14 de FEBRERO de 2024

12.00 h
Aula, Edificio I+D
Campus Río Ebro

INMA Junior

Tailored DNA Nanostructures for Enhanced Therapeutic Delivery

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DNA is a biopolymer with exceptional self-assembling properties owing to its highly specific nitrogen bases recognition. This intrinsic feature enables DNA nanotechnology the use of DNA strands as building blocks to form complex DNA-based nanostructures with precise control over their size and shape at the nanoscale, in a reproducible way. Leveraging these distinctive capabilities, we have developed tailored DNA-based nanomaterials (DNS) for the delivery of therapeutic agents targeting cancer and cardiac diseases.

Regarding cancer, we have developed a collection of DNS with subtle structural modifications related to their length or flexibility. Our objective was to explore the impact of these variations on the overall performance of DNS as nanocarriers for chemotherapy. We assessed their biological stability, cellular internalisation, capacity to encapsulate the anticancer drug doxorubicin, as well as their influence on the viability of cancer cells.

In the context of cardiac therapy, we designed DNS with specific sequences tailored for the trapping of miR24-2-5p, a microRNA (miR) associated with cardiac aging when overexpressed. We investigated the efficacy and specificity of miR capture by DNS both in vitro and in a HEK293 cell model. Additionally, our DNS demonstrated successful internalization into HEK 293 cells and exhibited modest uptake into human cardiomyocytes.

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