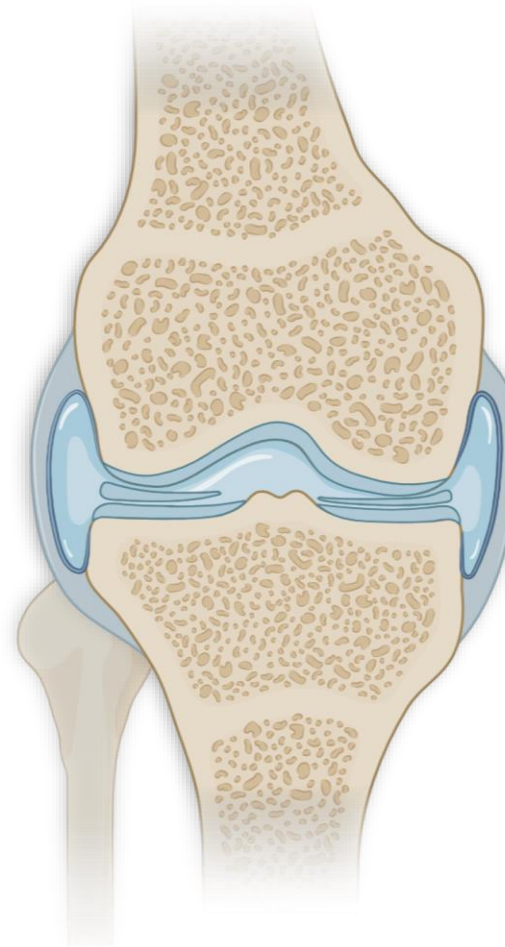
Orr Bar Natan

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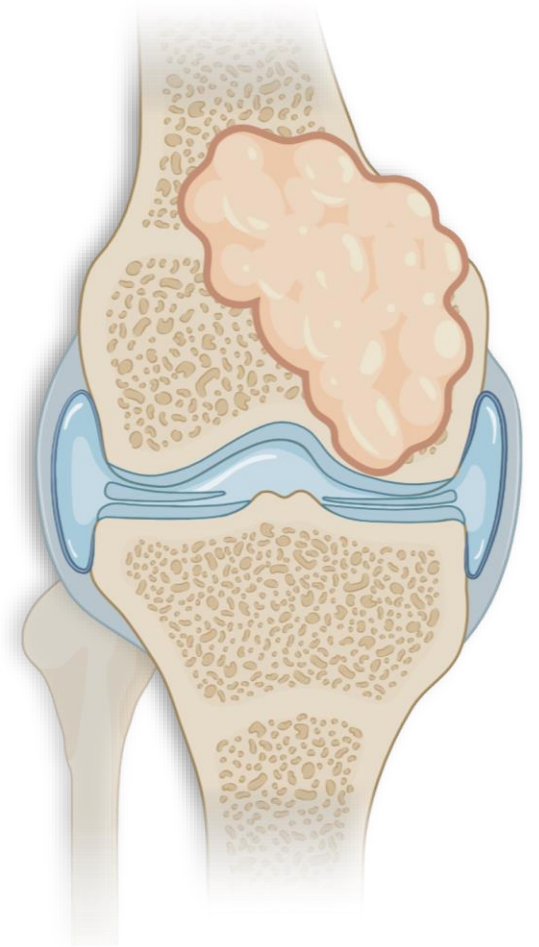
OSTEOSARCOMA (OS)

- Annual incidences- 3.4 per million people
- Most common organs- **Long bones**
- Metastasis- lungs
- **SOC- Doxorubicin,Cisplatin and Methotrexate**
- Average 5-year survival- 70% and 20% for metastatic patients

