

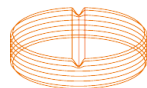
Liposome-based immunotherapy for autoimmune diseases

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Fundació Institut d'Investigació en Ciències
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MEDICAMENTOS INNOVADORES
Plataforma Tecnológica Española

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1. The Institution

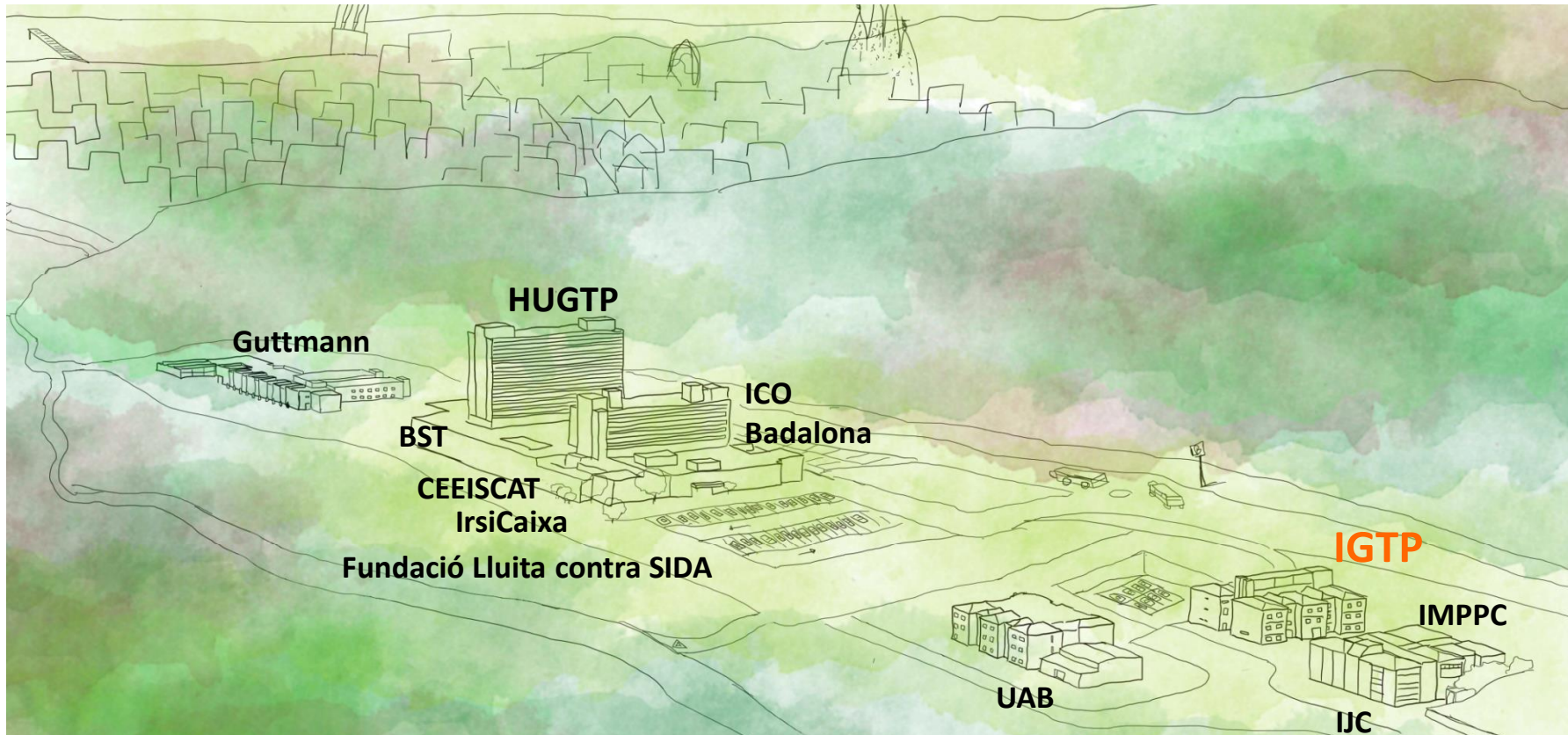
2. The Product

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1. The Institution



The Health Sciences Research Institute Germans Trias i Pujol (IGTP) is a CERCA biomedical research centre on the Can Ruti Campus, around the Germans Trias i Pujol Hospital in Badalona just outside Barcelona. As accredited centre of excellence for Medical Research accredited by the "Instituto Carlos III", the IGTP coordinates research and innovation activities on the campus as well as providing technical platforms and know-how to the scientific and medical community. The Can Ruti Campus is home to diverse research centres, including several which are outstanding in their fields, a teaching unit of the Autonomous University of Barcelona and various spin-offs.

