



# Nanomedicines can improve the efficacy of old drugs molecules into outstanding products



# Advanced nanosystems for modulation of mucosal drug delivery

## *Parenteral route*

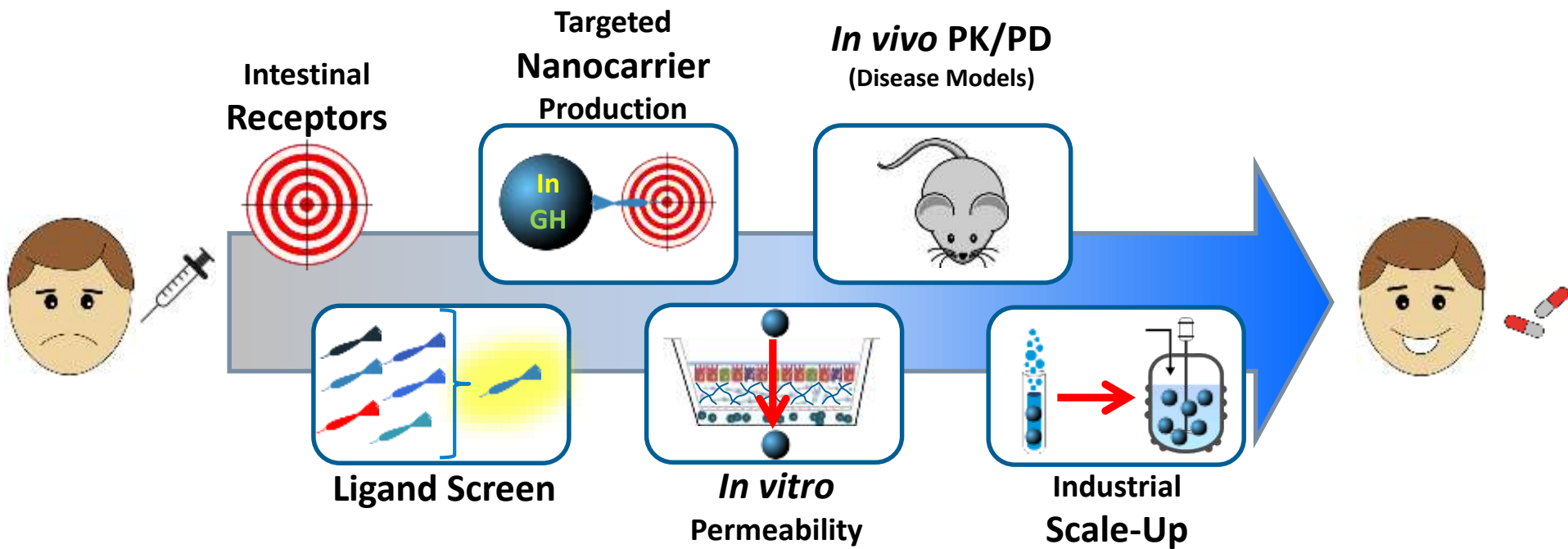
- Painful
- Chronic nature of diseases
- Risk of infection / costs in injection materials



## *No-invasive delivery*

- Easy administration
- Accessible
- Patient adherence
- Follows endogenous pathway
- Market competition / Patenting

