Metabolic risk of new food technologies: calorimetric study of model cell membranes for the determination of the influence of free fatty acids (FFA) in diabetes mellitus onset.

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Type 2 diabetes mellitus (T2DM) is a chronic disease that continues to spread in both developed and developing countries. Indeed, the individuals affected by diabetes mellitus (type 1 and type 2) in the world are now close to 400 million and estimates suggest that they will reach 600 million by 2035[1].

The rapid spreading of this disorder is influenced not only by genetic factors but also by environmental ones: socio-economic variations, evolution of lifestyle and changes in dietary habits have contributed to increase the percentage of overweight and obese individuals[2], which in turn have led to a greater diffusion of diabetes. In fact, weight gain is closely related to insulin-resistance onset[3], which is considered as the starting point for the development of the disease. However, the manner in which obesity and nutrition factors are linked to the onset of T2DM is not fully understood yet, especially at a molecular level.

The aim of the project presented here is to prepare and characterize (thermodynamically and spectroscopically)[4] model membranes which simulate as possible the phospholipid bilayers of the Langerhans β-cells in order to highlight and discriminate the role of the lipid composition and foodborne stress (in terms of $[Ca^{2+}]$[5] and [FFA][6]) in the membrane stability. Moreover, the interaction between the model membrane and *hIAPP*, which seems to be involved in β-cells death[7], will be used to evaluate the influence of membrane stability on T2DM onset.

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