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The Research Group

Immunology of type 1 diabetes Unit

Main aims of the group:

To understand
immunological
mechanisms of
pathogenesis
in T1D

To arrest the
autoimmune
response in T1D

To translate
basic research
into clinical
tools for T1D
and other AID



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2. The Product

The invention utilizes autoantigen-encapsulating liposomes for the prevention or treatment of type 1 diabetes.

- Liposomes - TOLERANCE
- Autoantigens - ANTIGENIC SPECIFICITY



2. The Product

Target indications: Prevention or treatment of autoimmune diseases

-Prevent type 1 diabetes

-Biodistribution

-Ag-specificity

-Molecular mechanism



Treatment of other
autoimmune diseases



RESEARCH ARTICLE

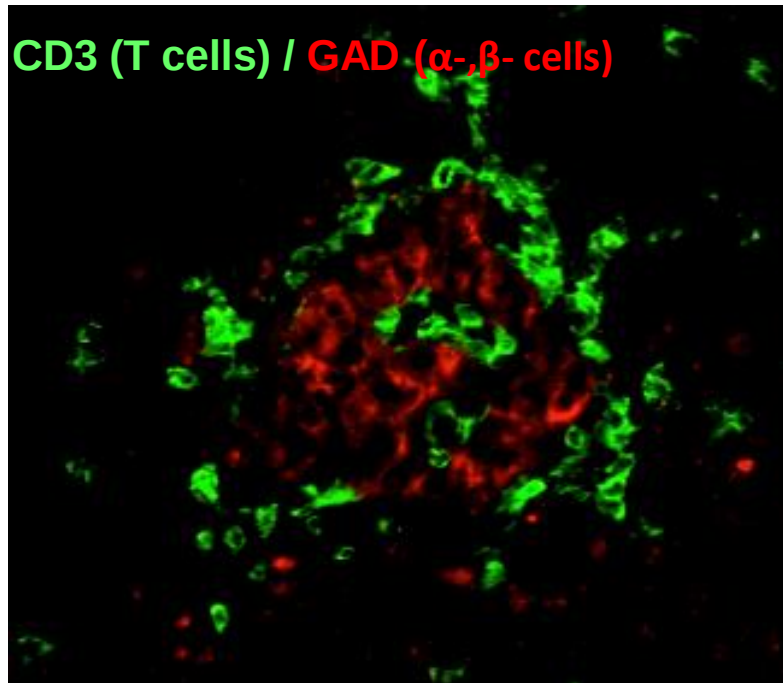
Use of Autoantigen-Loaded
Phosphatidylserine-Liposomes to Arrest
Autoimmunity in Type 1 Diabetes

Pujol-Autonell I *et al*, 2015

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2. The Product: a) Target Indications

T1D: an unresolved disease



Human islet from a T1D patient (onset)
Adapted from Planas *et al.*, 2010, Clin Exp Immunol.

Metabolic disease of unknown aetiology caused by the autoimmune destruction of insulin-producing pancreatic β -cells.

- Å T cell mediated
- Å Limited access to pancreatic tissue
- Å Long asymptomatic period
- Å No cure / prevention
- Å Role of apoptosis

