Supporting information for

Novel doxycycline gold nanoparticles via green synthesis using PEO-PPO block copolymers for enhanced radiosensitization of melanoma

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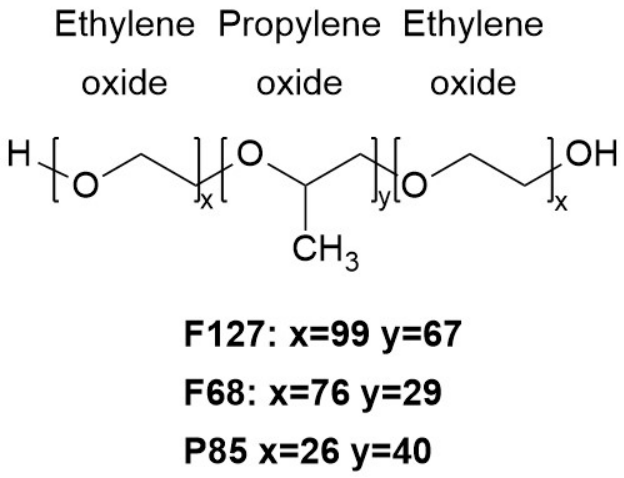

Figure S1. Chemical structure of PEO-PPO block copolymers (F127, F68 and P85) used in this work. These copolymers consist of hydrophilic poly(ethylene oxide) (PEO) blocks and hydrophobic poly(propylene oxide) (PPO) blocks arranged in an amphiphilic triblock configuration. This molecular architecture enables the formation of polymeric micelles (PMs) in aqueous dispersions, with the PEO blocks exposed to the aqueous environment and the PPO blocks forming the core of the micelle.

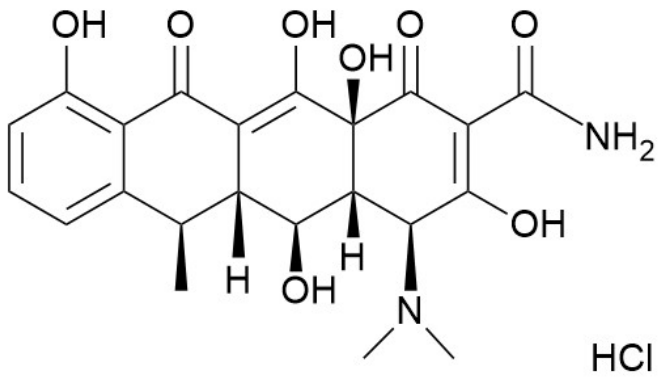

Figure S2. Molecular structure of doxycycline hydrochloride (DOXY), a broad-spectrum antibiotic from the tetracycline class. DOXY contains a complex tetracyclic ring system with multiple functional groups, including hydroxyl groups and a dimethylamine group. In this study, DOXY is proposed as an inhibitor of mitochondrial biogenesis, aiming to modulate mitochondrial function and cellular metabolism.

