SELECTED OPPORTUNITIES IN ONCOLOGY

NANO-SIZED DRUG DELIVERY STRUCTURE (CHIM15575)

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Product factsheet

- **Product:** nano-sized drug delivery structure for prolonged delayed and controlled diffusion of an active agent or a drug
- **Application:** All fields notably cancerology
- **Rational:**
  - Recurrent problem concerning pharmaceutical compositions :
  - biological modification and/or elimination of the medication in the body
    - Very short periods of effectiveness of the treatments,
    - Compensation by the administration of repeated doses,
    - toxicity/side effects due to untargeted delivery,
  - Drugs usually rapidly dissolve in the digestive tract
- **Technology:**
  - Nano-sized drug delivery structure comprising a support material, a multilayered structure and an active agent or drug (see figure 1 and 2). The multiple layer structure allow diffusion by anisotropic principle. A antibody can be coupled to the nanostructure to allow a targeted delivery.
- **Patent and publication:** PCT/EP2017/059966 filed April, the 26th 2017

NANO-SIZED DRUG DELIVERY STRUCTURE

Product

Example of the Structure of ONE nanoparticule

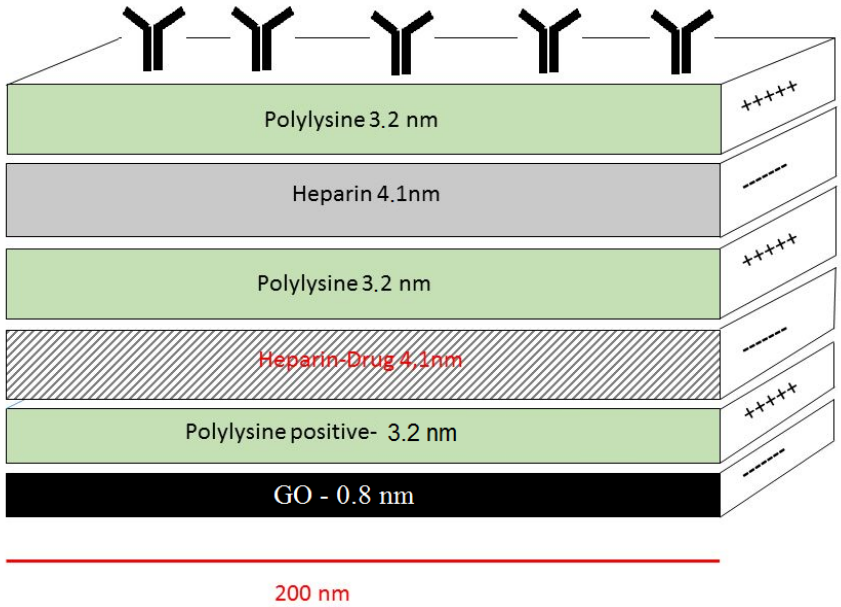
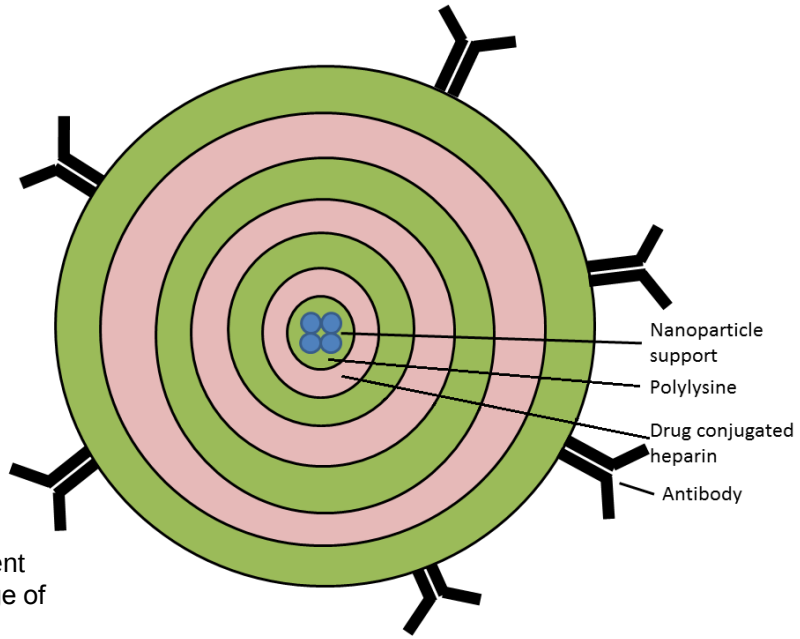


Figure 1: Particular nano-sized drug delivery structure a support material (notably graphene oxide), a **multilayered structure** (with polylysine and heparin for example) and an active agent or drug. GO = Graphene oxide

Figure 2: Cross-sectional drawing of a particular nano-sized drug delivery structure



Anisotropy Principle : By crossing the NP different layers with different characteristics (charge, density,…) the drug to de delivered, will change of direction and thus be delayed.

