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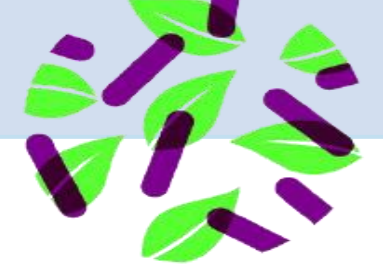


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# Innovative Approaches: Phyto-Probiotics as a Therapeutic Support for Managing Obesity-Linked Psoriasis

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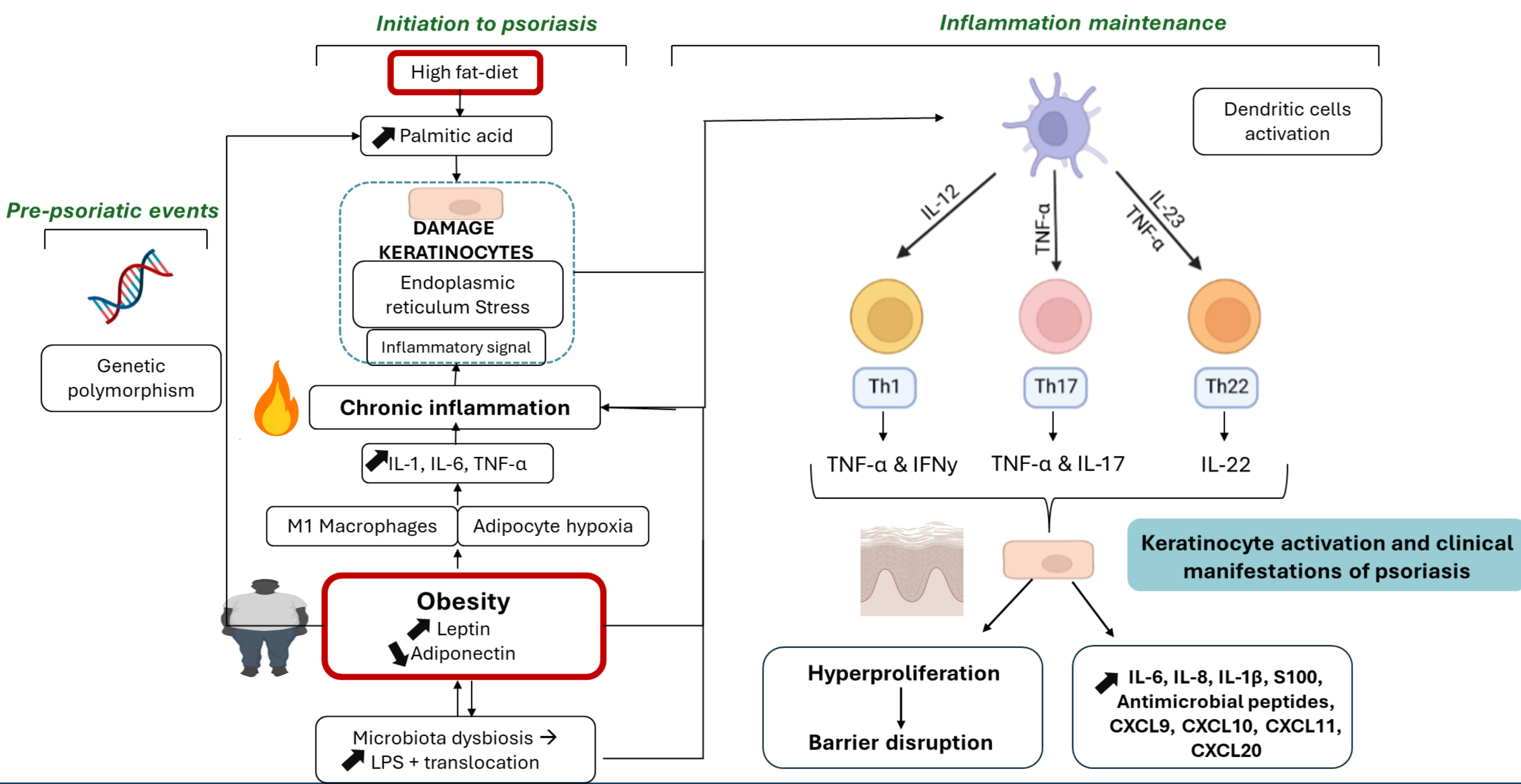
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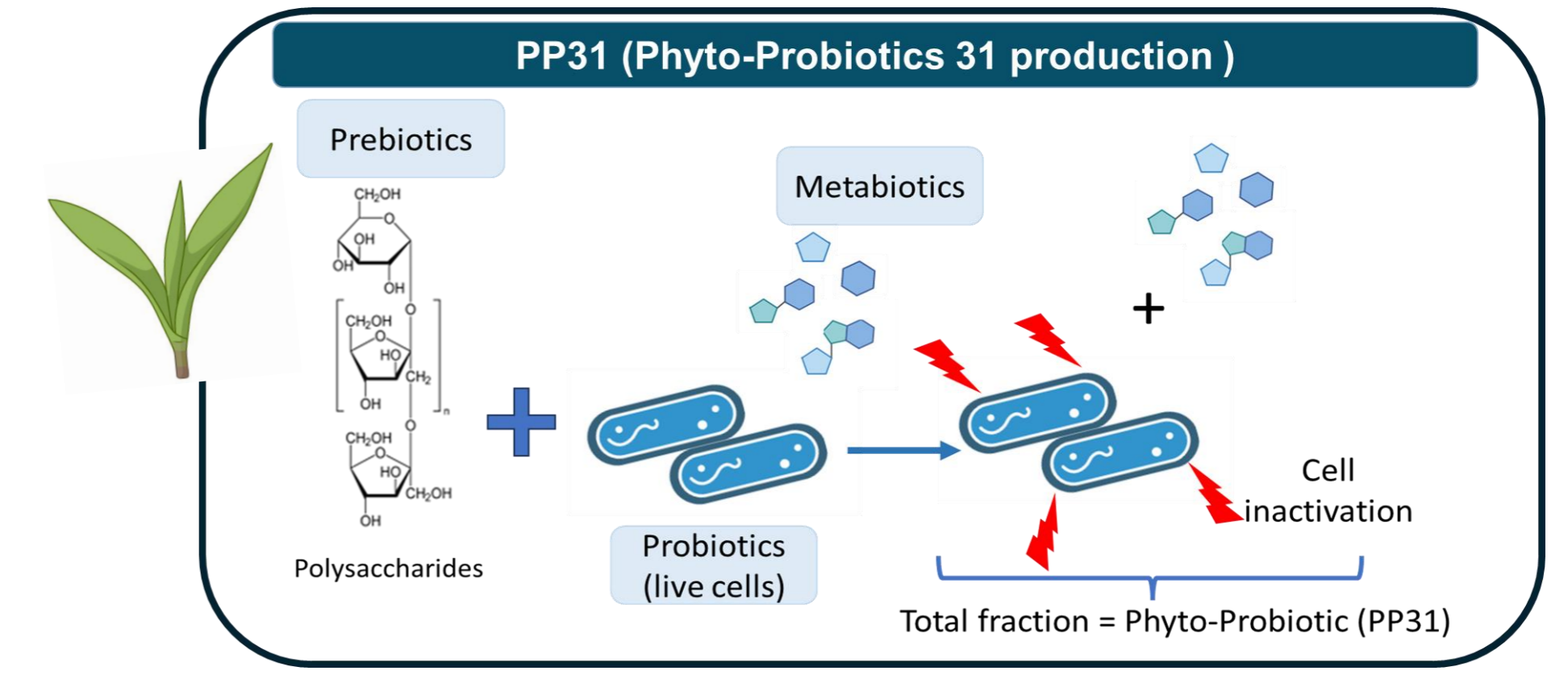
## Background

Obesity, which has become a global public health issue, is defined by an excessive accumulation of body fat. It is a chronic disease and a major risk factor for many other pathologies development such as psoriasis. Obesity epidemiology demonstrates that its prevalence has gradually increased over the last few decades. According to WHO, more than 890 million persons are estimated to be obese in 2022.



