WHO WE ARE

Our Partners

The DeDNAed team consists of 7 international partners from Austria, France, Germany and Spain.

TECHNISCHE UNIVERSITÄT CHEMNITZ

ZfM Zentrum für Mikrotechnologien

CIC biomaGUNE
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

MEINSBERG KSI

IMMM
Institut des Molécules et Matériaux du Mans
Le Mans Université
UMR CNRS 6283

Universität Potsdam

tecnalia
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

BNN

KEY FACTS

About DeDNAed

36 MONTHS DURATION

7 INTERNATIONAL PARTNERS

4 COUNTRIES INVOLVED

3 MIO. € OVERALL BUDGET

Get in touch!

Any questions about our work or new ideas to contribute? We'd love to hear about it.
info@dednaed.eu

Follow us on

DEDNAED

Cluster decorated recognition elements on DNA origami for enhanced raman spectroscopic detection methods

To learn more visit:

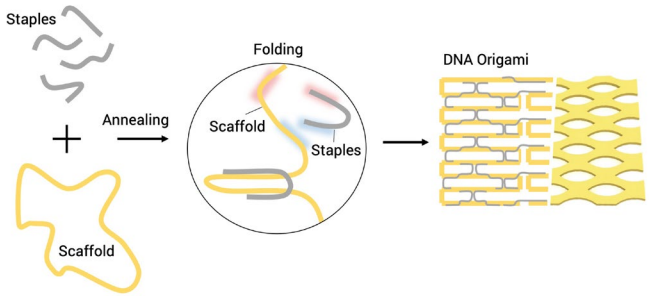
www.dednaed.eu

This project has received funding from the European Union's Horizon 2020 researchand innovation programme under grant agreement No 964248.

Our project

The project intends to develop a novel, innovative biosensing platform whose advantages and benefits are in terms of sensitivity, versatility and being ultrafast by an optical approach.

Our platform will be based on the assembly and integration of sensing elements (transducer and bioreceptor) by DNA origami. The DNA origami will serve as a “nano-breadboard” in order to precisely control the position of these elements and thus the sensor architecture at the nanometer scale.



DNA origami synthesis: A cyclic DNA single strand of a bacteriophage (M13mp18) is folded into a desired shape with the help of short oligonucleotides (staple strands) during a thermal annealing. The shape is controlled by the complementary parts of the staple strands to the different regions of the scaffold.

HOW IT WORKS

The biological recognition element will be based on metallic nanoclusters and a sensing element (DNA or antibody), which will be assembled on a DNA origami template that will serve as “nano-breadboard” to control the sensor architecture at the nanometer scale. The precise positioning of the biological recognition element in a surrounding nanoparticle array will lead to a significant increase in Raman signal. In this way, Surface Enhanced Raman Spectroscopy (SERS) can detect the signal shift between free and occupied (bound target molecule) recognition elements.

This sensor method can be transferred to different biomarker molecules resulting in a high degree of flexibility in the area of application, from medical technology to food monitoring. In addition, the transfer of the DNA origami-based sensor platform to flexible, textile substrates is carried out using lipid bi-layers and the Langmuir-Blodgett method for later use as a wipe test or medical wearable.

Objectives

The research concept results in the following, overarching objectives of the project:

1. Establishment of DNA origami as “nano-breadboard” for biological recognition elements
2. Proof of signal enhancement through spatial alignment of biological recognition elements
3. Demonstration of detection of food contaminants and bio markers on the novel sensor platform
4. Transfer of the sensor platform to a flexible substrate