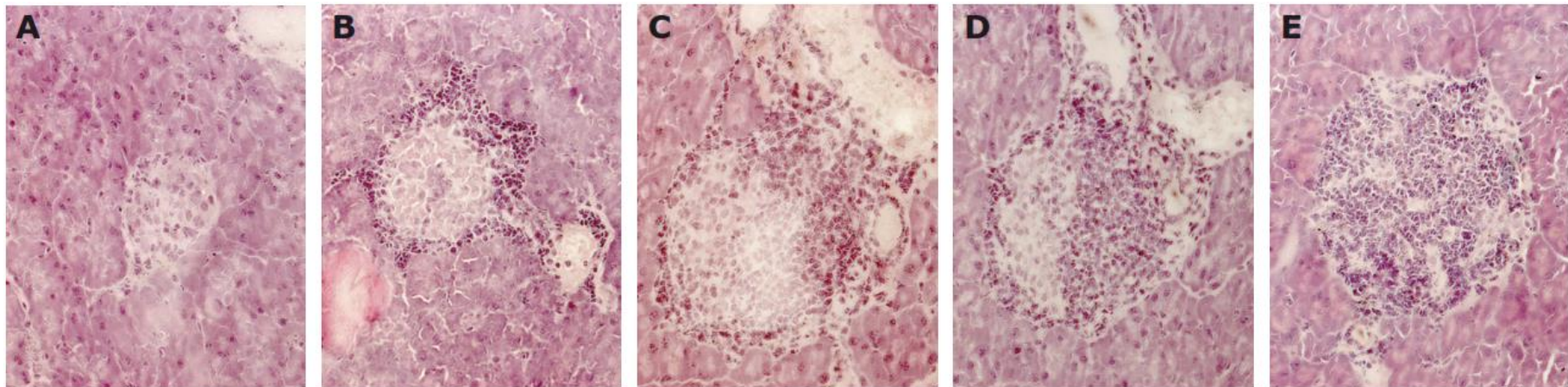
Increasing incidence in all ranges of age at a rate of 2-5% per year

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2. The Product:

b) The immuno-nanotherapy

Tool: the non obese diabetic (NOD) mouse model

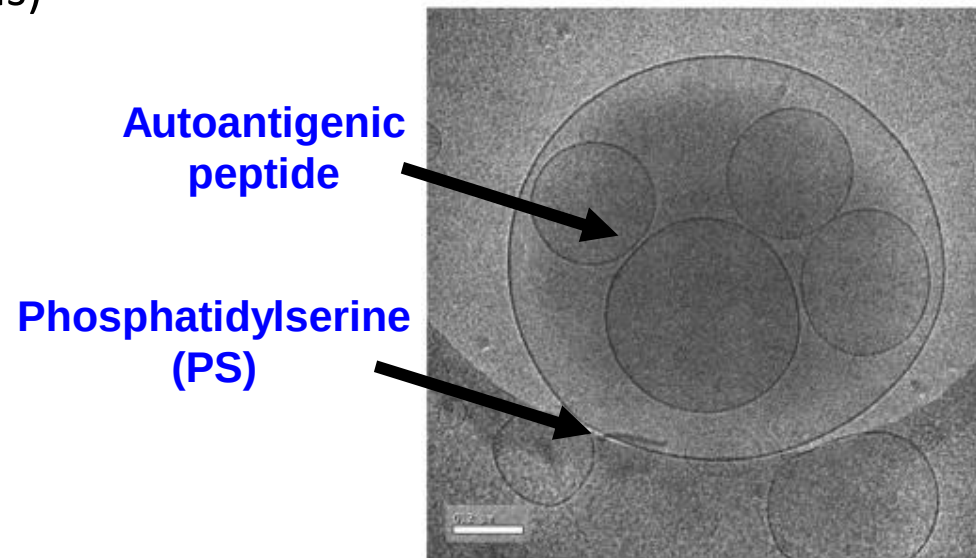


2. The Product:

b) The immuno-nanotherapy

How could apoptotic β -cells be mimicked for therapeutic purposes?
Synthetic strategy based on liposomal microparticles

- Å Ready to be **efferocytosed** (signals)
- Å Beta cells **autoantigens**
- Å Signal for **tolerance**
- Å Optimal **size** for phagocytosis

