

# Molecular receptors enrich methylated and acetylated peptides for ultra-sensitive proteomics to explore the hidden modified proteome in disease

*Timeline* | 01/2024 to 12/2027

*ICIQ People* | [Ballester Research Group](#)

*Overall Budget* | 1.545.600 €  
*ICIQ's Budget* | 335.920 €

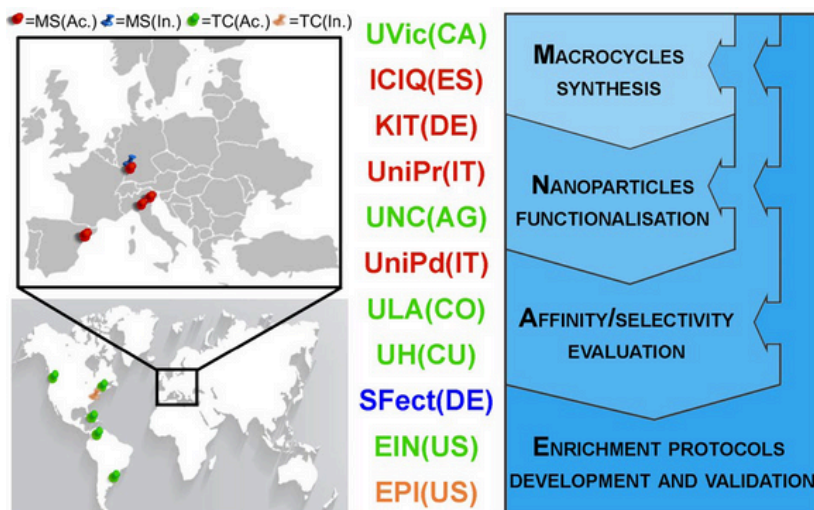
<https://enrich-se.eu>

*Call* | HORIZON-MSCA-2022-SE-01

## SUMMARY

Scientific studies indicate that inefficient epigenetic control is associated with a wide variety of non-communicable diseases (NCDs) like cancer, schizophrenia, and diabetes. Indeed, histone post translational modifications (PTMs) are crucial for many cellular processes including transcription and DNA repair. Thus, the ability to readily and reliably detect PTMs is crucial to better understand epigenetic processes and the complex functions of histone PTMs in human diseases. Mass spectrometry (MS) is the technique of choice to identify such modifications across the proteome. MS requires an enrichment step generally performed using antibodies, but these have several limitations such as high costs, batch-to-batch variability and data reproducibility. In a multidisciplinary effort **ENRICH** aims at developing new cost-effective, fast and efficient tools for the enrichment of post translationally modified proteins overcoming the current limitation. **ENRICH** will functionalize nanoparticles (NPs) with molecular receptors able to enrich PTMcontaining peptides, derived from proteolytic digestion, for subsequent MS analysis. Concurrently, the ability and selectivity of the synthesized receptors and functionalized NPs will be evaluated via spectroscopic analyses. The **ENRICH** network gathers the expertise required to tackle this challenge. The consortium is composed of 9 high-level academic research groups from 2 different continents (Europe and America) and 2 highly innovative companies. By the seconding of 87 ERs/ERSs across Europe and worldwide, the aim is to capitalize on the consortium expertise in complementary fields such as chemical synthesis, spectroscopy, and proteomics. The network promotes an effective integrate training of researchers, boosting their career development, and promotes collaborations between the partners. The direct involvement of industries guarantees the timely exploitation of the results from research laboratories to innovative products.

## CONSORTIA



**UNIVERSITÀ DI PARMA**  
Project coordinator

**KIT**  
Karlsruher Institut für Technologie

**UNIVERSITÀ DEGLI STUDI DI PADOVA**

**Universidad de los Andes**

**EINSTEIN**  
Albert Einstein College of Medicine

**UNC**

**University of Victoria**

**ScreenFect**

**EpiCypher**