There is no personalized treatment for osteosarcomas



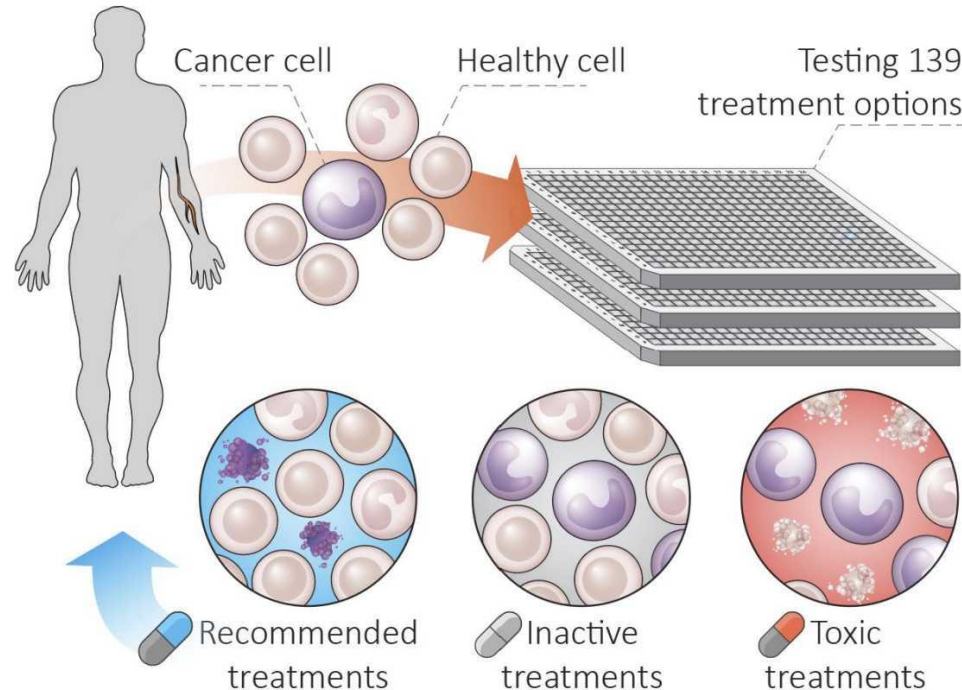
healthy bone



osteosarcoma

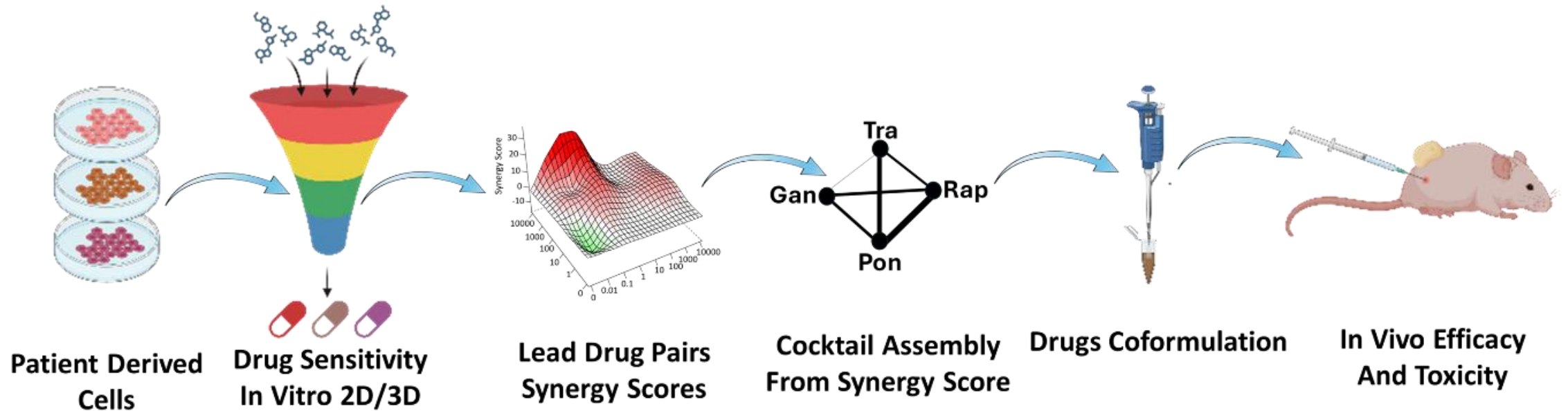
PRECISION MEDICINE

1. Genetic based: mutation of genes: EGFR in Lung Cancer or BRAF in Melanoma
2. Protein based: protein expression of Estrogen Receptor/HER2 in Breast Cancer
3. Functional based: no actionable genetic or protein alteration

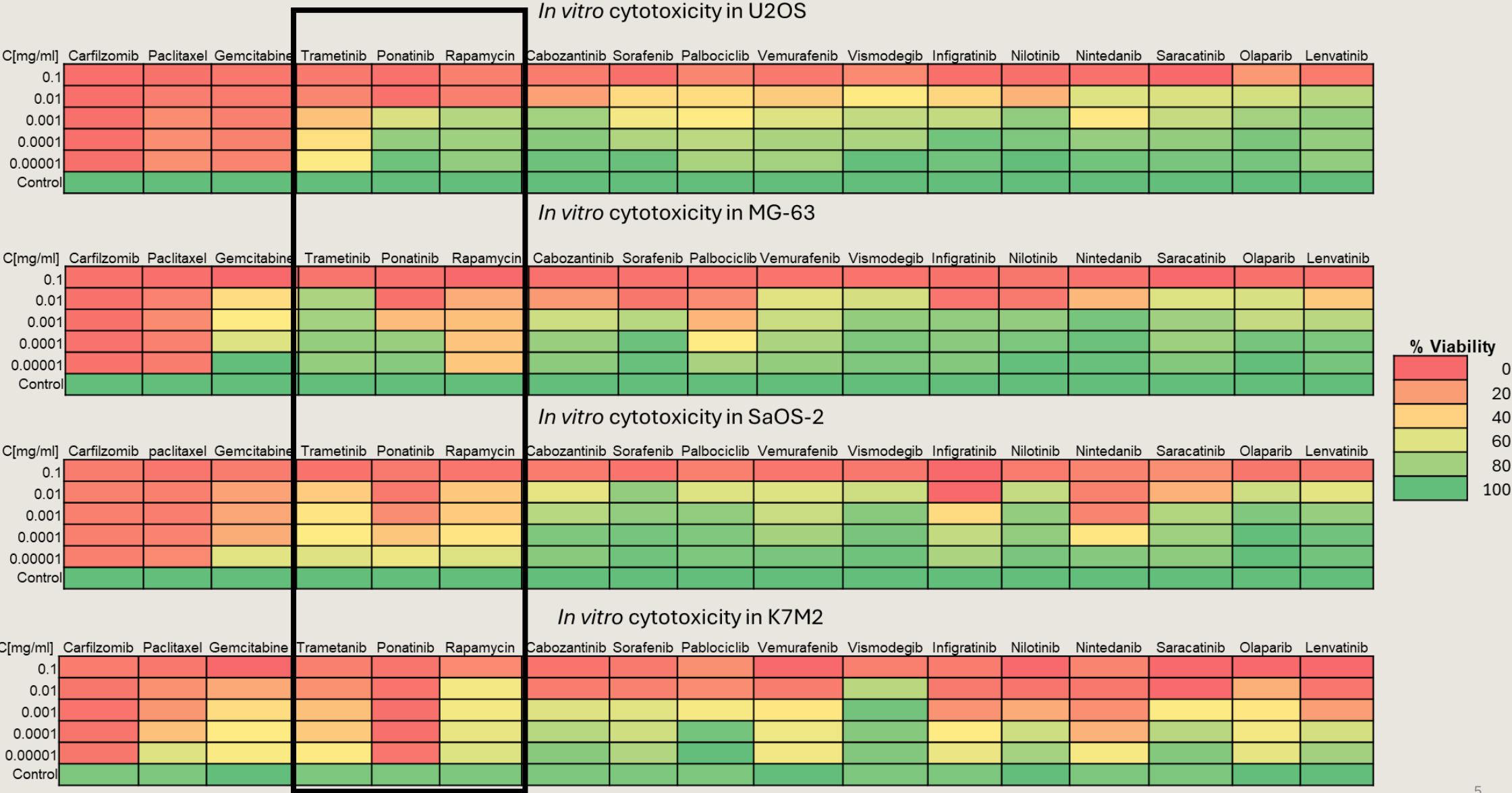


Osteosarcoma lacks consistent mutations- functional testing is essential!