## Objective

The aim of the project is to develop new natural health products for nutraceuticals and dermo-cosmetics. The extracts are obtained from the fermentation of a prebiotic and a probiotic. 37 combinations have been developed and investigated. Two of them have been retained for additional studies, including Phyto-Probiotics 31.



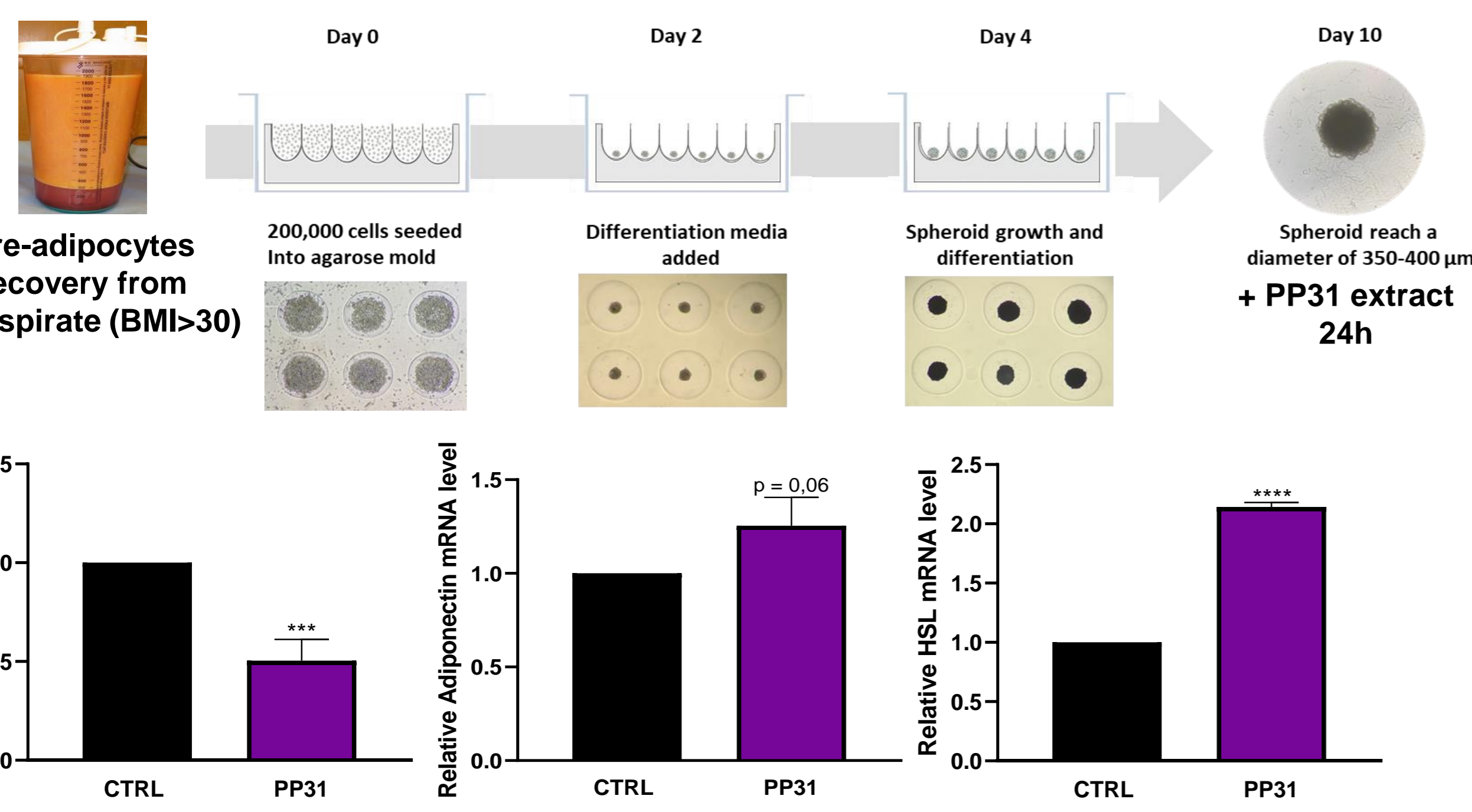
## Targets

Low-grade Inflammation

Obesity Psoriasis

## Methods & Results

### Leptin, adiponectin and HSL (hormone-sensitive lipase) expression on human mature adipospheroids



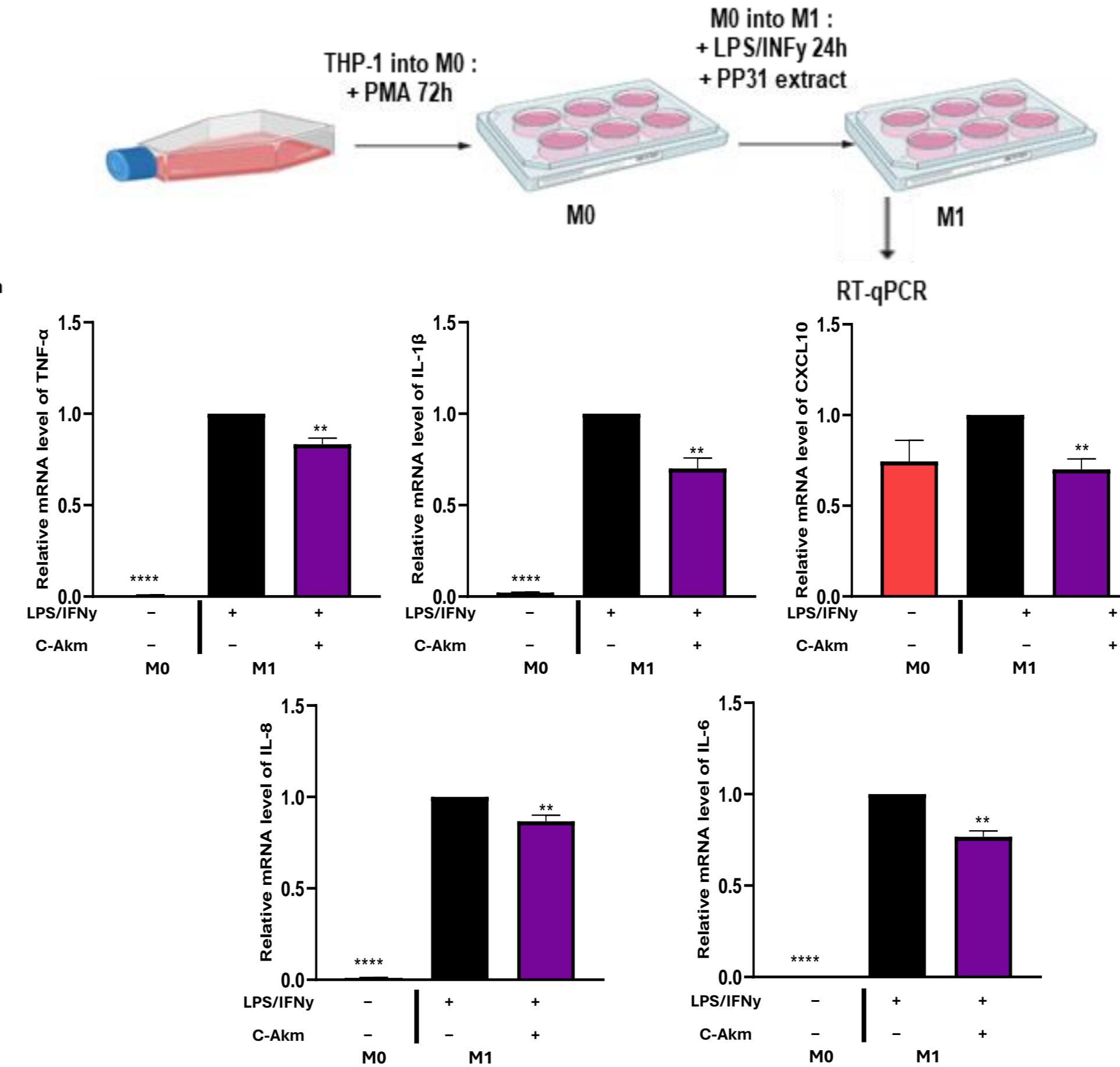
Decreased the gene expression of Leptin and enhanced HSL and Adiponectin in human mature adipospheroids