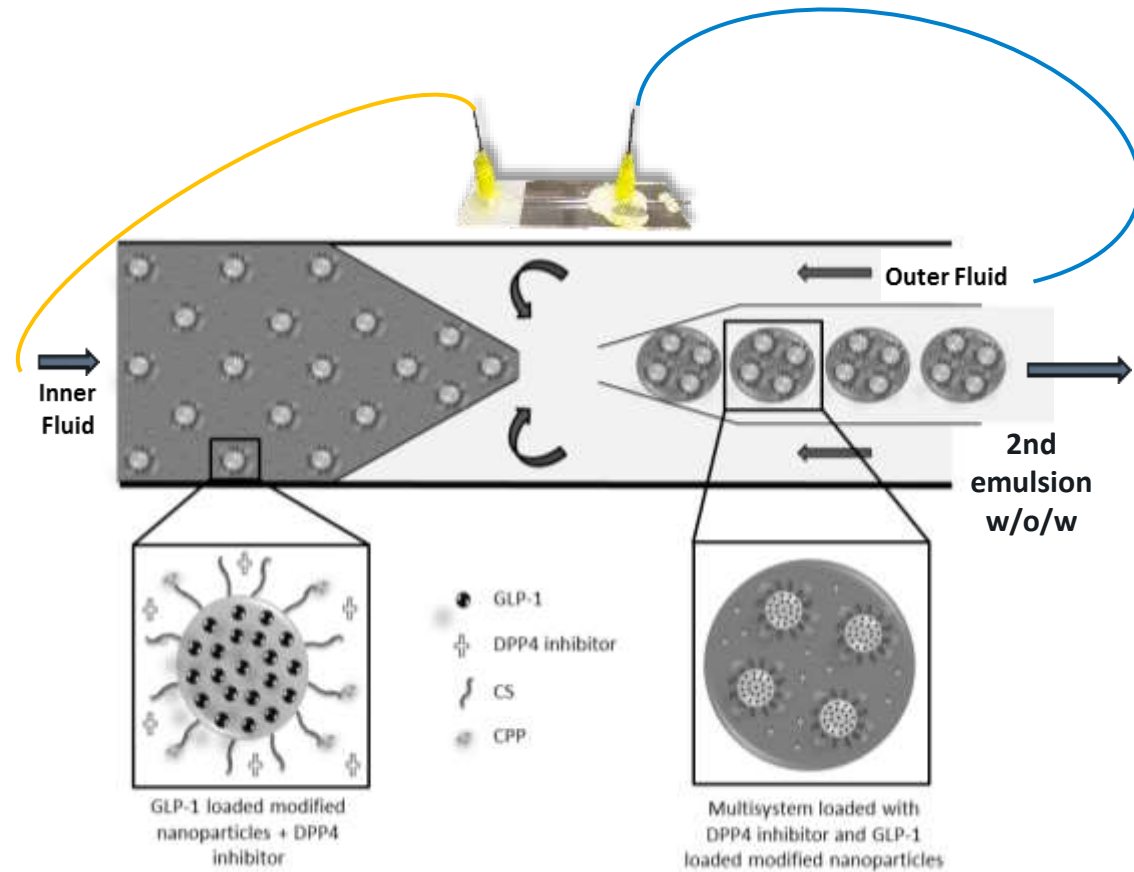
# Oral delivery of therapeutic peptides and proteins



