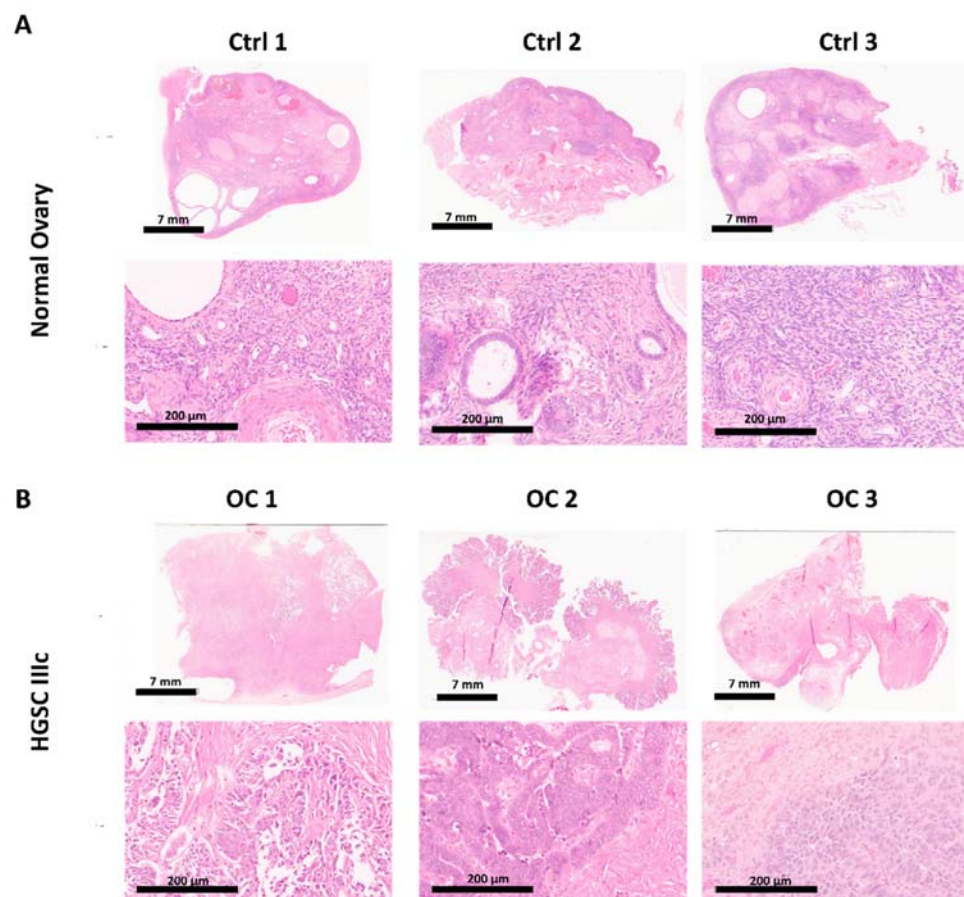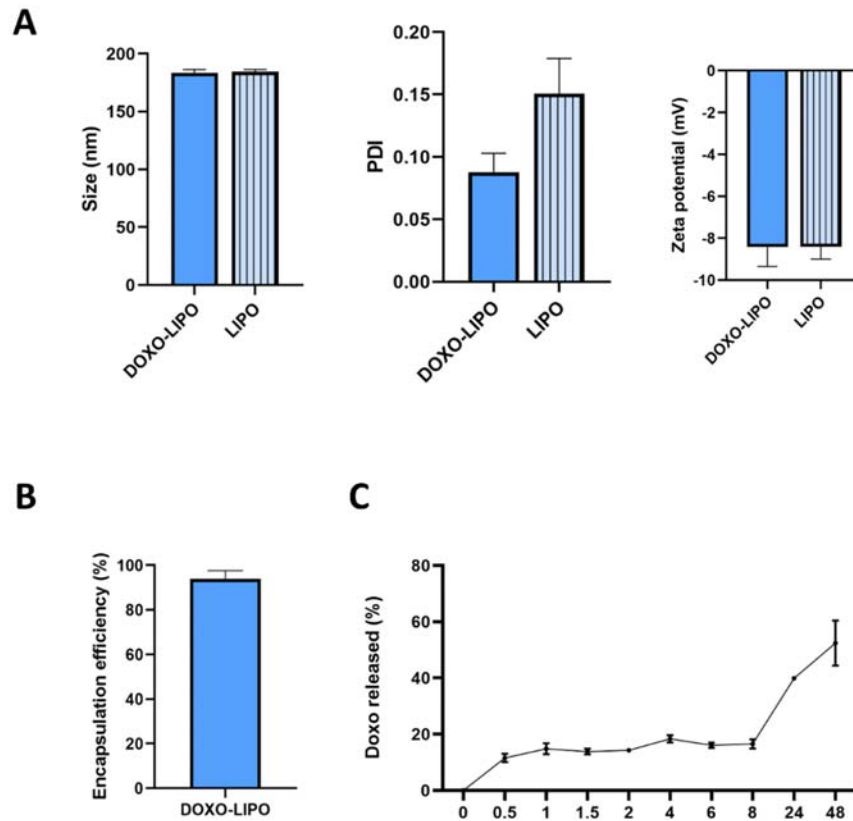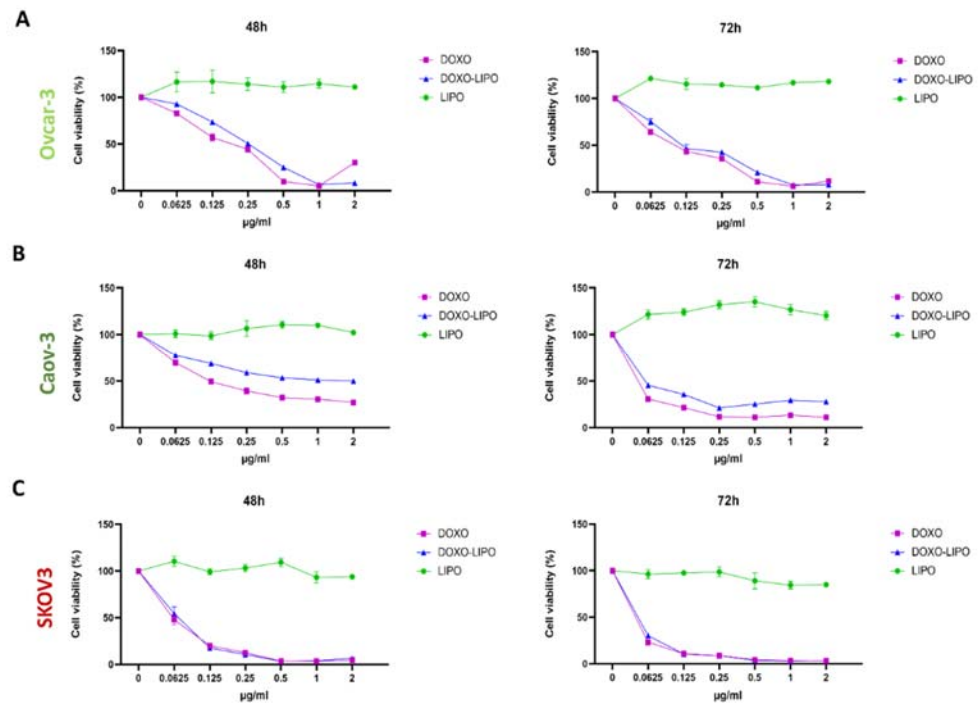**Figure S1. AFM analysis of patients' derived biopsies.** (A) Young's modulus (MPa) analysis of 3 HGCS III (OC1-2-3) and 3 normal patient-derived biopsies (ctrl 1-2-3) by AFM.
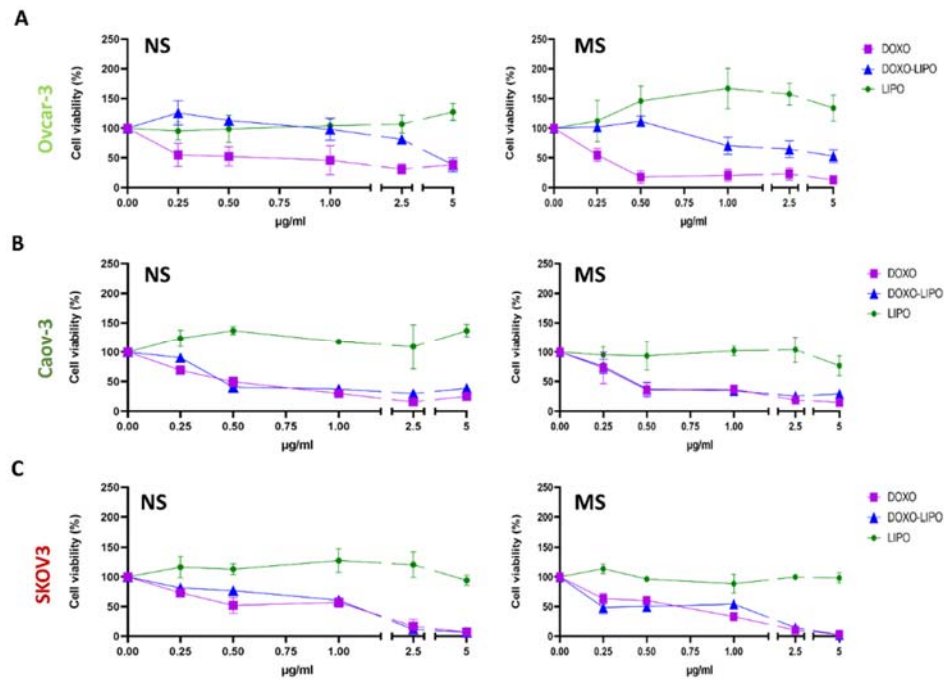
Figure S3. Physical and pharmaceutical characterization of empty (LIPO) and doxorubicin-loaded liposomes (DOXO-LIPO). (A) Dynamic light scattering and zeta potential measurements comparing empty LIPO and DOXO-LIPO. (B) Encapsulation efficiency and (C) release profiles of DOXO-LIPO in PBS +10% FBS (50:50) at 37 °C. Data are mean + standard deviation (n=3).

Figure S4. DOXO free and DOXO LIPO cytotoxic effect on ovarian cancer cell lines in 2D after 48h and 72h of treatment. MTT analysis after 48h and 72h of DOXO free and DOXO-LIPO treatment for OVCAR-3 (A), Caov-3 (B), SKOV3 (C) ovarian cancer cell lines. Data are mean + standard deviation (n=3).

Figure S5. DOXO free and DOXO LIPO cytotoxic effect on ovarian cancer cell lines in 3D MS and NS after 72h of treatment. Cell TiterGlo analysis on cell viability under DOXO free, DOXO-LIPO and LIPO treatment for OVCAR-3 (A), Caov-3 (B), SKOV3 (C) ovarian cancer cell lines. Data are mean + standard deviation (n=3/5).