Leptin : pro-inflammatory adipokine

Adiponectin : anti-inflammatory adipokine

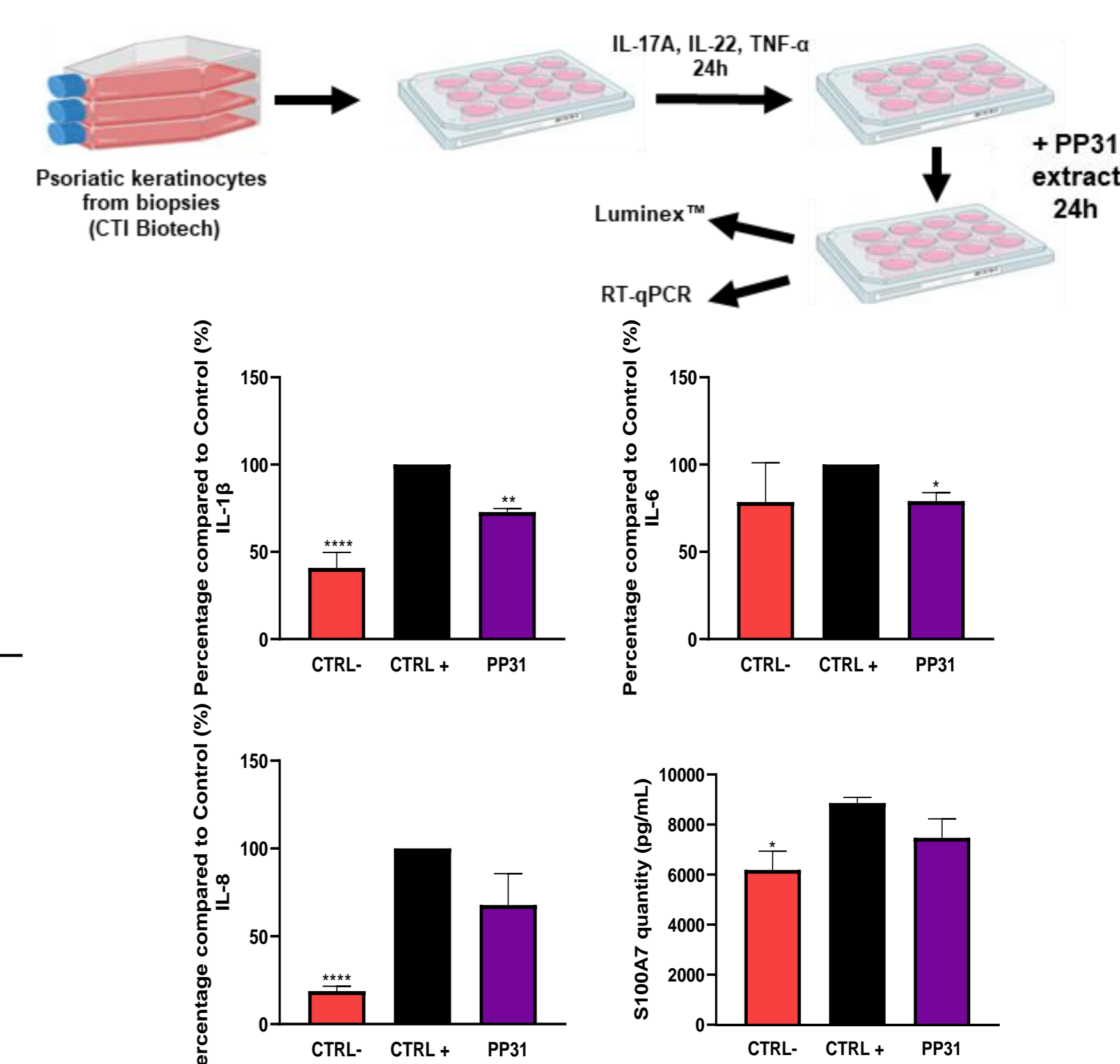
HSL : Enzyme that converts triglycerides in adipose tissue into fatty acids