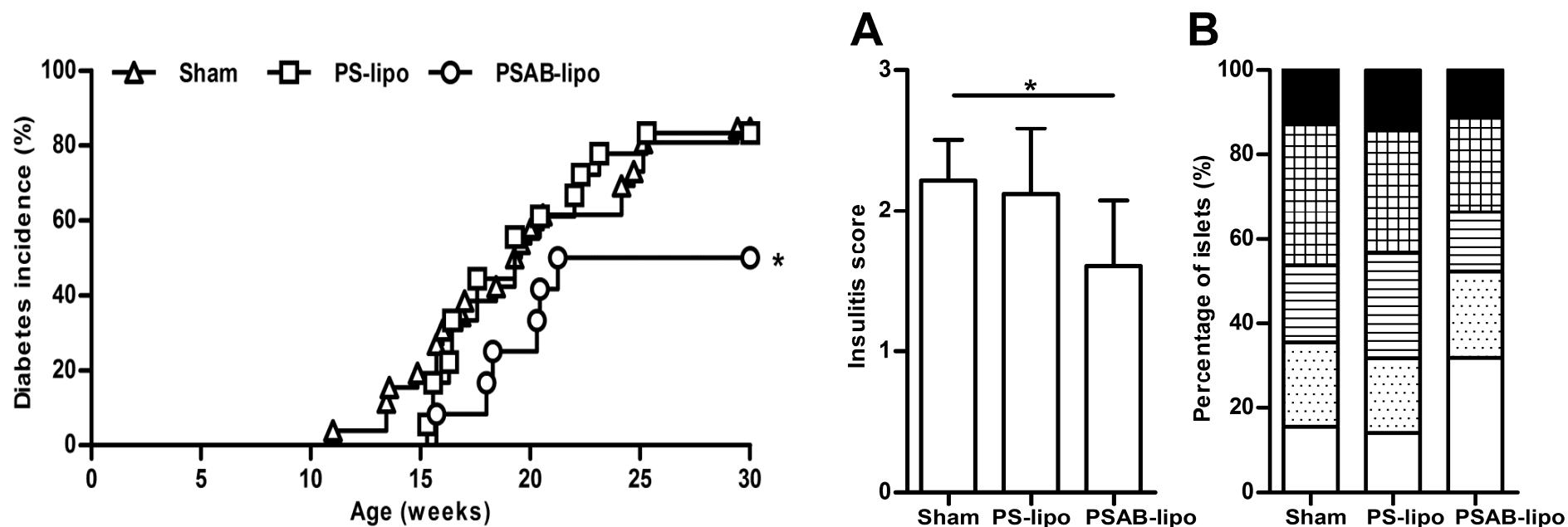


Pujol-Autonell et al, PLOS One 2015

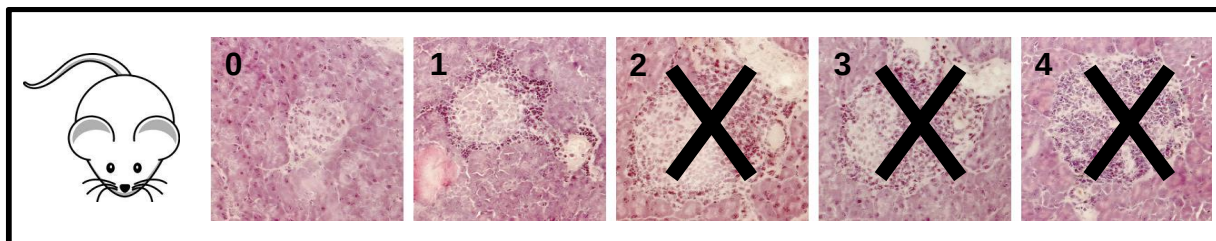
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2. The Product:

b) The immuno-nanotherapy



Pujol-Autonell et al,
PLOS One 2015



2. The Product:

c) Differential features facing the market

Å **Novel Approach:** Apoptotic mimicry provided by liposomes can restore tolerance lost in autoimmune diseases and offers a solution to the complexity of cell-based therapies