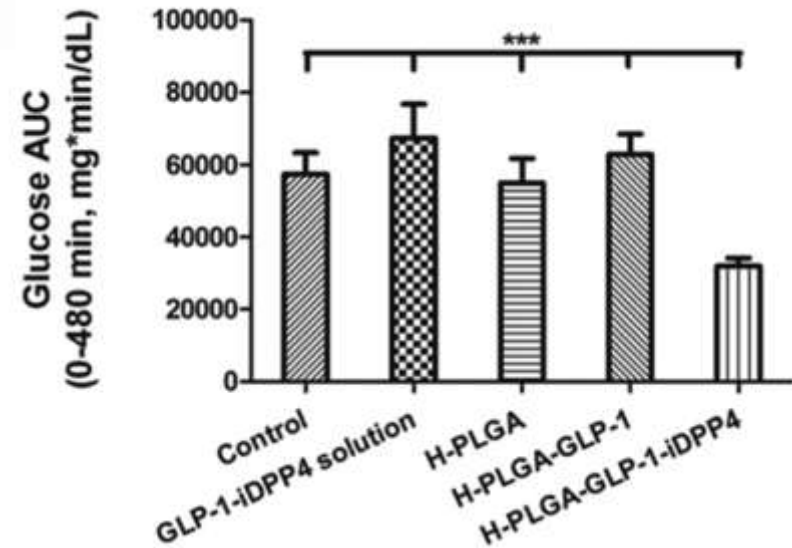
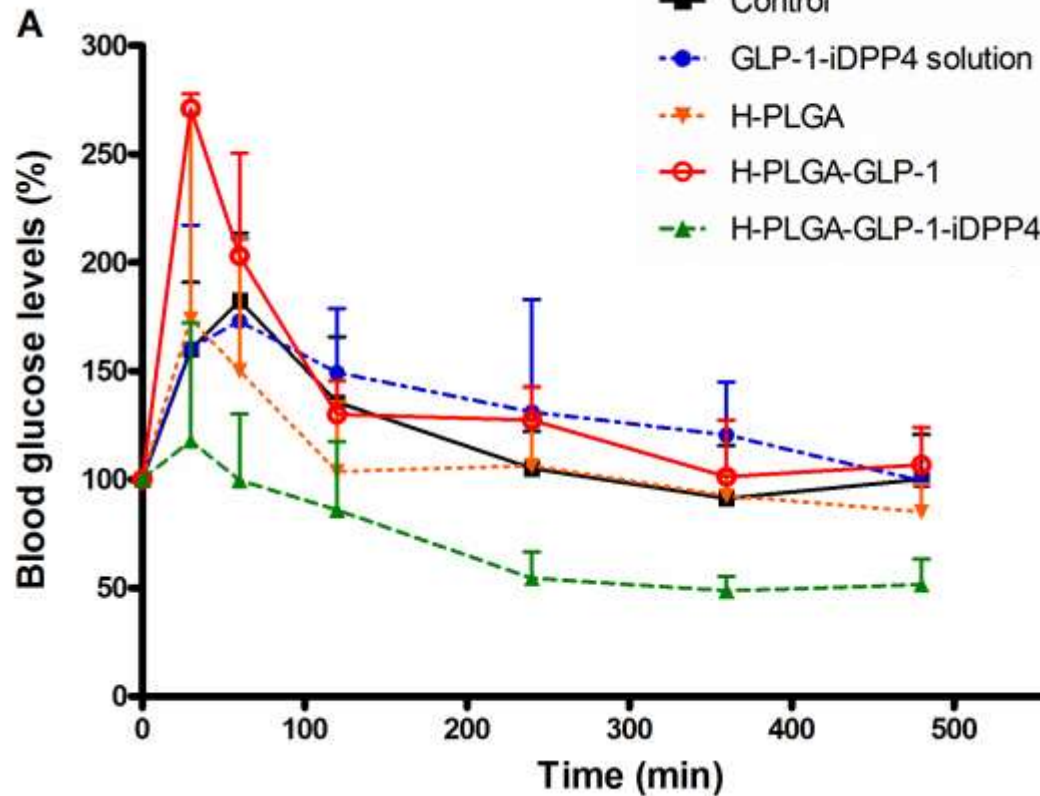
# Oral delivery of therapeutic peptides and proteins