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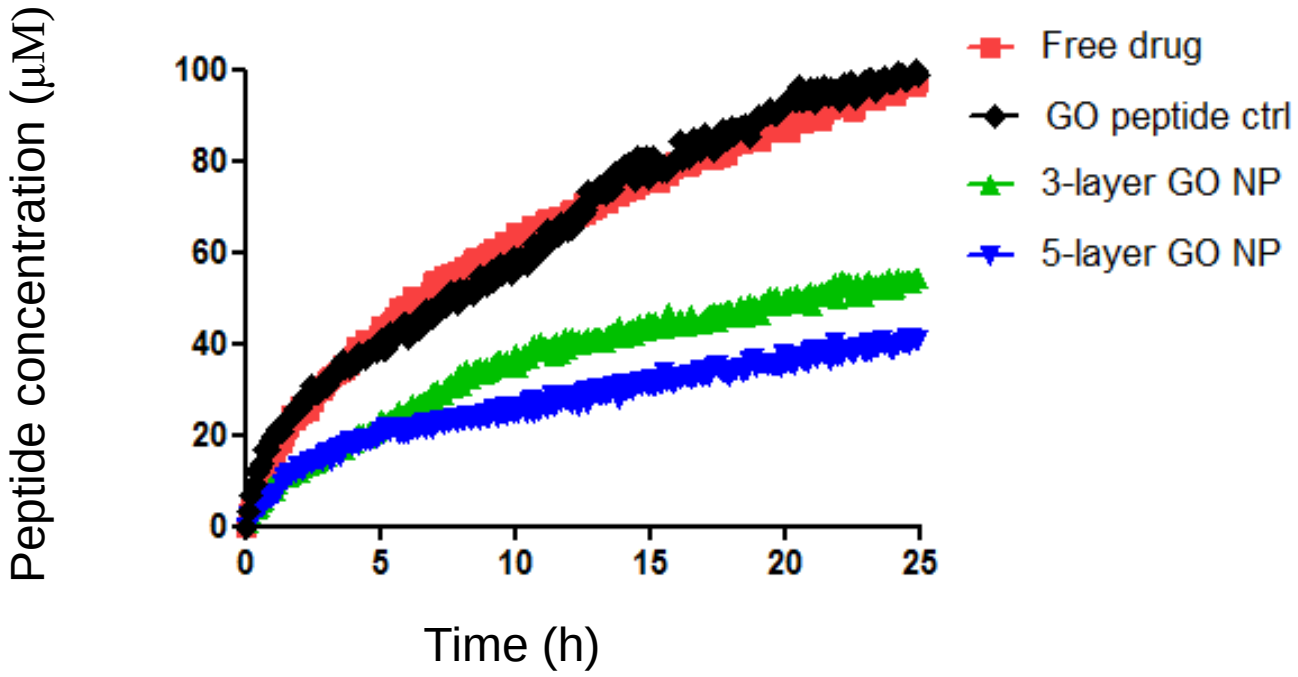
Proof of concept

Figure 3: Retardation of diffusion observed when using the nano-sized drug delivery structure of the invention with a peptide. Cumulative experimentation. GO = Graphene oxide – NP = Nanoparticule



