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

Overall Budget | 1.545.600 €

ICIQ's Budget | 335.920 €

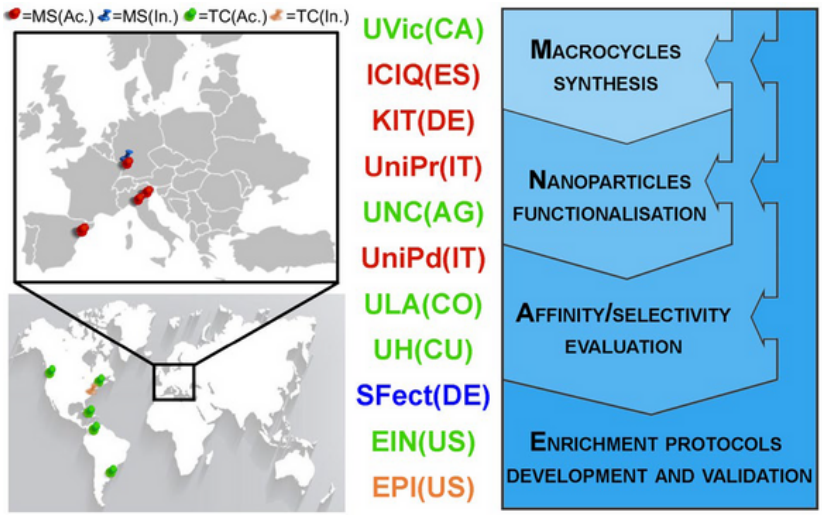
ICIQ People | Ballester Research Group

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 XX 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

VNIVERSIDAD DE LA HABANA

ICIQ Institut Català d'Investigació Química

KIT Karlsruher Institut für Technologie

Università degli Studi di Padova

Universidad de los Andes

EINSTEIN Albert Einstein College of Medicine

UNC

University of Victoria

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This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101131120