

MAGNETIC NANOPARTICLES FOR SELECTIVE ENRICHMENT OF PROTEINS IN COMPLEX MIXTURES



TECHNOLOGY SUMMARY

New method for preparing ion chelating magnetic nanoparticles, which allow selective protein enrichment, namely metalloproteases (MMPs) and His-tagged proteins, from complex mixtures.

BENEFITS

REDUCTION OF TIME AND COSTS for the enrichment and specific separation of vestigial proteins in biological samples, through a combination, within the same material, of properties such as:

HIGH SPECIFIC SUPERFICIAL AREA

HIGH AFFINITY FOR METALLIC IONS

MAGNETIC PROPERTIES

CONSIDERABLY STABLE in commonly used tampons for biological applications.

ENHANCED VERSATILITY: the nanoparticles are stable at a significant pH range (pH 5-9).

SUITABLE FOR WATER REMEDIATION AND ANALYSIS due to the elevated affinity of these nanomaterials to metallic ions.

CONTEXT

Metalloproteases are present in diverse biofluids (e.g. urine, serum and saliva) and, due to their highly catalytic activity, MMPs are usually expressed in minute amounts and their deregulation can lead to pathological conditions. The present techniques for the characterization of MMPs are often limited, lacking specific antibodies for some proteases. On the other hand, the production of recombinant proteins in a highly purified and well-characterized form has become a major task for protein chemistry and pharmaceutical industry. Some widely used methods are based on immobilized metal affinity chromatography. However, these techniques are often considerably onerous and time consuming.

This methodology is a more efficient alternative to the present methods, being based on magnetic nanoparticles with high affinity for metallic ions.

APPLICATIONS

This technology can be used in diverse applications:

PROTEIN ENRICHMENT

SMALL-SCALE PROTEIN PURIFICATION (metalloproteases and metal-binding proteins)

WATER REMEDIATION (removal of metallic ions)

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IP RIGHTS

European patent pending.

DEVELOPMENT STAGE

TRL 4: tested for protein enrichment at laboratorial scale, with very promising results.

The material is available for presentation.

KEYWORDS

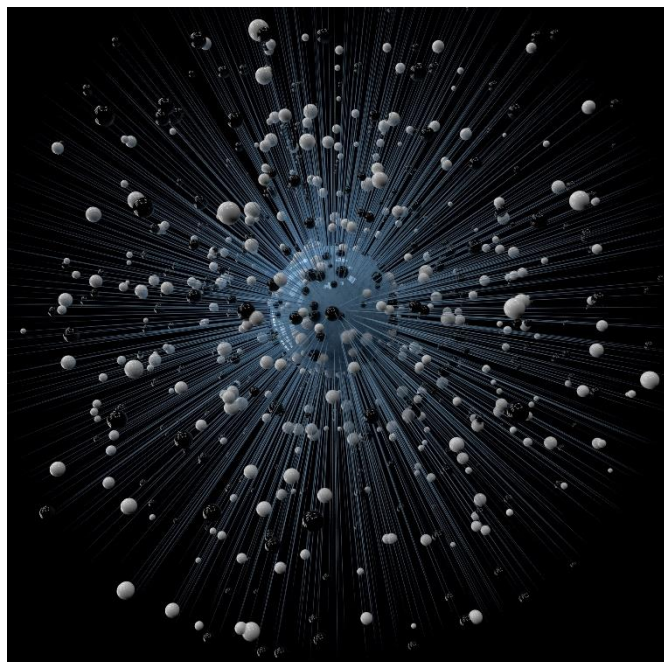
MAGNETIC NANOPARTICLES

SURFACE MODIFICATION

CHELATING LIGANDS

METALLOPROTEASES

HISTIDINE-TAGGED PROTEINS



DEVELOPED BY

Researchers of the Institute for Biomedicine (iBiMED) and of Aveiro Institute of Materials (CICECO) from the University of Aveiro.

BUSINESS OPPORTUNITY

Licensing agreement.

Testing of new applications.

PARTNERSHIP

The University of Aveiro seeks partners within the industries of biotechnology, pharmaceuticals, healthcare and environment.

CONTACT

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