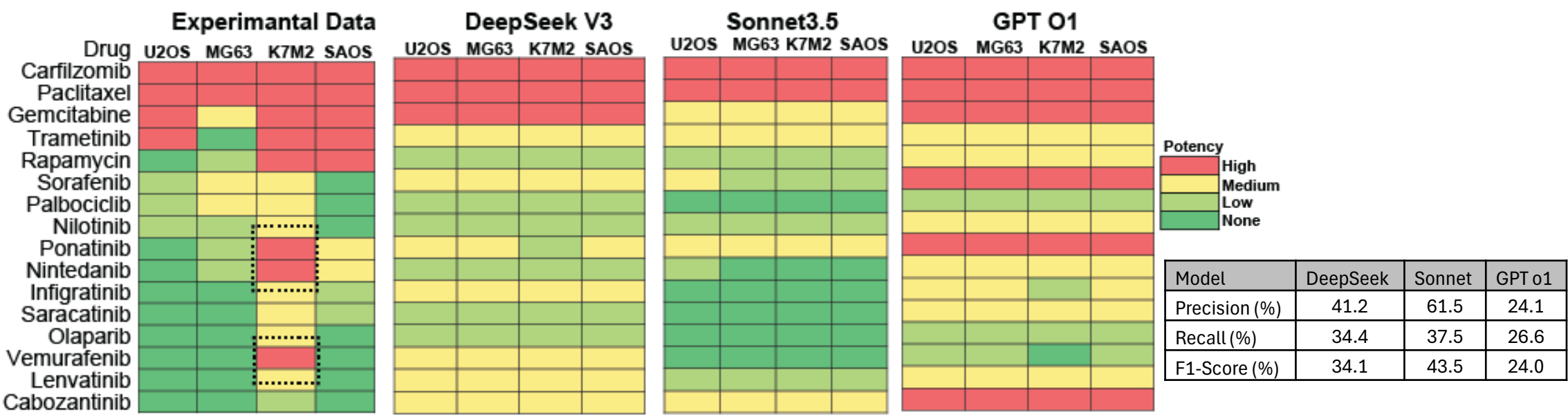
HOW TO MAKE A PERSONALIZED COCKTAIL?



