PosH-Tag: Cost effective and highly specific biomolecule separation with bare silica surfaces and immobilization using bare magnetic iron-oxide nanoparticles

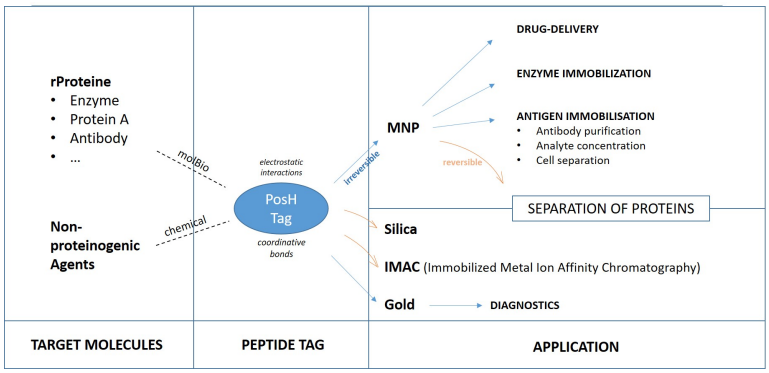
Reference No: B80037

CHALLENGE

Biomolecule separation using conventional methods like chromatography can be expensive and expose molecules of interest to harsh conditions. Especially specific stationary phases providing affinity to the target molecule are very costly (up to 10000 €/kg). In contrast, biomolecule separation with silica-based chromatography columns provides a very low-cost alternative. Moreover, immobilization with magnetic iron-oxide nanoparticles (IONs) provides a gentle approach to isolate molecules of interest from suspension. However, IONs usually require application specific functionalization, thus resulting in a laborious and costly bio-separation process.

INNOVATION

The novel technology is an electrostatic peptide based iron-oxide binding-tag (PosH-tag) which directly and highly specific binds to bare IONs and to silica at ambient pH. The PosH-tag can be genetically fused to a broad variety of biomolecule targets including peptides, proteins, non-proteinogenic drugs or larger constructs. PosH-tag also binds directly and highly specific to silica surfaces and allows for efficient separation of target molecules e.g. from crude cell lysates and cell supernatants. Remarkably, PosH-tagged molecules bind irreversibly to IONs, facilitating easy access to sensory and analytical applications using e.g. immobilized antibodies (e.g. mAbs), protein A or enzymes. In contrast, PosH-tag binding to silica surfaces is reversible and can easily be eluted with lysine or arginine buffer (> 100 mM). The herein presented technology provides a cost effective and highly specific platform for protein purification and immobilization. The yields and the purity of this purification process is very similar to Ni-NTA/IDA columns without the NTA modification and the use of imidazole. Moreover, a purification with Ni-NTA/IDA columns is also possible with this tag making it quite interesting not only for large-scale applications but for lab-scale applications as well.



COMMERCIAL OPPORTUNITIES

- Downstream processing
- Sensory and analytical applications
- Catalytic and enzymatic applications

DEVELOPMENT STATUS

Proof of concept

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