

# INTEREST OF INSULIN NANOPARTICLES FOR ORAL DELIVERY IN DIABETIC RATS

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## OBJECTIVES

The most physiological and convenient route for the administration of insulin in the treatment of diabetes is the oral route. However, two main problems have to be overcome

- the degradation of insulin, a 51 amino acid peptide, in the gastro-intestinal tract by proteolytic enzymes
- the low intestinal absorption of insulin, which never exceeds 1%.

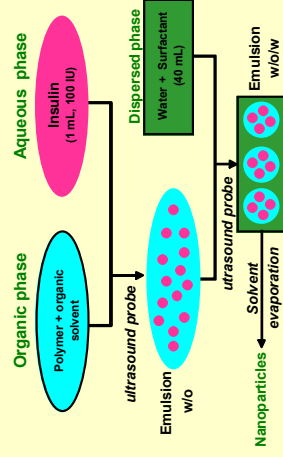
Thus, we have associated insulin to nanoparticles (NP) composed of a biodegradable polymer, poly (epsilon caprolactone) (PCL) and a polycationic non biodegradable polymer of a polyacrylic nature, Eudragit RS.

The first objective was to determine whether this new nanoparticles system is able to encapsulate insulin and to deliver it in the blood stream of diabetic rats.

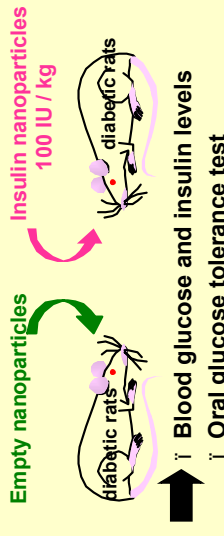
The second objective was to understand the interaction of the positively charged NP with the electronegative intestinal mucosa.

## METHODOLOGY

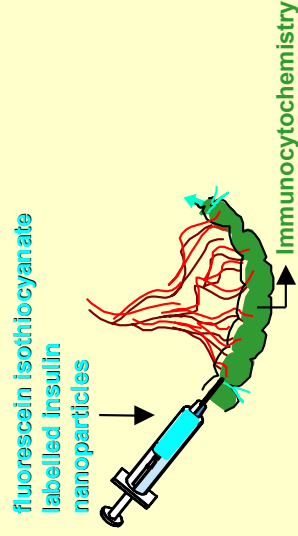
### 1. PREPARATION OF NANOPARTICLES



### 2. BIOLOGICAL EFFECT OF NANOPARTICLES



### 3. INTESTINAL UPTAKE OF NANOPARTICLES



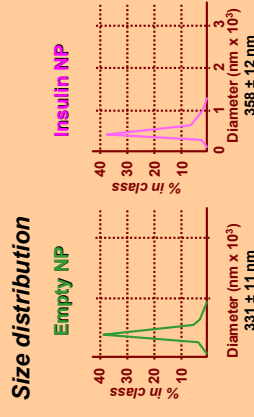
## CONCLUSION

Insulin-loaded nanoparticles prepared with a blend of PCL and Eudragit RS exert an antidiabetogenic effect when administered orally in diabetic rats. These results may be explained in part by the mucoadhesive properties of the polycationic polymer favouring the intestinal uptake of insulin NP followed by the transport of insulin in the mesenteric blood stream.

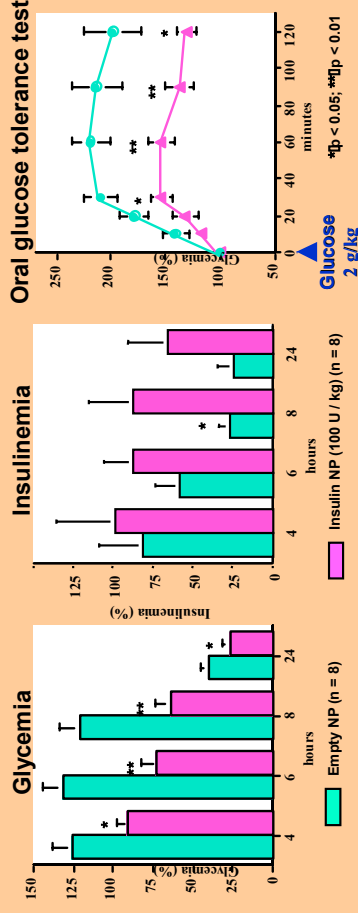
## RESULTS

### 1. CHARACTERIZATION OF NANOPARTICLES

Rate of encapsulation of insulin : > 98 %



### 2. BIOLOGICAL EFFECT OF ORAL INSULIN NANOPARTICLES



### 3. INTESTINAL UPTAKE OF INSULIN NANOPARTICLES

NP in the intestinal lumen

NP in the mesenteric blood

