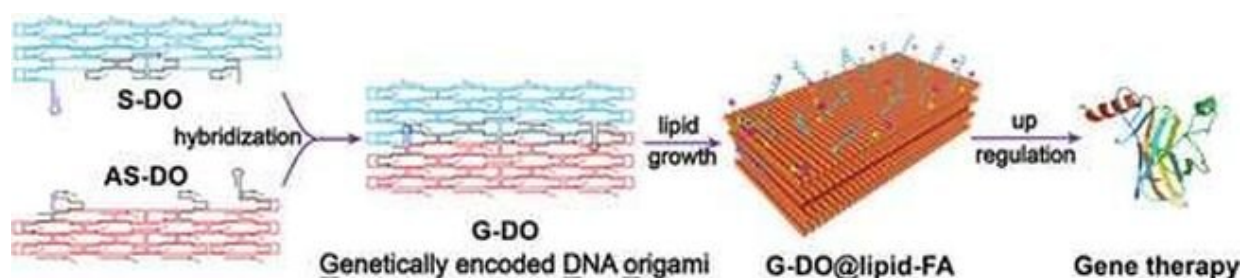


# Researchers devise genetically encoded DNA origami for targeted and precise gene therapy *in vivo*

April 25 2023, by Liu Jia



Graphical abstract. Credit: *Journal of the American Chemical Society* (2023). DOI: 10.1021/jacs.3c02756

As genetic information carriers, nucleic acid molecules have been developed as gene therapeutic drugs. On the basis of complementary base pairing, nucleic acid can not only encode functional genes, but also precisely self-assemble into nanostructures with specific sizes and shapes. However, the innate property (encoding gene) of these DNA nanostructures has rarely been displayed for gene therapy.

In a study published in the *Journal of the American Chemical Society*, Ding Baoquan's group from the National Center for Nanoscience and Technology (NCNST) of the Chinese Academy of Sciences (CAS) has devised a genetically encoded DNA [origami](#) for targeted and precise

[gene therapy](#) in vivo.

"The key design of the genetically encoded DNA origami is based on efficient self-assembly and chemical modification of nucleic acid," said Wu Xiaohui from NCNST, first author of the paper.

The complementary sense and antisense strands of gene can be directly folded into two DNA origami monomers by their corresponding staple strands. After [hybridization](#), the researchers fabricated genetically encoded DNA origami with precisely organized lipids on the surface for in-situ lipid growth.

After decoration with the tumor-targeting group, the antitumor gene (p53) encoded and lipid-coated DNA origami can elicit a pronounced upregulation of the p53 protein in [tumor cells](#) to achieve efficient tumor therapy in vivo.

"The genes folded and delivered by this method are not limited in length as viral vectors, and due to the presence of DNA origami templates, there are more options for lipid components, without being restricted by the composition and concentration formula of traditional liposomes," said Ding from NCNST, one of the paper's corresponding authors.

**More information:** Xiaohui Wu et al, Genetically Encoded DNA Origami for Gene Therapy In Vivo, *Journal of the American Chemical Society* (2023). [DOI: 10.1021/jacs.3c02756](https://doi.org/10.1021/jacs.3c02756)

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