## Microfluidizers

## Microfluidics technique

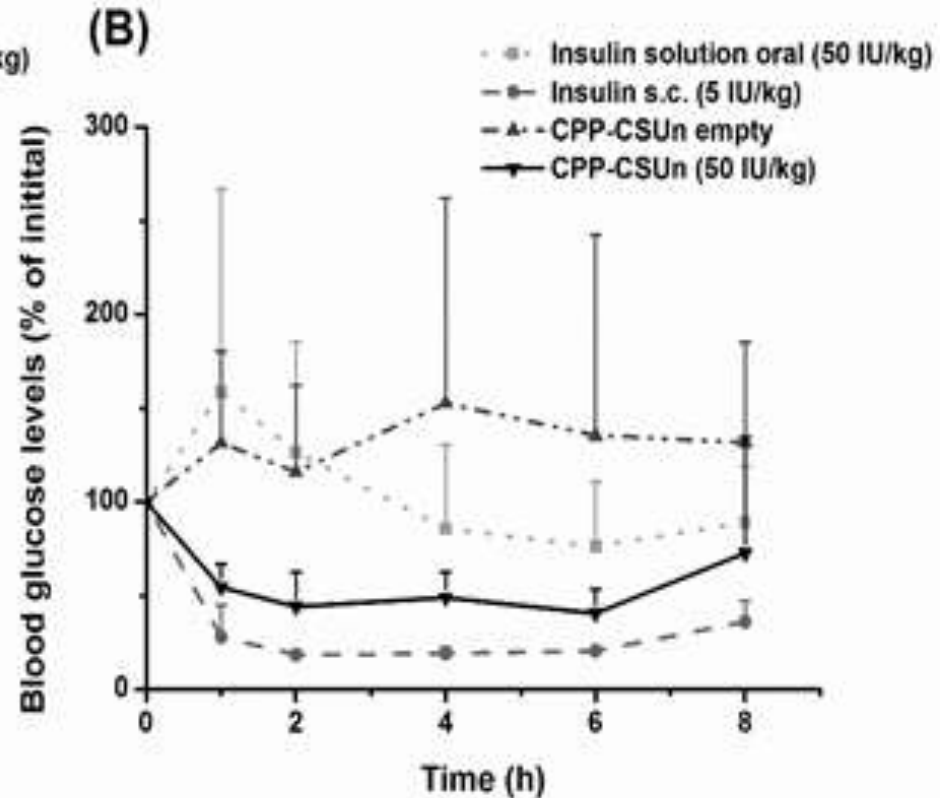
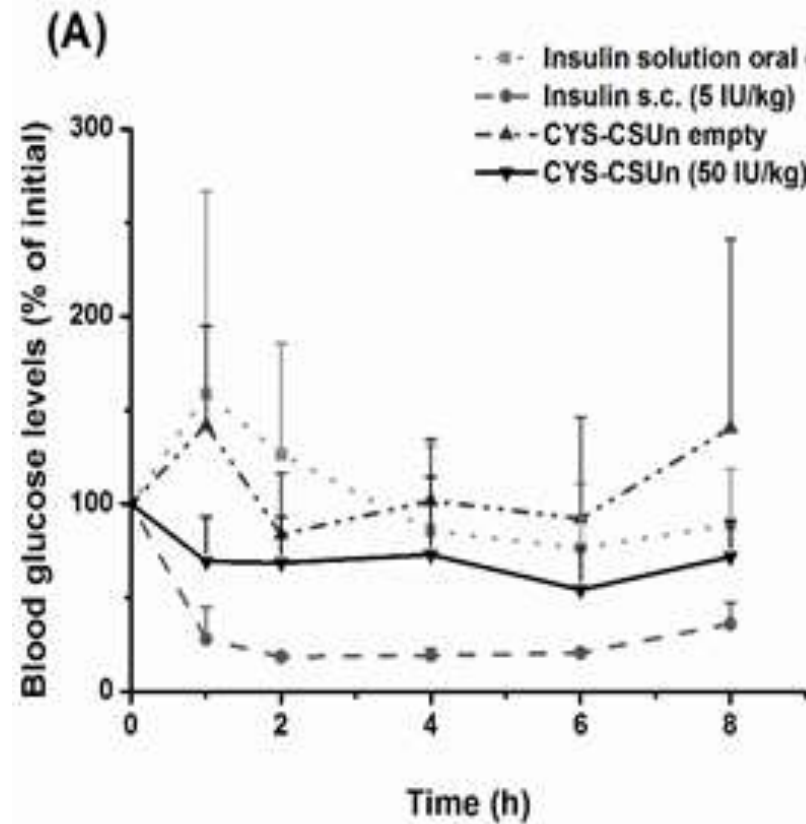