Å **Safe:** Based on a physiological process

Å **Antigen specificity**

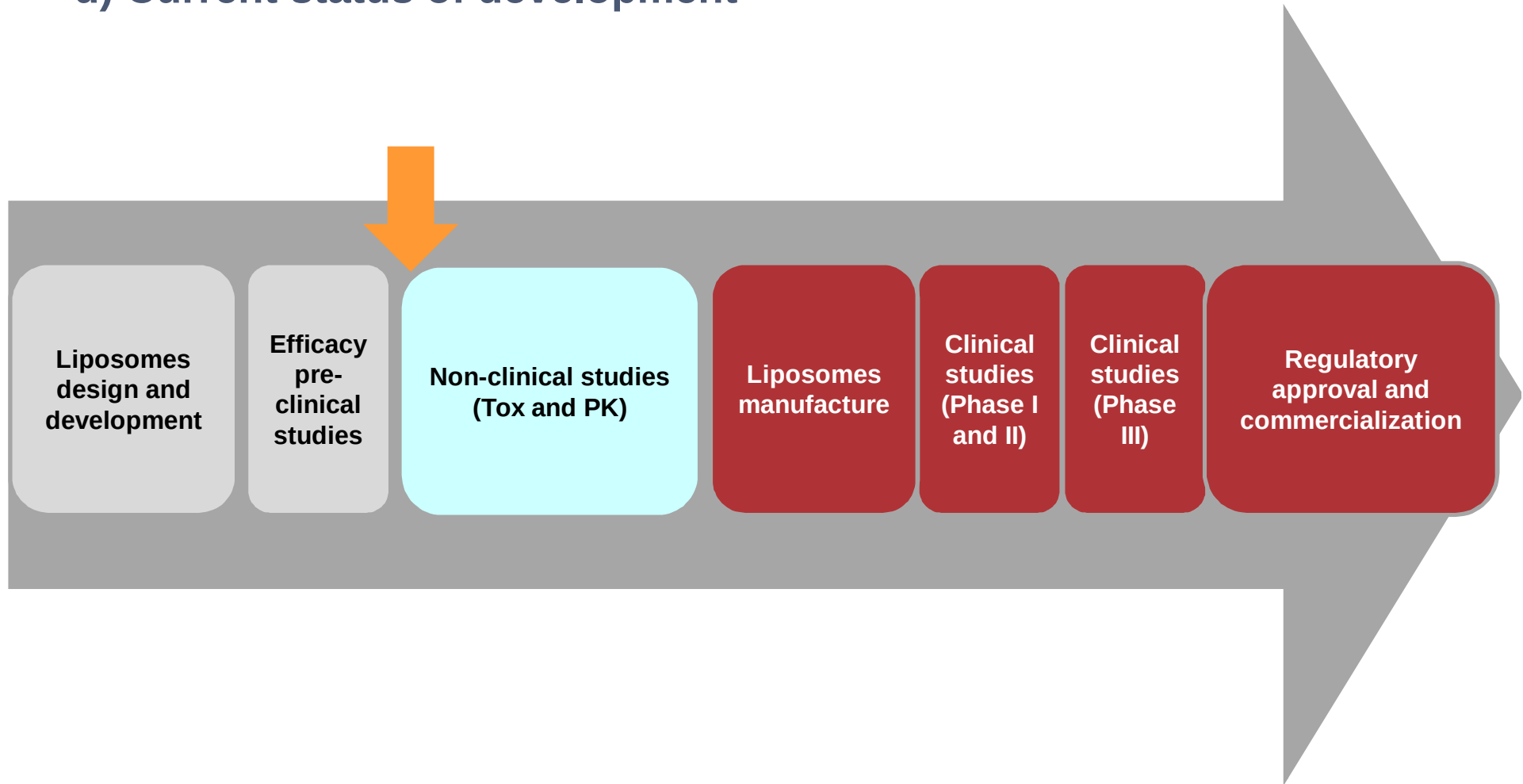
Å **Benefits**

easy to prepare and to standardize
customizable (for several AI diseases)
personalized therapy
possibility of large-scale production

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2. The Product:

d) Current status of development



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2. The Product: e) IPR protection

PCT patent application

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2. The Product: f) Pitfalls & Risks to be considered

Å Pre-clinical development ongoing

1. Dosage and regimen
2. Clinical endpoint

Å Experimental model → Clinical validation (proof of concept)

Å Product scale-up

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3. Partnering Opportunities

We are open to any kind of partnership with pharmaceutical and biotech industry that lead us to achieve final development and/or for licensing out the technology.

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Thank you very much for your attention



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