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University of Turku

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Multifunctional fusion protein nanoparticles for bio-affinity applications

Background:
Nanoparticles used in bio-affinity assays are typically functionalized with binding molecules and detectable labels using multistep processes. The conjugation of binders, which need be separately produced, typically occurs in a random orientation, resulting in considerable loss of functionality.

Description:
The invention utilizes ferritin-like subunits which self-assemble in solution to form a highly stable globular protein with an internal cavity. The use of these proteins as nanoparticles has significant benefits:

- The subunits can be produced in fusion with proteins or peptides, including antibodies, enzymes, luminescent proteins, and receptors
- The fused protein is attached covalently in the correct orientation and can be designed to face the inside or the outside of the particle
- Combining subunits fused with proteins with different functionality of specificity facilitates simple construction of multifunctional nanoparticles
- Can be produced by microbial fermentation rapidly, economically and in large quantities
- Various labels can be introduced in the cavity of the particles to enable sensitive detection.

Application Areas:
The particles can be used for any high-sensitivity bio-affinity applications, including immunoassays and other diagnostic assays as well as imaging and monitoring of biological pathways *in vitro* or *in vivo*.

The IP is available for licensing from the TTO of the University of Turku (UTU).

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Title: NANOPARTICLE FOR BIOAFFINITY ASSAYS

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National Phase: EP1608977 (B1)
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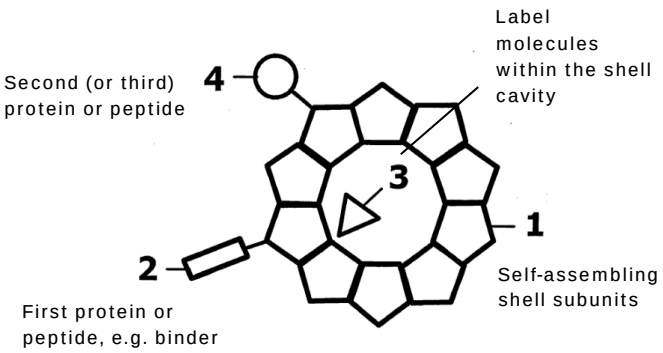
Status: Technology Readiness Level (TRL) 5-6
Functional fusion constructs have been successfully established and employed in different ligand binding assays. Applied binding molecules include, among others, single chain antibody fragments (scFvs). The nanoparticle yield has been effectively optimized for the bacterial production conditions and for the folding of the particles.



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