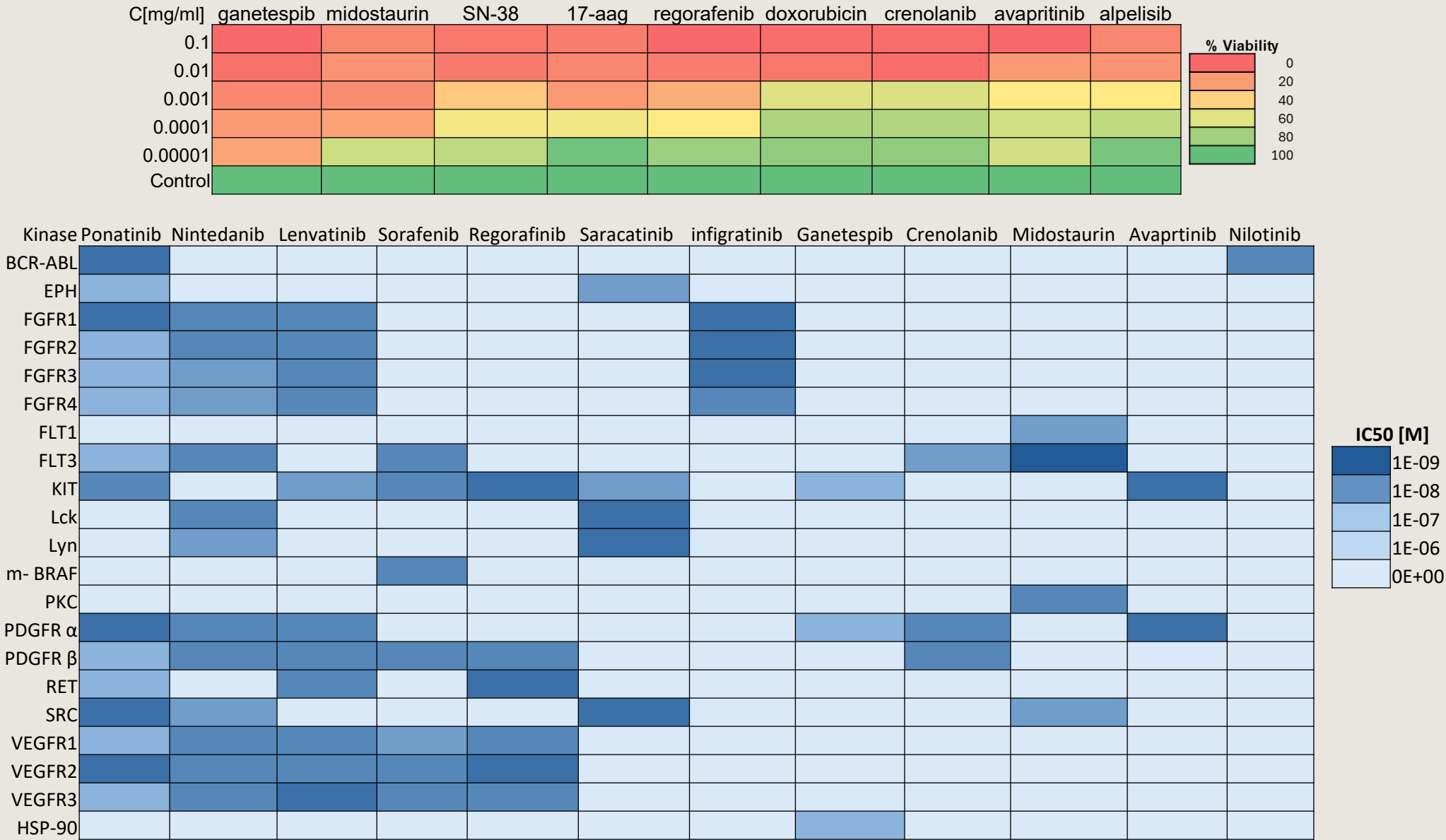
DIFFERENTIAL RESPONSE ON OSTEOSARCOMA CELL LINES



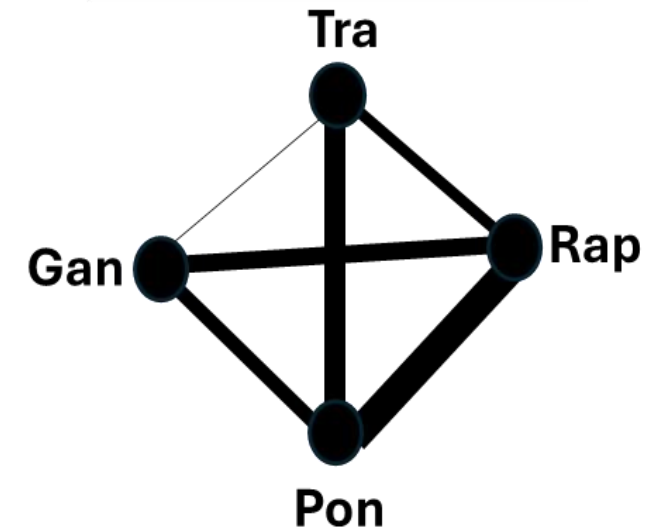
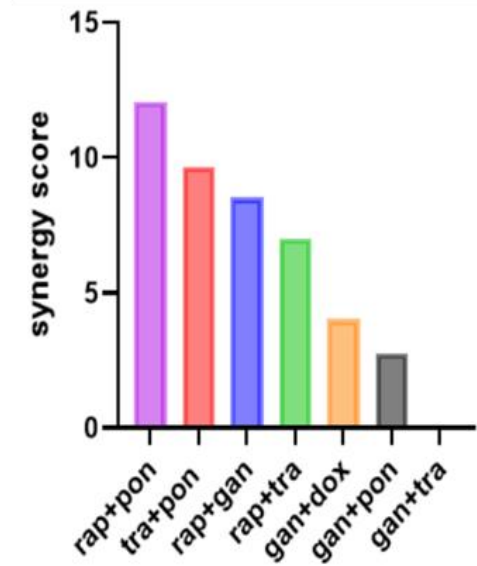
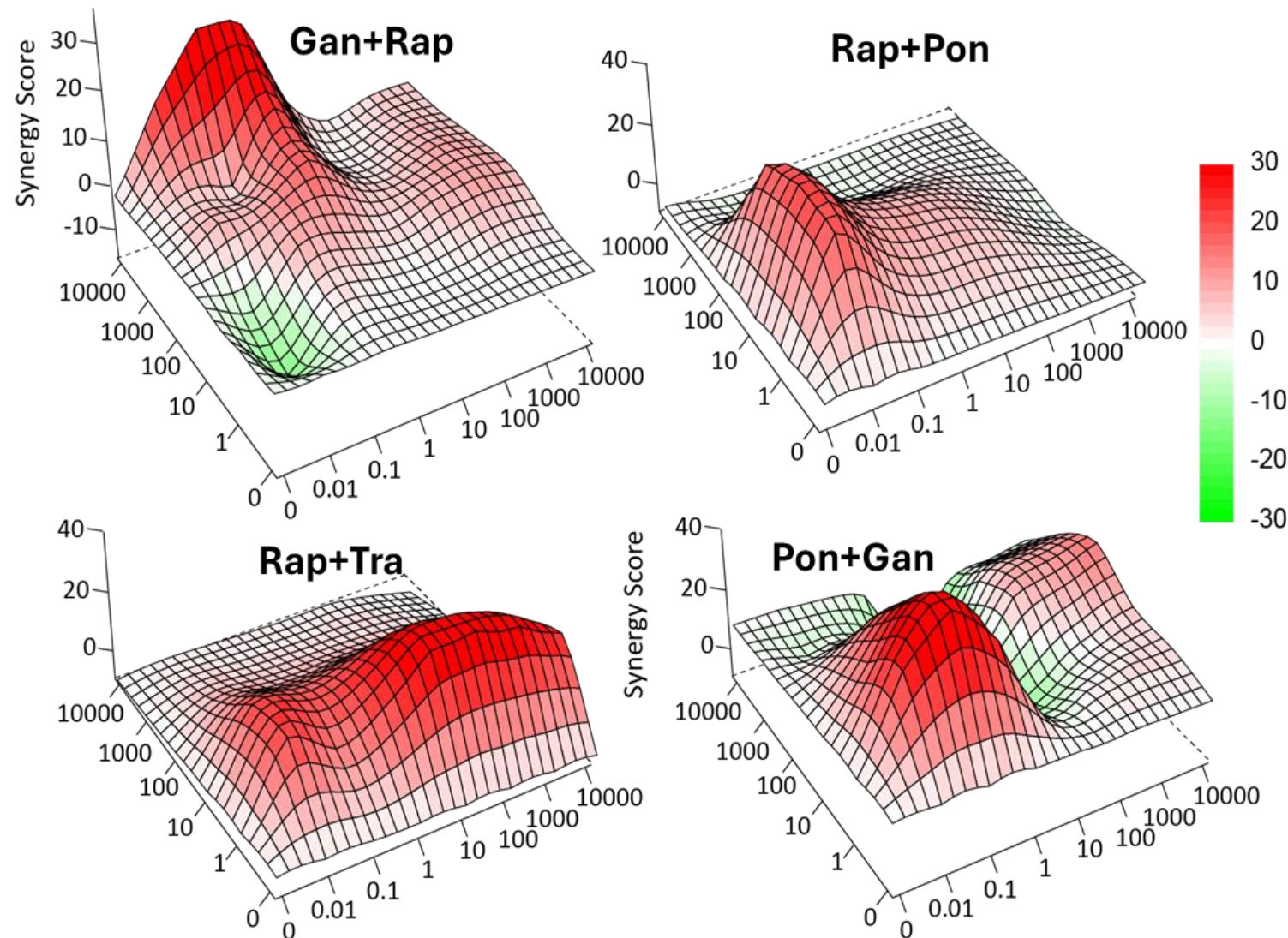
DATA DRIVEN DRUG SELECTION: LLM CANNOT PREDICT OUTCOME



