

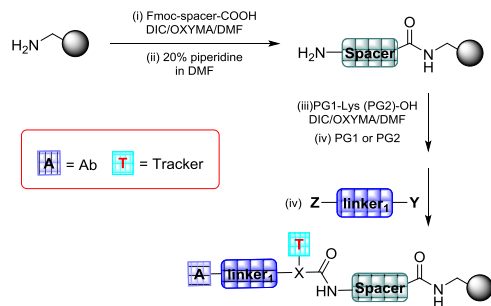
# DESIGN AND FORMULATION OF A NANOCARRIER FOR SELECTIVE DRUG DELIVERY BASED ON MONOCLONAL ANTIBODY SPECIFIC RECOGNITION

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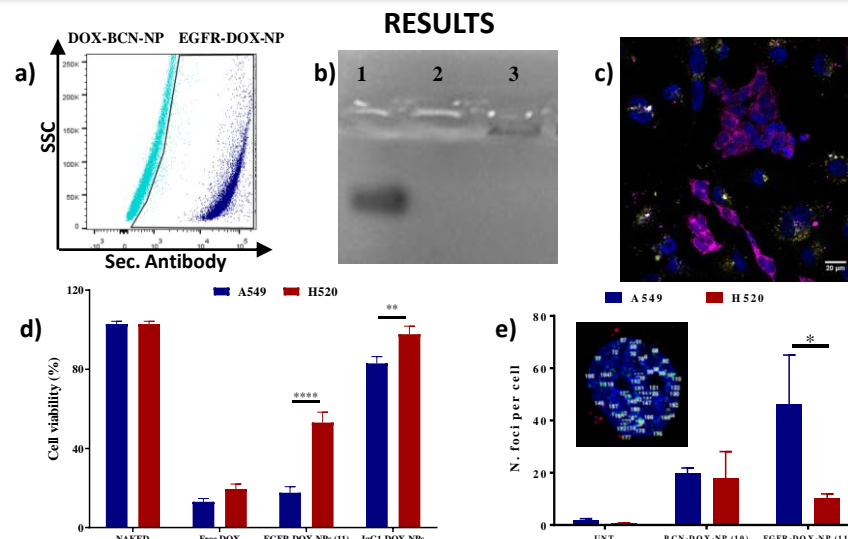
**Objective:** Development of a versatile and stable targeting nanocarrier based on monoclonal antibody conjugation for active delivery of a drug for monitoring specific cell response discriminating between cells depending on receptor expression levels

**Introduction:** Polymeric nanoparticles offer a great flexibility adapting its chemistry composition, size, stability, morphology and surface functionality. As a result, they are used in Biomedicine as drug delivery systems and diagnostic agents for a wide range of applications in diagnosis, therapy and theranostics [1] [2].

## Methods:



**Figure 1. Scheme of the synthesis route** for the functionalisation of the developed nanocarrier following Fmoc solid phase protocols.



**Figure 2. Characterisation and evaluation of the developed nanocarrier.** (a) Immunofluorescence of EGFR-DOX-NPs vs DOX-BCN-NPs; (b) Coomassie staining of electrophoresis gel of (1) antiEGFR, (2) coupling supernatant and (3) EGFR-DOX-NPs; (c) Selective nanofection of EGFR-DOX-NPs (yellow) in A549 cells (EGFR overexpression) in a coculture with H520 cells (EGFR low; stained with CellTracker (magenta)) by confocal microscopy; (d) Therapeutic effect of EGFR-DOX-NPs compared to free doxorubicin (500 nM) and IgG1-DOX-NPs; (e) Quantitative analysis of DNA damage by H2AX staining after incubation of EGFR-DOX-NPs compared to DOX-BCN-NPs. Student's T-test (\* p value < 0.0001)

**Conclusions:** An innovative and versatile approach for active targeted delivery based on the use of antibody decorated nanoparticles has been presented. **NPs targeting EGFR decorated with a drug for assessing drug efficacy were prepared and characterized.** *In vitro* validation was successfully achieved discriminating between two lung cancer cell lines with different levels of expression of this specific membrane receptor.

## References:

- [1] Q. Guo, *et al. Analytical Chemistry*, 2019.
- [2] D. Rosenblum, *et al. Nature Communications*, 2018

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