

# IMMUNONUTRITIONAL PRECISION NUTRITION TO REDUCE THE RISK OF SUFFERING METABOLIC DISEASES

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## Introducción

**Obese and type 2 diabetic (T2D)** humans develop increased insulin resistance (IR), which appears derived from an **increased innate immune** Toll like receptor 4 (TLR4) **activity** in skeletal muscle. Besides the role of **type 1 innate lymphoid cells** (ILC1s) in regulating systemic inflammatory diseases involved in the development of diabetes <sup>1</sup>, **monocyte/macrophages** play determinant role regulating the systemic availability of lipids for metabolic purposes <sup>2</sup>.

## Objetivos

The purpose of this study was to examine the role of **replacement of critical nutrients**, potential modulators of TLR4 activity, in cookies with the hypothesis that it would result in a biased functional differentiation of **ILC1s** with positive effects in the prevention of early immunonutritional imbalances leading to obesity and T2D (**Figure 1**).

## Métodos

Participants were **healthy adult** Caucasians of both sexes and included 60 lean subjects with no medical symptoms. Participants were randomly divided into groups, and each group received nutritional instructions to eat cookies (**group A, commercial formulation; group B, immunonutritional agonists-containing** formulation) over a 12-days study period, while adhere to a **normocaloric diet** (2057.3 ± 614.7 kcal) according to physical activity.

## Resultados

Group B displayed **downward trends in fat mass** (Group A, +0.58% vs Group B, -0.73%) together with broad variations in muscle mass (Group A, -0.27% vs Group B, -5.5%), suggesting variations in the body extracellular water. However, it was not quantified significant differences in body weight changes. These changes were associated to a **better control of IR** ( $\Delta$ TyG index; group A, +0.12 vs group B, +0.07 over the study period). These changes could be associated to significant variations in innate immune effectors (**Figure 2**).

## Conclusiones

Dietary immunonutritional agonists targeting innate immune biology enable selective functional differentiation of key **immune regulators** to **reduce the risk** of suffering dysregulated metabolism leading to **obesity and T2D**.

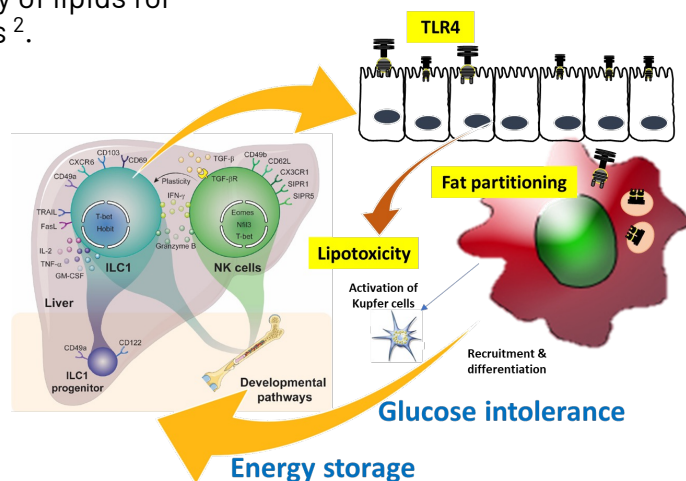
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### References:

<sup>1</sup>Diabetes & Metabolism 2019, 45(4), 341-346;  
<sup>2</sup>Science 2021, 2;373(6550):eabe9383

**Figure 1.** Working hypothesis: Schematic representation



**Figure 2.** Innate immune-induced changes