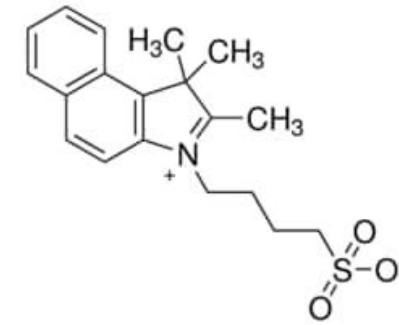
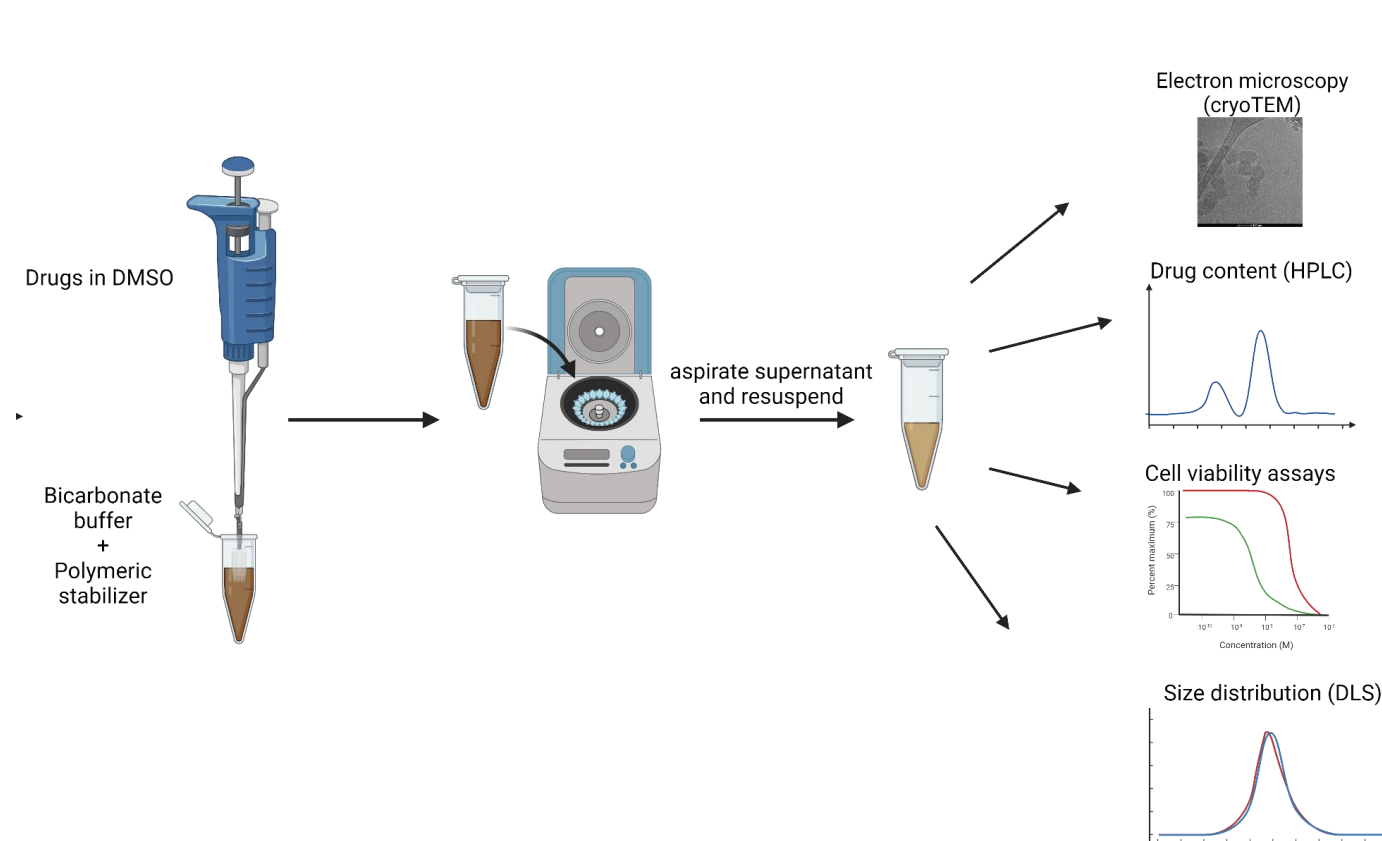
K7M2 IS SENSITIVE TO KINASE INHIBITORS