NANO-SIZED DRUG DELIVERY STRUCTURE

Proof of concept

Results obtained with an antibody anti-HER2 and mertansine

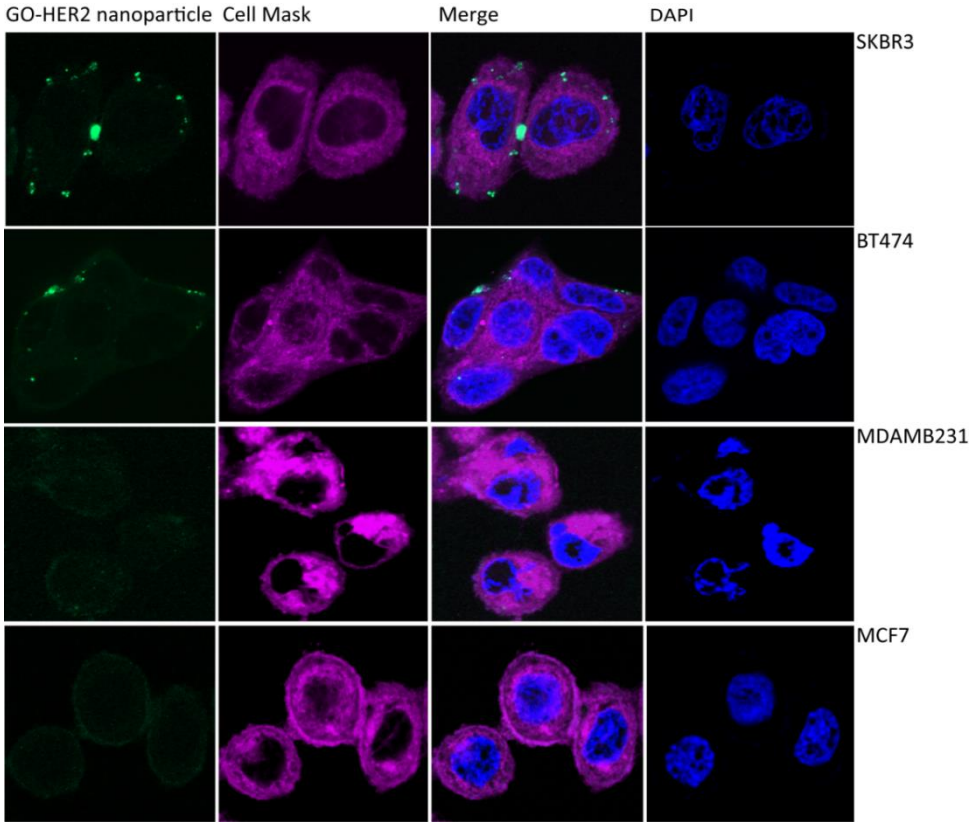


Figure 4: Immunofluorescence staining of HER2-GO nanoparticles with mertansine FITC-polylysine in cells (shown in green) show specific targeting in cells overexpressing HER2 (upper panels, SKBR3 and BT474) and no targeting to lower HER2 expressing cells, MDAMB231 and MCF7 cells (lower panels). Cell Mask was used to outline the cells with nuclei staining with DAPi.

