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Solution for bacterial surface display of recombinant proteins in the absence of genetically modified organisms

Jozef Stefan Institute, Slovenia developed, tested and optimised biotechnological procedure for heterologous surface display of recombinant proteins in the absence of genetically modified organisms. The proposed solution reduces high regulatory documentation requirements for marketing approval in case of medicinal applications, simplifies the harvesting process, reduces production costs and time to market. Partnership agreement for joint venture, licensing or research cooperation is sought.

Key words: Medical Biomaterials, Genetic Engineering, Cellular and Molecular Biology

Recombinant proteins are generally produced with the help of genetically engineered organisms (also GMO) which present a very complex and demanding regulatory requirements for the assessment of quality, safety, efficacy and environmental risk, which need to be approved by designated regulatory authorities before use in commercial products for human use, in particular for food or for medicines in European Union. The GMOs have also very negative public perception which presents a significant commercial set back.

The R&D team achieved recombinant protein expression in a host different from the one on which it is displayed (heterologous display). Such an approach enables recombinant proteins production without presence of GMO in the final manufacturing steps.

Additional application potential was achieved by engineering the biotechnological production system, where the desired protein is secreted into the growth medium from where it anchors to the outside surface of a wild-type lactic-acid bacteria (LAB) or to carefully selected non-viable bacteria-like particles (BLPs) by a non-covalent binding.

Microbial surface display is an emerging technology with numerous potential applications. Engineering microorganisms to display proteins of choice or recombinant proteins on their surface renders them useful as whole-cell biocatalysts, vaccines, biosensors, delivery vectors, bio-adsorbents and other. Microbial surface display can also be exploited for screening peptide libraries, detecting mutations and selecting binders.

The authors of the solution are expert scientists in the field of cancer progression and immune response study with modern biotechnological methods.



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Advantages:

- **bacterial surface display without the GMO organisms present in the last stage of the production system;**
- **recombinant protein surface display, recombinant protein secretion to the growth medium and non-covalent anchoring of the particular protein to the BPL or microorganism surface, simplifies the extraction process and increases the protein yield;**
- **adapt LAB which are well-studied and registered as “generally recognized as safe” (GRAS) for human consumption;**
- **LAB have positive effect on human health;**
- **absence of GMO in the final production step significantly reduces regulatory requirements for regulatory marketing approvals hence significantly reduces R&D costs, time and reduces general reluctance of final users towards GMO.**

The institute is looking for a suitable partner, a private or a public research organisation or an industrial partner with

50 or more employees with own capacity for research and product development.

The institute is open for different cooperation types in the form of:

- a joint venture with a partner willing to invest in product development for commercial use in medicine, or
- a license agreement with a partner interested in the transfer and implementation of the presented technology, or
- a research cooperation agreement with a partner who has scientific expertise in product development for the medicinal sector

STAGE OF DEVELOPMENT

Concept stage

INTELLECTUAL PROPERTY

The patent protection is in preparation.

CONTACT DETAILS

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