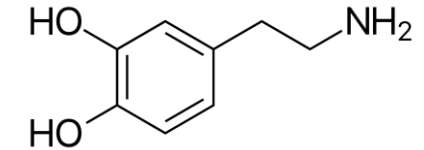
SELECTION OF DRUG PAIRS WITH SYNERGY RANKING



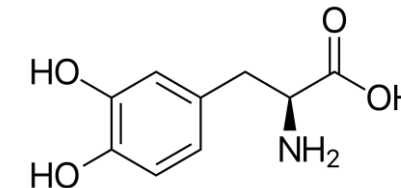
NANOPRECIIPITATION OF POLYDOPAMINE DRUG NANOPARTICLES



In820



Dopamine

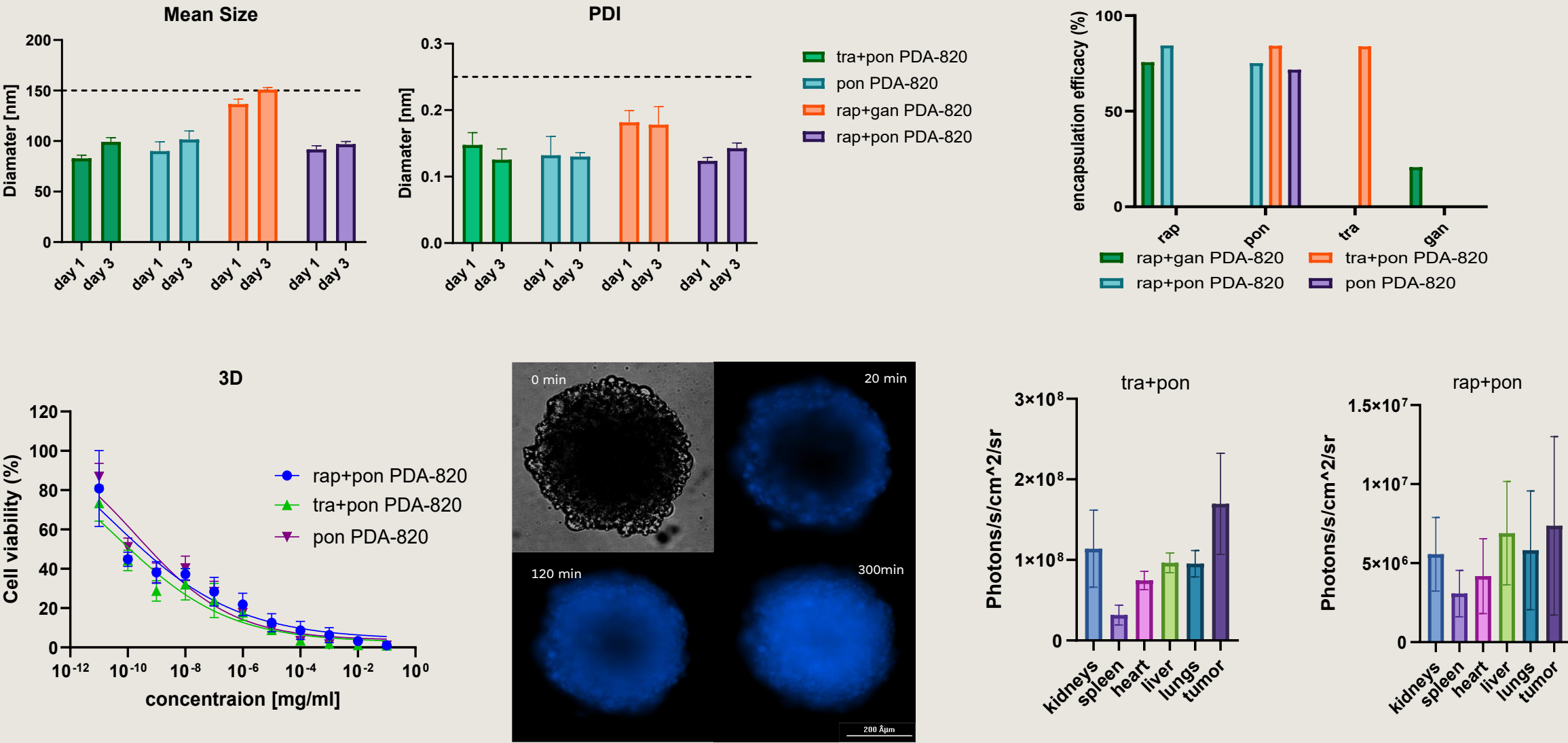


L-Dopa

