

# New nanoformulation for direct drug delivery in the central nervous system

University of Chile has generated a new formulation for intranasal administration of immunomodulatory drugs for direct delivery in the central nervous system (CNS)

## THE CHALLENGE

Worldwide there are 2.5 million people affected by multiple sclerosis (MS), with 16% of these patients concentrated in the US. Systemic administration of IFN- $\beta$  is the first line and most utilized therapy for treating this disease; however, new methods of administration are needed that are less invasive and more convenient, and that reduce the risks and improve the efficiency of the treatment. Here, nanotechnology has an important role in the industry since its development has contributed to a significant improvement in the administration of active compounds in the organism, by improving solubility, availability and delivery of drugs, as well as providing less invasive routes and thus, improving the patient's adherence to treatment.

## THE TECHNOLOGY

**New formulation for intranasal administration of immunomodulatory drugs for direct delivery in the CNS.**

The effectiveness of this delivery system and its administration route was tested in mouse models for MS with experimental autoimmune encephalitis and was compared to other administration strategies of IFN- $\beta$ , such as systemic administration and intranasal administration of "naked" IFN- $\beta$  (Fig. 1). Results showed that treatment with this new formulation has significantly a better clinical recovery compared to the other strategies, reaching an average 57% of recovery of clinical severity while IIP and IIN exhibited only an 18% and 29%, respectively.

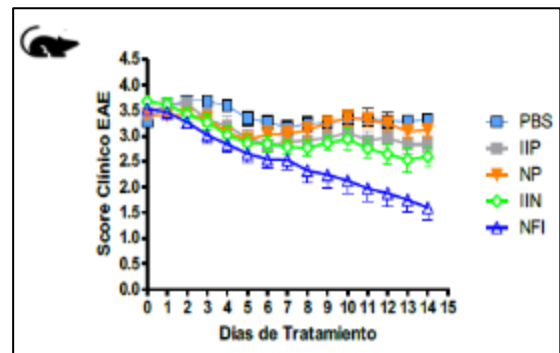
## STAGE OF DEVELOPMENT

- **Therapeutic effect tested in mouse models for MS**
- **In vitro assays for toxicity** in murine fibroblasts

- **Physicochemical characterization** of nanoparticles

## COMPETITIVE ADVANTAGES

- **More efficient and less toxic** than systemic administration – It requires lower dose
- **Less adverse effects** than systemic administration
- Allows **self-administration**
- **Painless and non-invasive** – More adherence to treatments



**Figure 1. Evolution of daily clinical scores measured for 2 weeks after treatment.** *PBS*: control, intraperitoneal injection; *IIP*: IFN- $\beta$ , intraperitoneal injection; *NP*: empty nanoparticles, nasal delivery; *IIN*: "naked" IFN- $\beta$ , nasal delivery; *NFI*: IFN- $\beta$  in this new nanoformulation, nasal delivery. Treatments with same dose and frequency

## APPLICATIONS

- Delivery system for immunomodulatory drugs
- Delivery system for drugs directed to CNS

## OPPORTUNITY

University of Chile is searching for industry partners for **out-licensing** and/or **collaborating to develop this technology.**

## INTELLECTUAL PROPERTY/REFERENCES

- Patent application number PCT/IB2019/052510