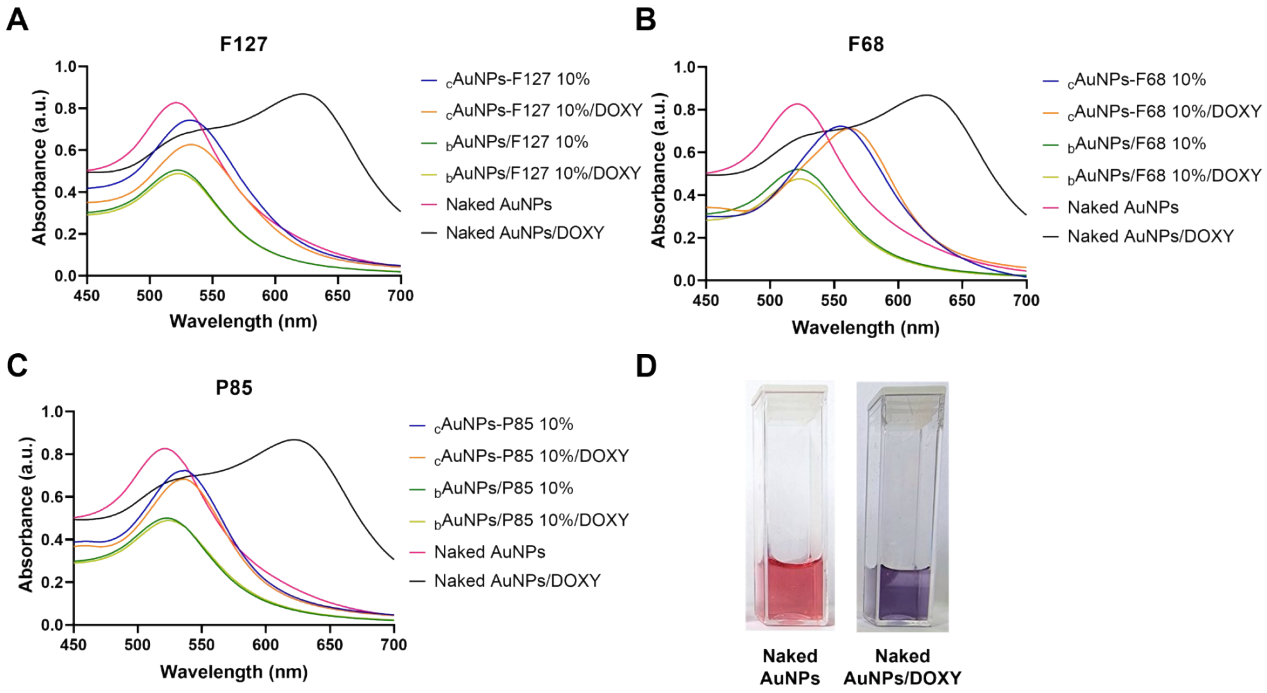

Figure S3. UV-Vis absorbance spectra of $_{c}$AuNPs-PMs complexes and $_{b}$AuNPs/PMs blends at 10% (w/v) copolymer concentration, compared to naked AuNPs synthesized via the Turkevich method, both with and without DOXY. (A) F127, (B) F68, and (C) P85. The incorporation of DOXY induces a red shift in the surface plasmon resonance (SPR) peak of the naked AuNPs (black line), suggesting interactions that promote nanoparticle aggregation. (D) Photograph illustrating the color change in the naked AuNPs dispersion upon DOXY addition, consistent with the observed SPR shift, further supporting DOXY-induced nanoparticle aggregation.

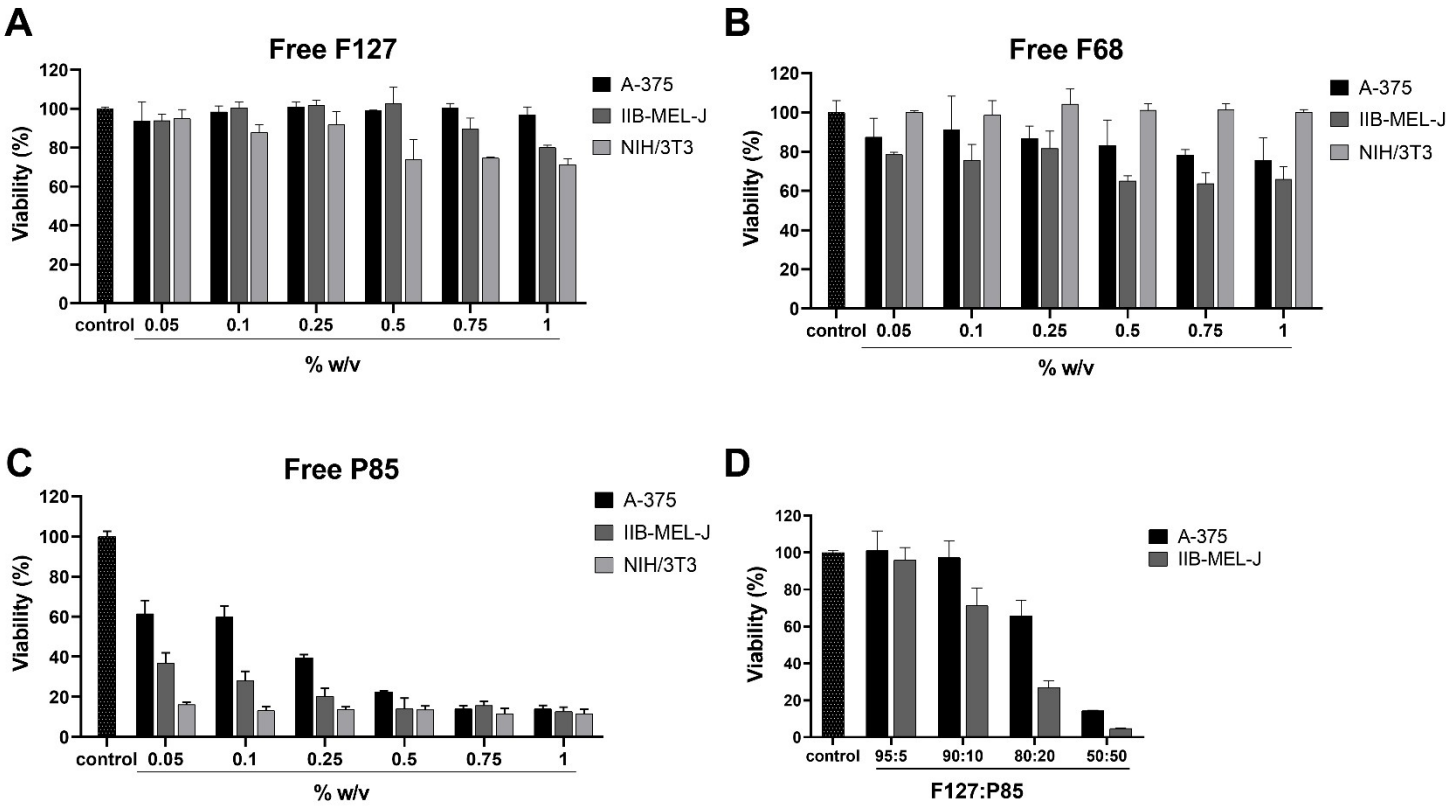

Figure S4. Cytotoxicity of free copolymers: (A) F127, (B) F68, and (C) P85 at increasing concentrations in A-375, IIB-MEL-J, and NIH/3T3 cells. (D) Cytotoxicity of F127:P85 combinations at 1% w/v final concentrations, assessed in A-375 and IIB-MEL-J cells.