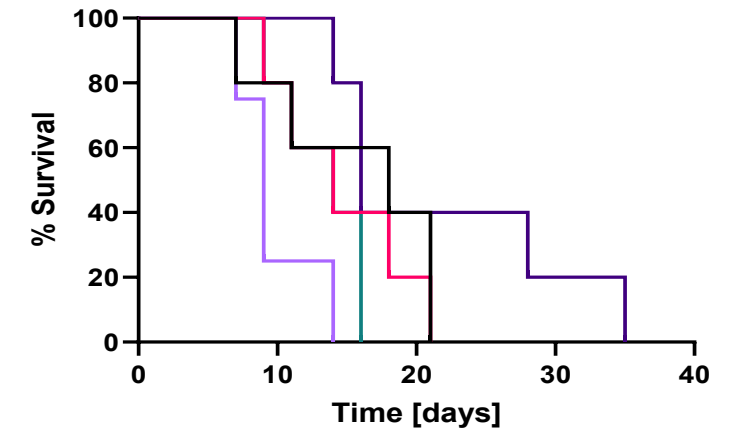
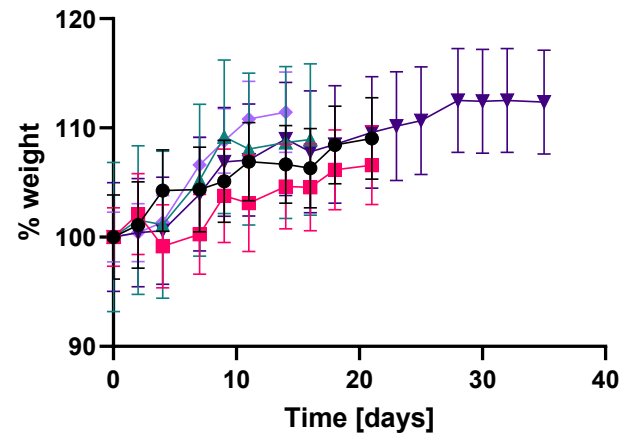
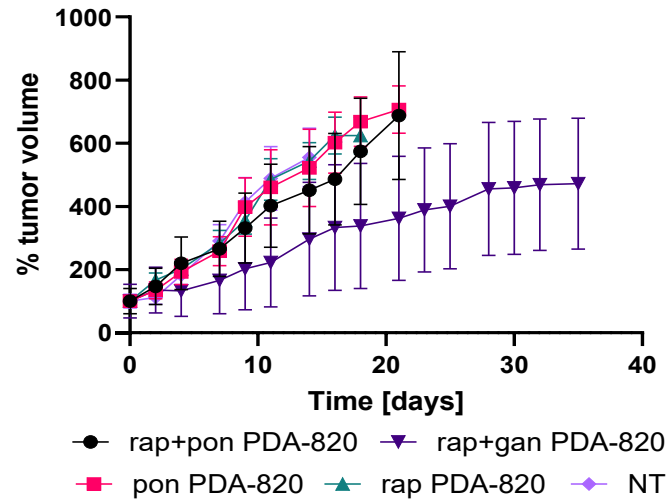
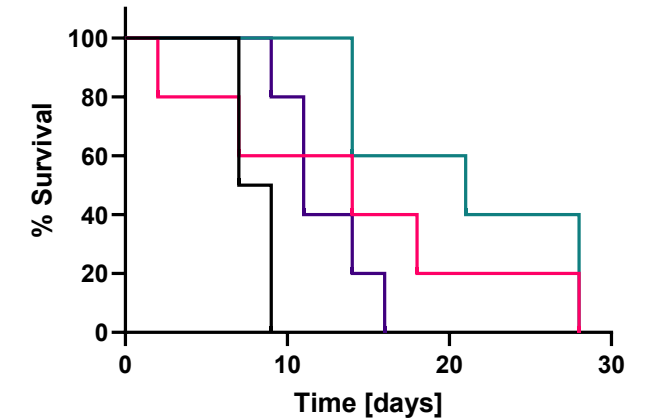
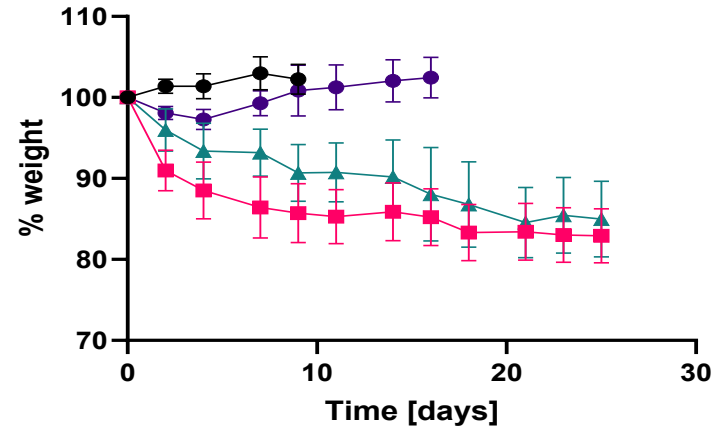
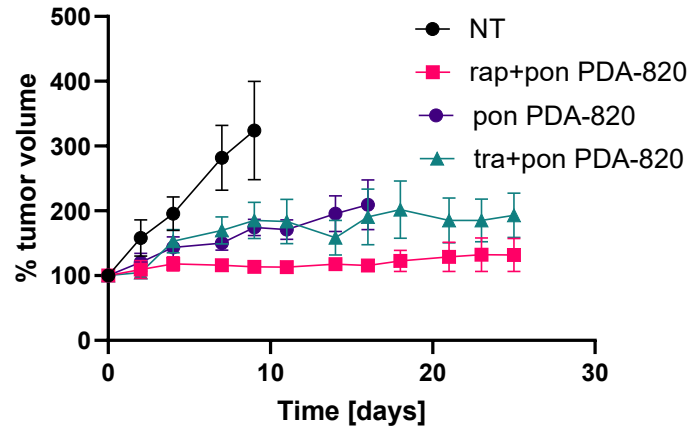
Advantages:

- Simple Preparation (20min)
- Biocompatible
- Stable
- Predictable

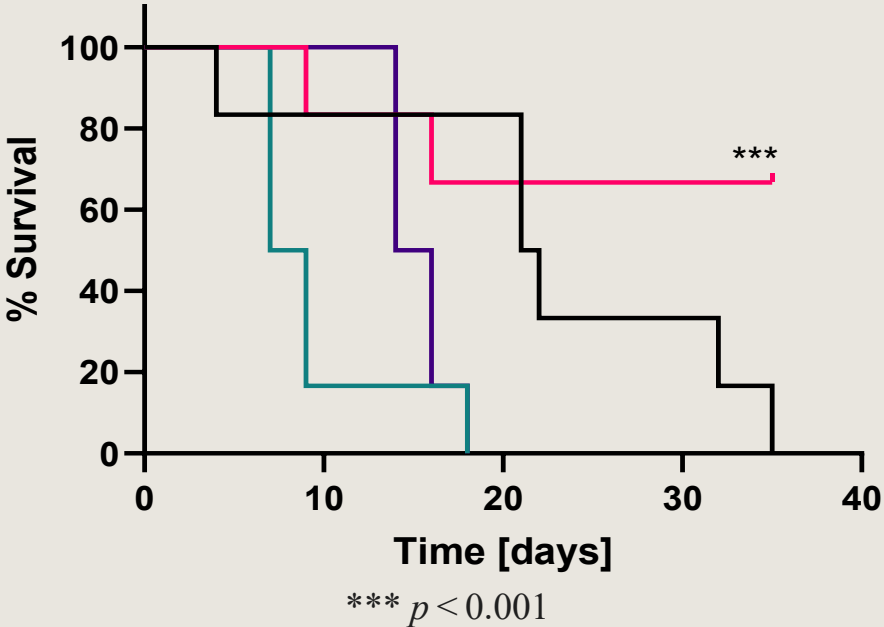
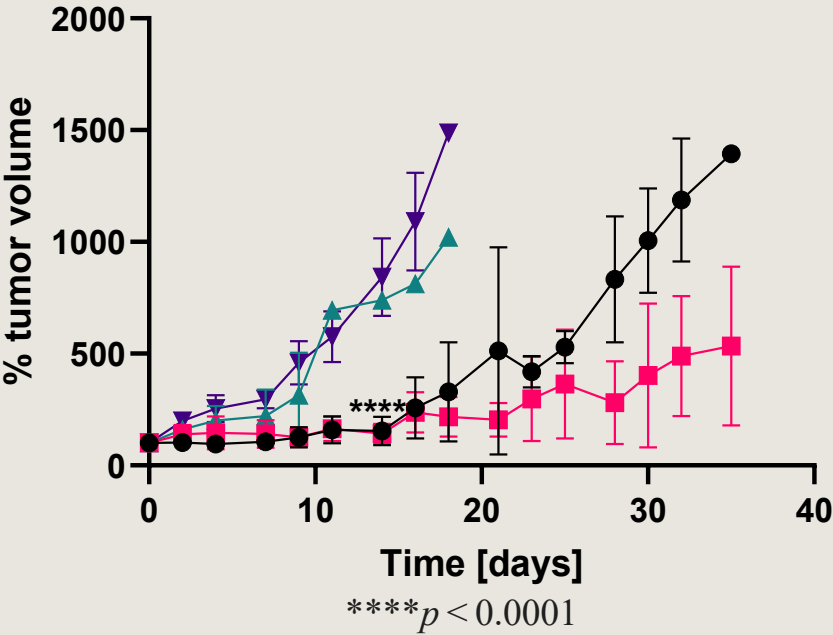
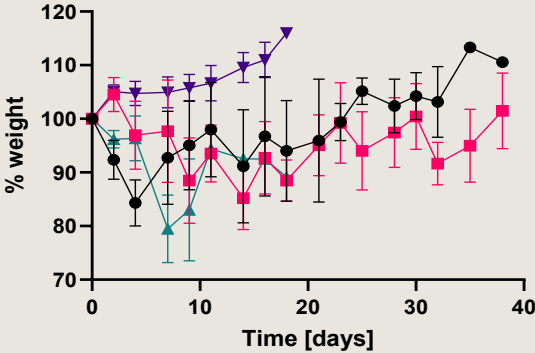
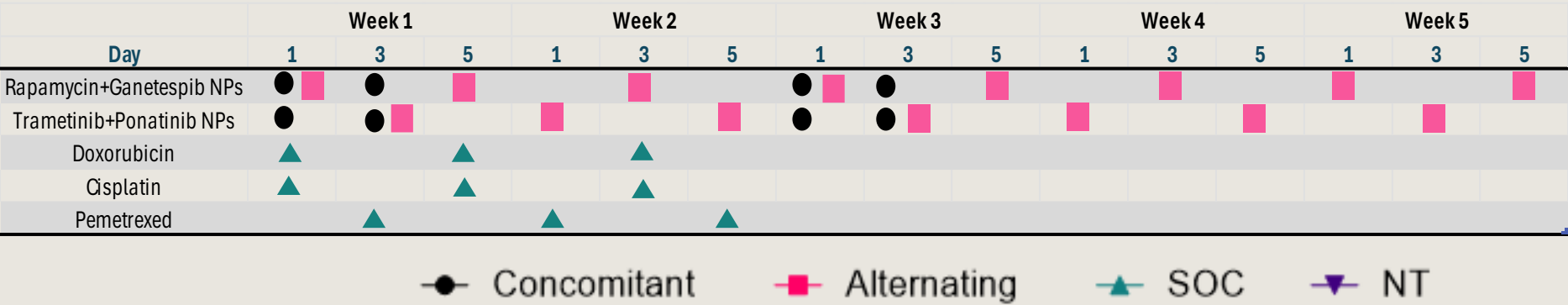
DRUG COMBINATION IN NANOPARTICLES UPTAKE&EFFICACY



TWO DRUG COMBINATIONS DID NOT REACH THE GOAL



ALTERNATING SUPPRESSED BOTH CONCOMITANT AND STANDARD-OF-CARE TREATMENTS



CONCLUSIONS

- Functional screening identified potent, unexpected drug combinations for osteosarcoma.
- PDA-820 nanoparticles enabled stable, high-efficiency co-delivery of synergistic therapies.
- In vivo, alternating combination regimens outperformed both standard-of-care and concomitant strategies in efficacy and tolerability.

In osteosarcoma, one-size-fits-all fails. Only personalized, function-guided therapy with smart delivery can outsmart this disease



THANK YOU!

Come Talk to me for more information!

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Additional Posters from lab

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