

# miRNAs LIBRARIES PREPARATION THROUGH NANOTECHNOLOGY, FOR MASSIVE SEQUENCING

## Technology for Licensing

### Keywords:

miRNA, Next Generation Sequencing (NGS), miRNA-seq, library, nanotechnology, ligation reaction.

### Description:

miRNAs are small RNA molecules involved in many gene expression regulation. The miRNAs dysregulation is associated with most human chronic diseases (as cancer, diabetes, neurodegenerative diseases). Their analysis represents a field of increasing relevance, but its small size and low concentration limit their study and precise quantification from biological samples.

At present, although parallel-massive sequencing, miRNA-seq, is postulated as the most promising technique for the analysis of these species, reproducibility problems associated with the library preparation stage make its application difficult.

Our invention proposes a method of miRNA libraries preparation for massive sequencing without the ligation reaction. Habitually, adapters are added by this reaction, which leads to the appearance of biases and altering the relative frequencies of the miRNA species. This technology allows eliminating these binding biases, achieving an efficiency increase and costs reduction.

This library preparation carries out using nanotechnology. In this way, the necessary massive sequencing adapters are added by Taq-polymerase, without the ligation reaction. It uses magnetic particles that have 5' covalently linked oligonucleotides on their surface, on which the miRNA is reverse transcribed and the sequencing adapters are added by Taq-polymerase.

Actuación en el marco del Proyecto ILIBERIS: Actuaciones Singulares de Transferencia de Conocimiento en el CEI Biotic. Objetivo prioritario OP.01 "Potenciar la investigación, el desarrollo tecnológico y la innovación"



UNIÓN EUROPEA  
Fondo Europeo de Desarrollo Regional



Junta de Andalucía  
Consejería de Transformación Económica,  
Industria, Conocimiento y Universidades



Andalucía  
se mueve con Europa

## Advantages and Benefits

### » Reduction of biases

The use of nanotechnology allows removing the ligation reactions of the process and, consequently, suppressing the biases associated with it.

### » Increased efficiency

Our library preparation method achieves an increase in the efficiency of the process that is affected in the usual procedures by the problems associated with the ligation reaction.

### » Reproducibility of results

The manufacture of libraries without ligation reaction makes it possible to solve reproducibility problems due to the biases caused by this reaction.

### » Cost reduction

The lesser appearance of problems during the manufacturing process and the consequent improvement in efficiency promotes to reduce the associated costs.

### Patent status:

Spanish patent application number: P202031119  
Priority date: 06/11/2020  
Spanish Patent Office Search Report (IET) available.

PCT application number: PCT/ES2021/070804  
International filing date: 08/11/2021

### Contact:

Oficina de Transferencia de Resultados de Investigación  
(OTRI) - Universidad de Granada

[patentes@ugr.es](mailto:patentes@ugr.es)

[www.otri.ugr.es](http://www.otri.ugr.es)