### THP-1 polarisation into M0-like or M1-like macrophages



Reduced the gene expression of M1-like markers (*TNF-α*, *IL-6*, *IL-8*, *IL-1β* & *CXCL10*)

### Psoriatic keratinocytes

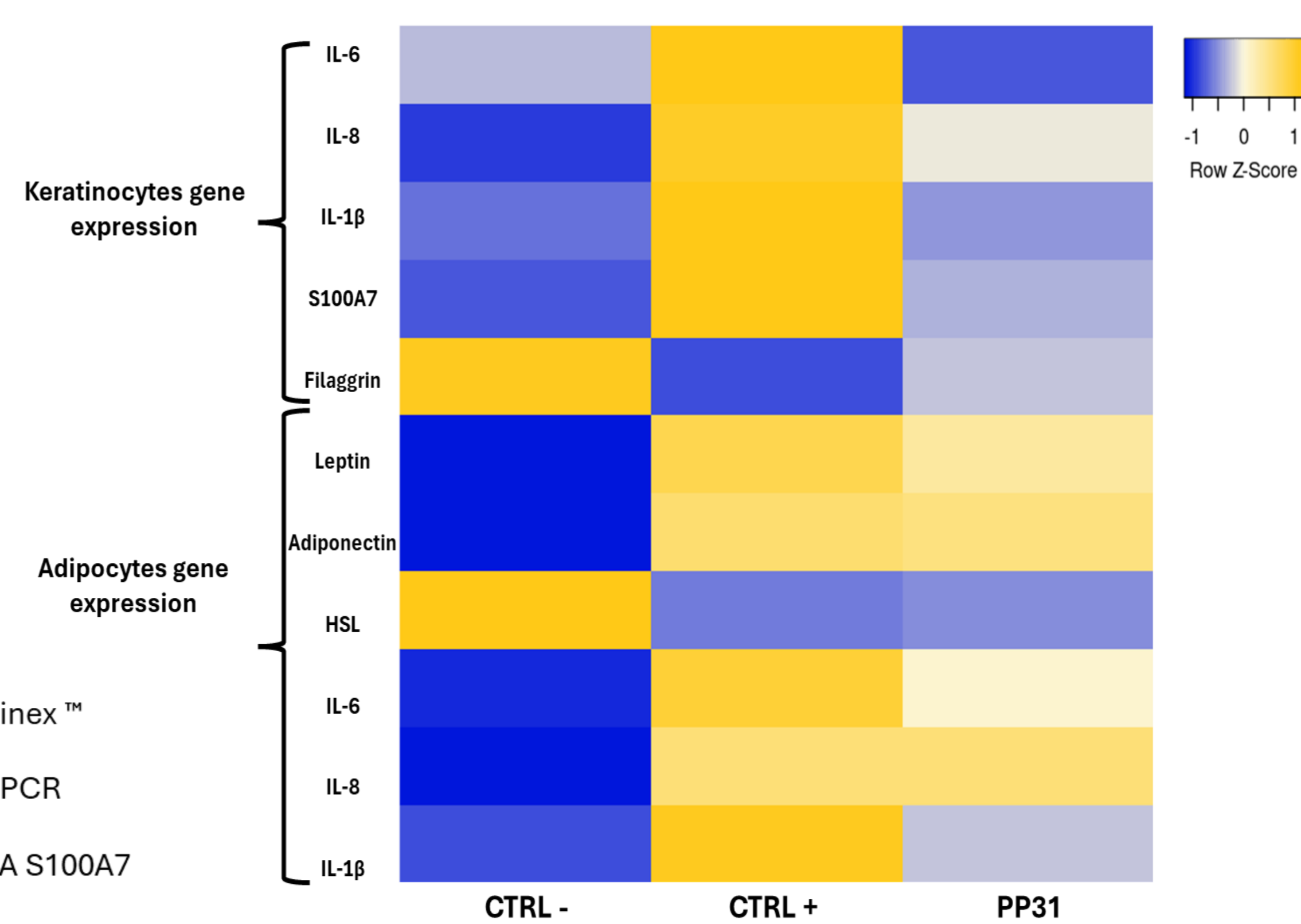
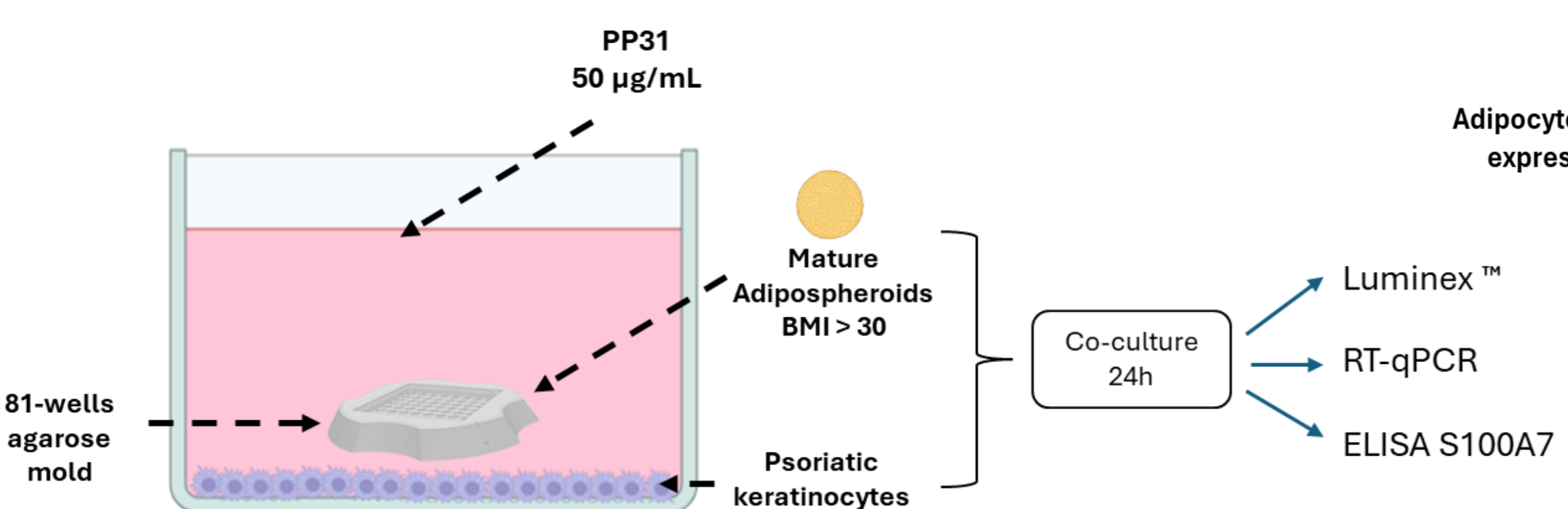