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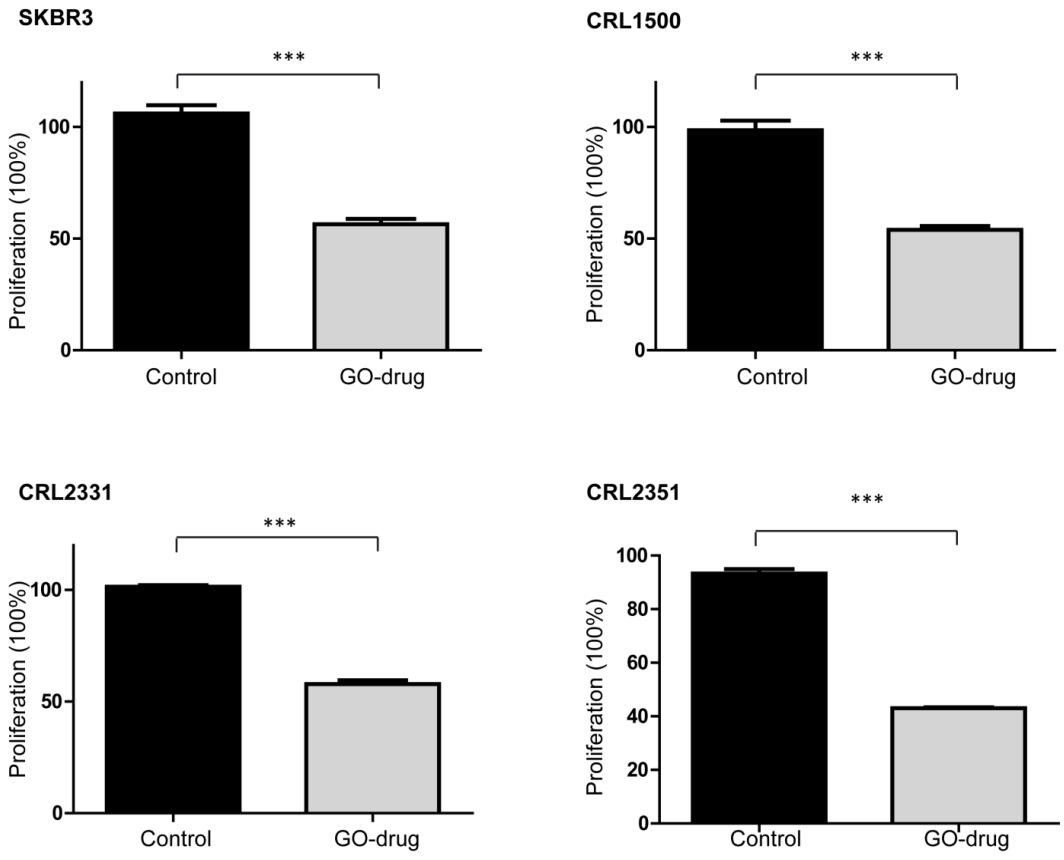
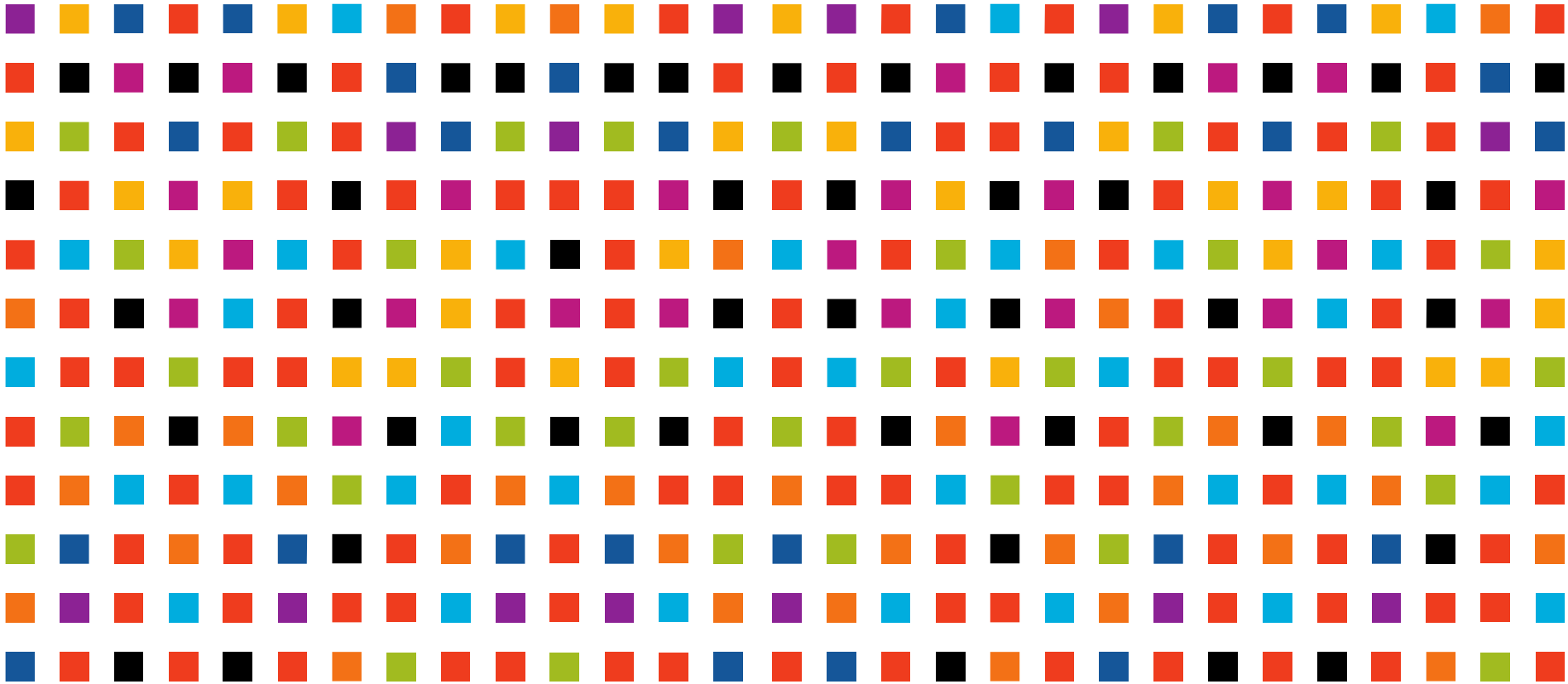


Figure 5: After a two day incubation period, the GO-HER2 antibody structures were efficient in decreasing the cell proliferation rate in 4 different HER2 overexpressing cells types, SKBR3, Au 565, CRL 2331 and CRL 2338. Incubation for a longer time period showed extended decrease in cell proliferations rates.



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