PIVOTAL ASSESSMENT OF THE EFFECTS OF BIOACTIVES ON HEALTH AND WELLBEING. FROM HUMAN GENOMA TO FOOD INDUSTRY.

Research summary sheet

Context and Challenges

The main aim of WP3 is to understand the effect of the bioactive compounds (DHA, BG, and AC) in the prevention of the Metabolic Syndrome (MS). For that it is necessary to elucidate the mechanism of action: it means to know what happens (at cellular and molecular level) when the bioactives interact with the human body. Moreover, the WP3 explore the effects of the combinations of bioactives, investigating their possible synergistic or neutral effect.

In WP3 *in vitro* studies two main cell model systems are being used, adipocytes (main cells on adipose tissue) and hepatocytes (main cells in the liver), due to their pivotal role in development of the MS. Indeed, white adipose tissue (WAT) and liver are key metabolic organs. Dysfunctions of signalling and metabolism in the liver and/or in the WAT causes metabolic disorders (insulin resistance, dyslipidemia, hypertension, etc.), which determine or predispose to metabolic associate disease such as non-alcoholic fatty liver disease (NAFLD), obesity and/or type 2 diabetes (T2D).

Results and Applications

- It has been shown the beneficial effect of the DHA, alone and in combination with BG or AC metabolites, on metabolism of adipocytes and on lipid metabolism and insulin resistance in hepatocytes.
- Application of the in vitro cellular models to study the effect of the selected bioactives on adipocytes and hepatocytes metabolism.

Breakthroughs, benefits and added value

- To define the use of the bioactives and to select proper combinations with powerful beneficial effect.
- The application of the *in vitro* models to screen and/or discover new sources of bioactives.

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Results achieved

- The bioactives decreased the inflammatory status in adipocytes, what indicates a beneficial role on their functionality and metabolism.
- The bioactives decreased the cellular lipid content in hepatocytes which contributes positively to maintain the lipid homeostasis.
- The bioactives improve the insulin signalling in hepatocytes.
- Combinations of bioactives demonstrate a synergistic effect.

Further information: **http://www.pathway27.eu/**

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