

Microdisks: production and internalization by skin cancer cells

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Planar nano and micro disks made of magnetic materials are very promising in novel biomedical applications.[1] Particles with large magnetic moments and non-spherical shapes provide outstanding properties for cell manipulation, biosensing, and magneto-mechanical actuation. Fabrication of these geometries requires top-down lithography processes and usually a low production yield.[2] This work reports on the optimization of the process at each stage, from the patterning to the detachment of disks and the sterilization of the solution. Figure 1 presents a scanning electron image (SEM) at the end of the process, a drop of dispersed microdisks in water dried on a silicon wafer. It is worth noting that these large microdisks are still in a magnetic vortex state, and therefore, they are suitable for biotechnological applications. The viability of the microdisks for cellular studies was tested in-vitro assays. Cytotoxicity and internalization of the particles were investigated for periods of 24 hours. Figure 2 shows an optical image of microdisks internalized by macrophages

RAW 264.7 and MeWO tumoral cells. Work supported by MINECO FIS2016-76058 (AEI/FEDER, UE), EU grant H2020-MSCA-734801, GV IT1162-19 and PIBA 2018-11.

References

- [1] L. Peixoto et al. *Appl. Phys. Rev.* 7, (2020) 011310.
- [2] B. Mora et al. *ACS Appl. Mater. Interfaces* 10 (2018) 8165.

Figures

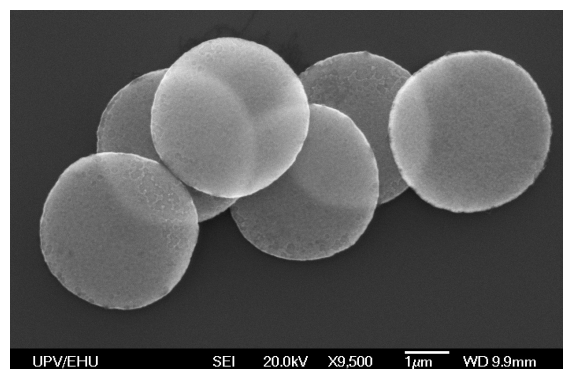


Figure 1: SEM image of detached magnetic microdisks dried on a Si wafer.

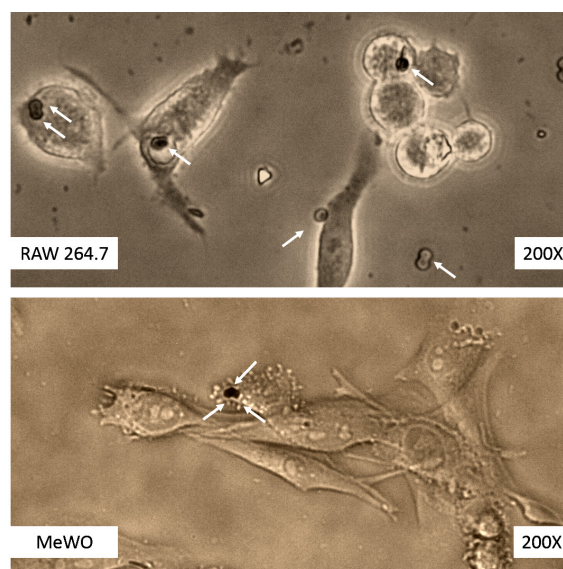


Figure 2: Optical image of macrophages (RAW 264.7) and skin cancer cells (MeWOskin) with internalized magnetic microdisks.