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Abstract

The use of functional nanomaterials with magnetic, plasmonic and acoustic properties are appealing for introducing new functionalities to medical microrobots,^[1] in particular they enable for example the steering of the microrobots by external magnetic fields,^[2] or their visualization under scattering tissues via ultrasound or photoacoustic imaging techniques.^[3–5] Moreover, nanocarriers such as polymersomes and liposomes, which have been widely used as passive drug carriers, are here employed to decorate the surface of such medical microrobots, to increase their cargo (e.g. drugs, enzymes)-loading capacity, while providing them with specific triggering strategies that enable their function on demand.^[6–8] Additionally, as the microrobots are active devices with high thrust forces they are promising for targeted therapies aiming to reach disease sites deep in tissue.^[9,10]

References

- [1] M. Medina-s, O. G. Schmidt, M. Medina-Sánchez, O. G. Schmidt, *Nature* **2017**, *545*, 406.
- [2] V. Magdanz, I. S. M. M. Khalil, J. Simmchen, G. P. Furtado, S. Mohanty, J. Gebauer, H. Xu, A. Klingner, A. Aziz, M. Medina-Sánchez, O. G. Schmidt, S. Misra, *Sci. Adv.* **2020**, *6*, 1.
- [3] A. Aziz, M. Medina-Sánchez, J. Claussen, O. G. Schmidt, *Nano Lett.* **2019**, *19*, 6612.
- [4] A. Aziz, J. Holthof, S. Meyer, O. G. Schmidt, M. Medina-Sánchez, *Adv. Healthc. Mater.* **2021**, DOI 10.1002/adhm.202101077.
- [5] A. Aziz, M. Medina-Sánchez, N. Koukourakis, J. Wang, R. Kuschmierz, H. Radner, J. W. Czarske, O. G. Schmidt, *Adv. Funct. Mater.* **2019**, *29*, 1905272.
- [6] H. Xu, M. Medina-Sánchez, O. G. Schmidt, *Angew. Chemie Int. Ed.* **2020**, *59*, 15029.
- [7] H. Xu, M. Medina-Sánchez, M. F. Maitz, C. Werner, O. G. Schmidt, *ACS Nano* **2020**, *14*, 2982.
- [8] F. Rajabasadi, S. Moreno, K. Fichna, A. Aziz, D. Appelhans, O. G. Schmidt, M. Medina-Sánchez, *Adv. Mater.* **2022**.
- [9] C. K. Schmidt, M. Medina-Sánchez, R. J. Edmondson, O. G. Schmidt, *Nat. Commun.* **2020**, *5*, 5618.
- [10] M. Medina-Sánchez, H. Xu, O. G. Schmidt, *Ther. Deliv.* **2018**, *9*, 303.

Figures

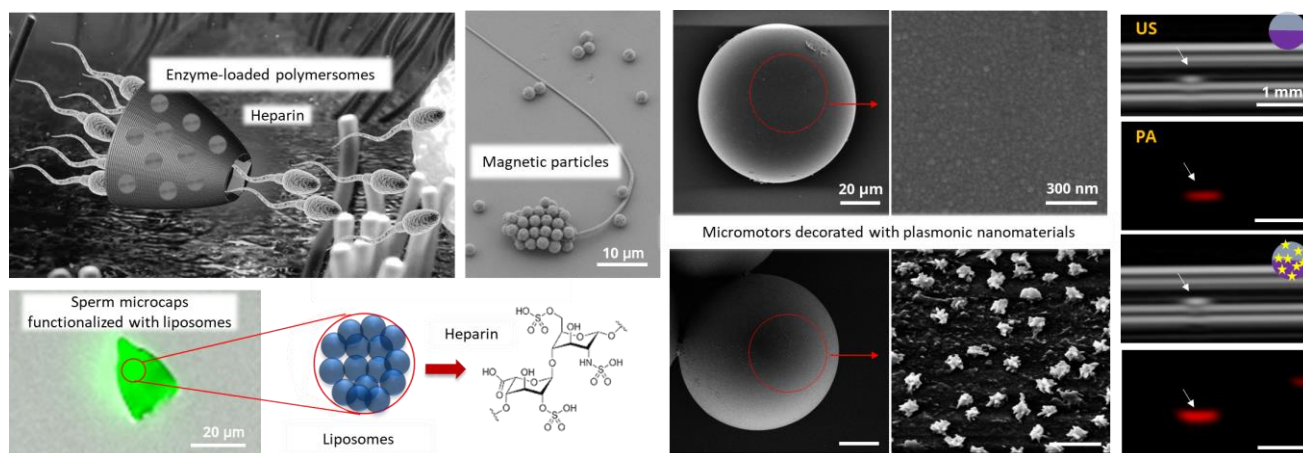


Figure 1: Various medical microrobots and micromotors functionalized with nanomaterials