



In-Cell-Art announces the publication in *Nature Biomedical Engineering* of a Nanotaxi® for messenger RNA vaccine

Nantes – France, 2nd of April, 2019 – In-Cell-Art (ICA), a biotechnology company specialized in nanocarrier technologies named Nanotaxi® for unlocking the promise of nucleic acids to treat acquired or inherited diseases, announces today that ICA and international academic researchers published in the journal *Nature Biomedical Engineering** the characterization of the mechanism by which a Nanotaxi® allows in non-human primate efficient delivery of messenger RNA molecules in cells of interest for the implementation of a robust immune response.

The publication describes an original non-invasive method in non-human primate by positron emission tomography for spatio-temporal monitoring of the vaccine trafficking. The results show that the Nanotaxi® CHOLK a new type of vector derived from a natural sugar allows efficient delivery of mRNA in antigen-presenting cells at the injection site and in draining lymph nodes. Those professional cells are essential to the establishment of a strong adaptive immune response. This Nanotaxi® CHOLK consists of a single molecule that forms supramolecular assemblies with mRNA by a simple self-assembling process. The physicochemical properties of CHOLK/mRNA assemblies lead to the ideal biodistribution in lymph nodes and the delivery of messenger RNA molecules within key cells of the immune system.

Bruno Pitard, CSO and founder of In-Cell-Art, says “*Vaccination using nucleic acids such as messenger RNA (mRNA) for antigen expression generates considerable interest and expectation for the development of prophylactic and therapeutic vaccines. Nevertheless, the development of this new generation of vaccines will not be achieved without new classes of vector capable of efficiently transporting the mRNA molecules within the cytoplasm of the cells of interest. Today, no mRNA-based vaccine has shown protection in phase 3 clinical trials. The induction of a robust humoral and cellular vaccine response involves the expression and presentation of the antigen to lymphocytes B and T in the lymph nodes. Today, as demonstrated in this article, and after 20 years of research in the field of macromolecular drug delivery, ICA has accumulated unique technical skills and resources that allow it to design a unique specific synthetic delivery system for the development of new generations of vaccines using messenger RNAs for antigen expression*”

*this article appears in *Nature Biomedical Engineering* and can be found online at:
<https://doi.org/10.1038/s41551-019-0378-3>

About In-Cell-Art

In-Cell-Art (ICA), which is headquartered in Nantes (France) is a biopharmaceutical company specializing in the preclinical and pharmaceutical development of nanocarriers named Nanotaxi® for macromolecular drugs. Its founder and research team, which includes a Nobel Laureate, have designed new classes of vectors that are organized on a nanometric

scale, which enables them to cross the cell barrier efficiently and safely. ICA Nanotaxi® technology displays unique properties for development of:

- DNA Vaccines

ICA614 Nanotaxi®, an innovative DNA synthetic formulation, offers unique efficient and industrial features such as the dramatic enhancement of the immunogenicity of plasmid DNA-encoding tumours or pathogen-derived antigens, a reduction in the dose of plasmid DNA, as well as an excellent safety profile. ICA614 Nanotaxi® represents a crucial step in DNA vaccine development, and GMP fill/finish of ICA614 Nanotaxi®, as well as regulatory-enabling GLP safety evaluation of ICA614 Nanotaxi® alone HEPAVAC (Hepatocellular vaccine candidate) have been achieved successfully.

- mRNA Vaccines

Some other ICA Nanotaxi® are also being assessed in \$33.1 million RN-ARMORVAX consortium, co-funded by US Defense Advanced Research Projects Agency (DARPA). The consortium would validate the new application of ICA Nanotaxi® for mRNA-based vaccines for infectious diseases in collaboration with CureVac and Sanofi-Pasteur.

- mRNA Replacement Therapies

Some other ICA Nanotaxi® are also developed to improve the limited efficacy and stability of mRNA therapeutics, leading to the dramatic increase in therapeutic protein expression without DNA-encoded gene.

- Therapeutic antibodies

In the absence of recombinant antigen, ICANtibodies™ allows, from an in silico DNA antigenic sequence, the production of the most ambitious functional antibodies against any natively expressed nuclear, cytoplasmic, secreted or membrane proteins.

In-Cell-Art is a privately held company, which was founded in 2005, laureate in 2012 and 2013 of the Fast 50 Deloitte award, and in 2013 of Territoires Innovation Pays de la Loire Awards. It is a member of the Atlanpole Biotherapies high-tech cluster of biotechnology companies in western France.

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