Lowered the secretion of *IL-6* & *IL-1β*, not significant for *IL-8* and *S100A7*

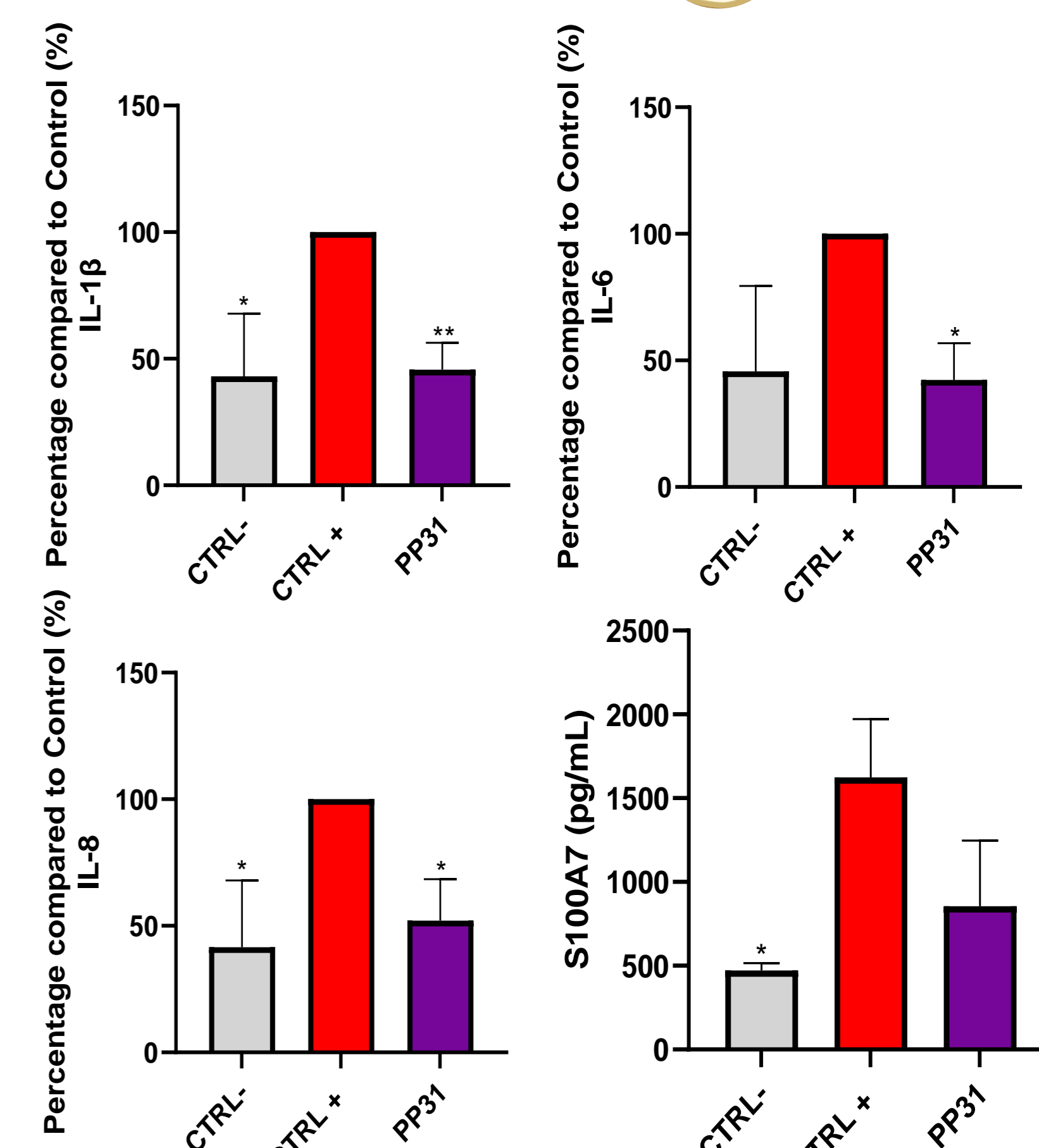
*S100A7* (psoriasin) : bacteriocin up-regulated in patients with psoriasis

### Co-culture mature obese adipospheroids / psoriatic keratinocytes

In order to mimic the influence of the obese adipose microenvironment on psoriasis, mature adipospheroids (BMI>31) were co-cultured with psoriatic keratinocytes from biopsies. The adipospheroids were grown and differentiated for 10 days before being co-cultured with psoriatic keratinocytes. On the day of co-culture, the extract was applied for 24 hours.



Decreased the gene expression of *IL-6*, *IL-8*, *IL-1β*, *S100A7* in Psoriatic keratinocytes. Downregulated *IL-6*, *IL-1β* in adipospheroids



Decreased the secretion of *IL-6*, *IL-8*, *IL-1β*, *S100A7*

## Conclusion

**PP31 extract may exhibit a triple effect by targeting obesity, inflammation, and psoriasis biomarkers, and may help in both local and systemic management of obesity-linked psoriasis.**