# Intestinal nanodelivery of GLP-1 and DPP4 inhibitor for type 2 diabetes therapy

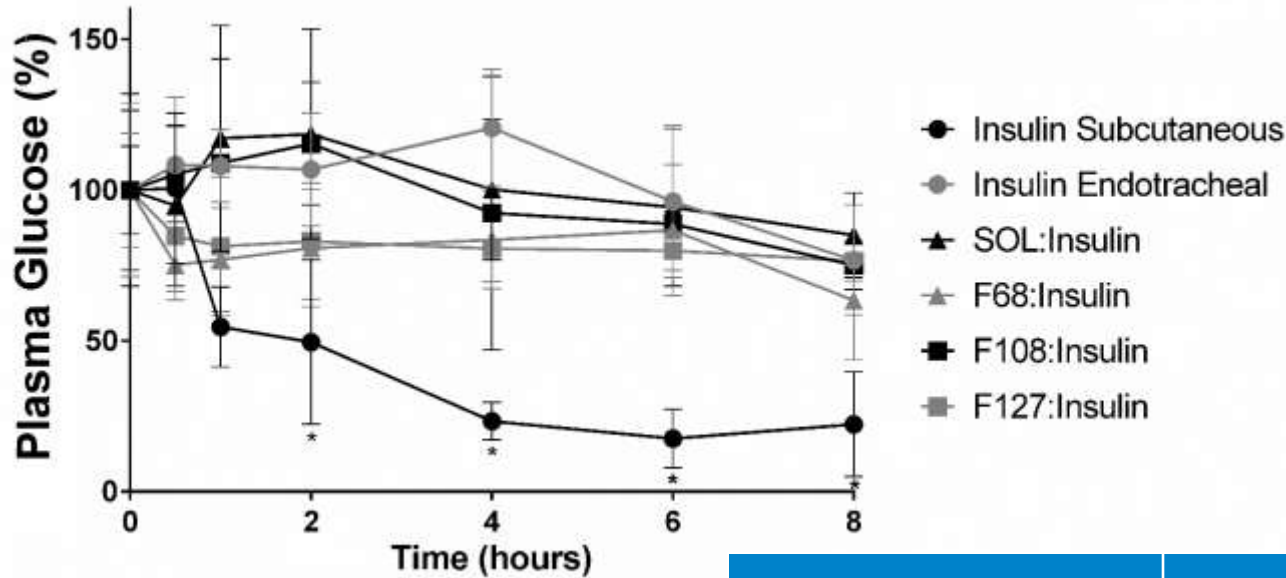


# Intestinal nanodelivery of insulin for type 1 diabetes therapy

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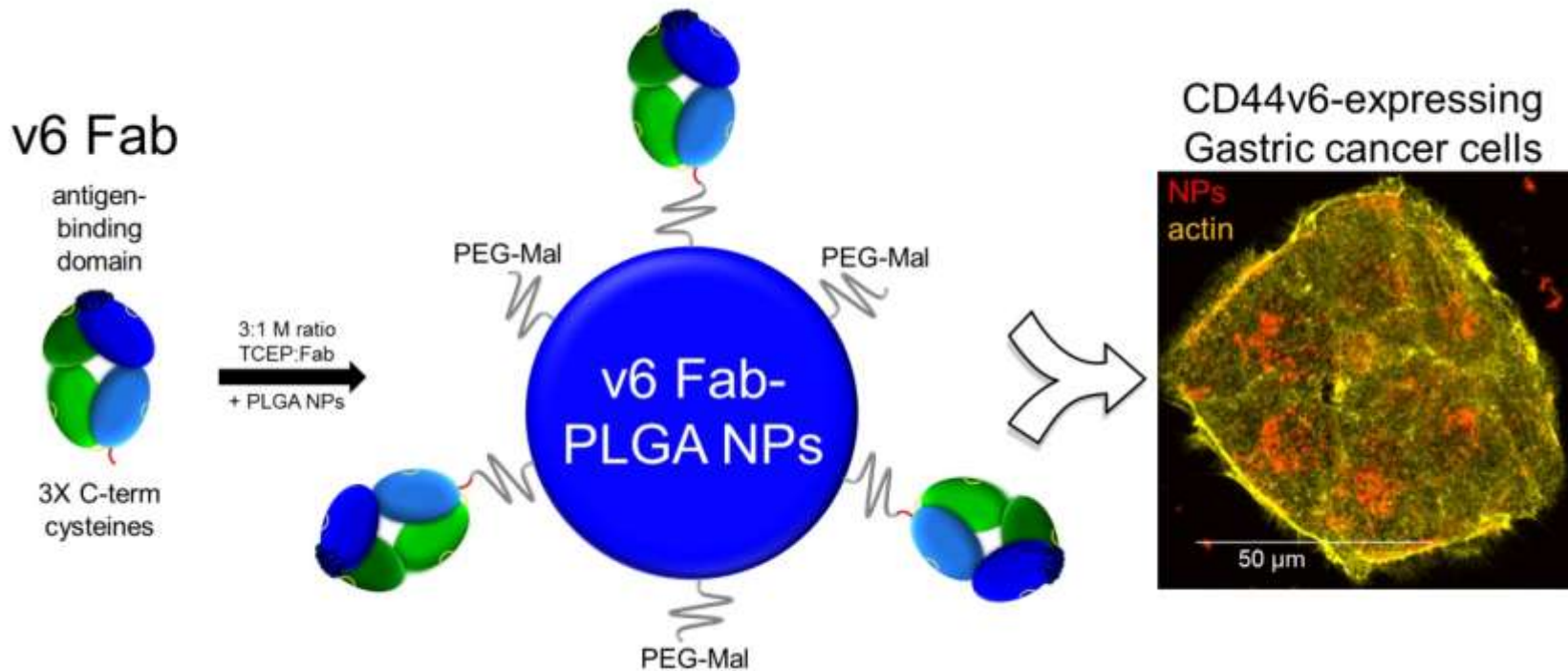
# Pulmonary nanodelivery of insulin for type 1 diabetes therapy



Sample	PA (%)	Serum insulin concentration (μIU/mL)
Subcutaneous Insulin	100.00±0.52	5.46±2.59
Endotracheal Insulin	5.60±0.03 *	13.73±8.83
SOL:Insulin	6.92±1.19 *,**	18.95±13.75
F68:Insulin	<b>32.52±7.25 **, **</b>	23.32±15.76
F108:Insulin	13.24±1.31 *,**	5.01±3.77
F127:Insulin	<b>28.88±5.05 **, **</b>	18.65±9.57



# Targeting human intestinal CD44v6 cells with Fab-decorated nanoparticles







## To sum up....

Nanotechnology is presented as the most promising strategy to improve drug properties:

- physicochemical properties (solubility)
- biophysical properties (conformational and structural stability)
- biopharmaceutical properties (permeability, metabolic stability)

providing **stability** for encapsulated molecules in the harsh environment of the physiologic fluidics, **surpassing mucus barrier** and guiding payloads to the local of absorption, ultimately **increasing bioavailability**.



# Translational drug delivery in the multi-research environment

Delivery route

Drug target

