TECHNOLOGY OFFER

EXTRACELLULAR VESICLES FOR PROTEIN DELIVERY IN AQUACULTURE

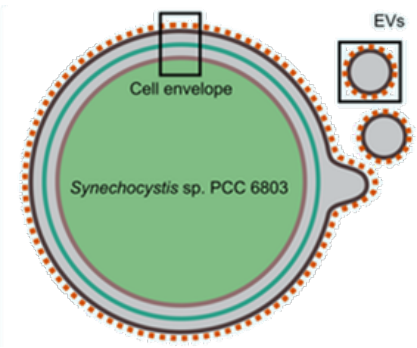
Background

The aquaculture sector faces challenges in expansion, particularly in creating safe and effective fish-growth performance schemes that tackle disease outbreaks.
There has been an increase in the development of novel biotechnological tools for the specific delivery of biologically active proteins and enzymes in aquaculture.

Technology

The technology leverages genetically engineered, non-pathogenic cyanobacteria (freshwater *Synechocystis* sp.) to produce hypervesiculating extracellular vesicles (EVs) capable of carrying and delivering specific heterologous proteins to mammalian cells and animals, including fish.

The invention refers to methods by which cyanobacterial EVs can work as nanocarriers of custom proteins in fish, with prospective applications in modulation of nutritional status or stimulating specific adaptive immune responses.



Synechocystis cell and EVs formation

Advantages

- Low immunogenicity vehicle for carrying and delivering proteins. Reduced pathogenic reactions, compared to traditional bacterial EVs;
- Improved targeting and increased efficiency: the cyanobacterial EVs can be engineered to have specific properties, such as stability and targeting capabilities;
- Different delivery systems possible, e.g. oral administration, injection, topical application.

PATENT STATUS

International Patent Application via PCT WO2023153949
Priority date: 10.02.2022
Pending in Europe

DEVELOPMENT STAGE

TRL4 – Technology validated in lab
Further development for validation in large scale setups required.

APPLICATIONS

Fish immunisation in aquaculture;
Protein/enzymes carrying delivery system;
Nutrient digestion;
Immune system modulator.

COOPERATION

Research Cooperation Agreement;
Licensing Agreement.

KEYWORDS

Cyanobacterial extracellular vesicles
Protein carrier system
Aquaculture
Fish Vaccination,

DEVELOPED BY

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