

Glossary

- **Cerebrovascular Accident (CVA)**

CVA, or stroke, is a deficiency in the oxygenation of the brain due to a blood clot or brain hemorrhage that may be fatal. Hypertension is the principal risk factor for CVA.

- **Fatty acids**

Fatty acids are lipid nutrients more commonly referred to as fats.

- **Adipocytes**

Cells specialized in the storage of fats and localized in fatty tissue. Adipocytes constitute the body's energy reserve.

- **Adenosine monophosphate (AMP)**

AMP is a molecule present in cells and involved in their energy metabolism. Elevation of AMP levels is, in particular, related to the energy requirements of the cell.

- **AMP-activated protein kinase (AMPK)**

AMPK or adenosine monophosphate-activated protein kinase is an enzyme that contributes to the regulation of energy status (via the ATP/AMP ratio). In particular, AMPK controls the expression of genes involved in energy metabolism by stimulating another metabolic regulator, sirtuin (SIRT1).

- **Adenosine triphosphate (ATP)**

ATP is a molecule present in cells and involved in their energy metabolism. The chemical compound contains energy-rich bonds (phosphate bonds) that supply the energy necessary for the cell's numerous chemical reactions.

- **Diabetes, type 2**

Type 2 diabetes (formerly called non-insulin-dependent diabetes mellitus (NIDDM), or adult-onset diabetes) is a disease that affects the regulation of glycemia, the glucose level in the blood, due to insulin resistance or insulin deficiency. Type 2 diabetes is a metabolic disease mainly observed in people above 40 years of age, people who are chronically overweight and/or have pertinent family history. The disease may result in blindness, kidney failure and, if not treated, amputation.

- **French Paradox**

The expression refers to the fact that the French, despite eating a relatively high-fat diet, have an exceptionally low cardiovascular mortality rate. The French diet and, in particular, the consumption of wine, which is rich in antioxidants, have been suggested as a possible explanation for the phenomenon.

- **Energy homeostasis**

Energy homeostasis is an internal equilibrium of the body that enables appropriate energy supply to the cells, thus ensuring that the body functions correctly.

- **Hypertension (HTN)**

Hypertension is high blood pressure in the arteries. The main risks associated with hypertension are cardiac, neurological and renal complications. Hypertension is defined as a blood pressure greater than 140/90 mmHg (or 14/9) when a person has no other co-morbidities such as diabetes.

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- **Insulin resistance**

It is thanks to insulin that glucose, the energy required by cells in order to function properly, can enter the cells. Insulin resistance is the resistance of cells to the action of insulin, resulting in accumulation of glucose in the blood. The accumulation is toxic for the body. Insulin resistance is one of the principal causes of type 2 diabetes.

- **Leptin**

Leptin is a hormone secreted by the cells in adipose tissue (adipocytes). The hormone acts on the brain (hypothalamus) and contributes to the regulation of food intake and energy expenditures. Leptin was discovered thanks to the work of Prof. Friedman, who received the Danone International Nutrition Prize in recognition of his body of work in 2007.

- **Cardiometabolic diseases**

The expression, 'cardiometabolic diseases', covers all cardiovascular and metabolic diseases including hypertension, dyslipidemia, type 2 diabetes and obesity.

- **Metabolism**

The term, 'metabolism' covers all the physical, chemical and biological transformations undergone by the compounds taken into or formed in the body in order to ensure that it functions correctly.

- **Mitochondria**

The mitochondria are intracellular structures that enable synthesis of the cell's principal energy source, ATP, from nutrients transported by the blood.

- **Nutrient**

A nutrient is any substance contained in a food and used by the body to cover its physiological needs. Energetic nutrients - lipids, carbohydrates and proteins – are to be distinguished from non-energetic nutrients, such as minerals and antioxidants (e.g., resveratrol).

- **Molecular nutrition**

Molecular nutrition is the science that studies the relationships between nutrients and the variations in the expression of certain genes at cellular level. Molecular nutrition is also called nutrigenomics.

- **Peroxisome Proliferator-Activated Receptors (PPAR)**

Peroxisome proliferator-activated receptors are a series of nuclear receptors that act as transcription factors for energy metabolism genes. The PPAR play a major role in lipid metabolism and are particularly exploited in the treatment of diabetes and metabolic syndrome.

- **Polyphenols**

Polyphenols, organic molecules found in plants, are natural antioxidants that are associated with a reduction in the risk of certain chronic diseases. Polyphenols are attracting particular research interest in the fields of prevention and treatment of certain forms of cancer, as well as inflammatory, cardiovascular and neurodegenerative diseases.

- **Nuclear receptors**

Nuclear receptors, proteins present in the cell's nucleus, enable the cell to adapt the expression of target genes, particularly as a function of the nutrients present in the body. PPAR are a well known series of nuclear receptors. They are activated by transcription co-factors such as the sirtuins, which are themselves activated by nutrients such as resveratrol.

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- **Resveratrol**

Resveratrol is a polyphenol that occurs naturally in grapes and wine. The hypothesis that a moderate wine intake may have a beneficial effect on human health is based on the effects of resveratrol on cell metabolism.

- **Sirtuin**

The sirtuins are a series of enzymes whose role is to modulate the expression of genes involved in the cell's energy status. Sirtuins are transcription co-factors that act as 'molecular captors' for nutrients and intracellular metabolites. Sirtuins play a dual role: they record the changes in the environmental concentrations of certain nutrients and metabolites, and they translate that information by modifying the transcription of genes involved in metabolic control, thus ensuring appropriate adaptation.

- **Sirtuin 1 (SIRT1)**

The sirtuin enzyme, SIRT1, is an important regulator of metabolic processes, including, in particular, intracellular fatty acid metabolism and energy production. SIRT1 is activated in response to cellular calorie restriction. Recent studies, particularly those conducted by Prof. Auwerx, have shown that SIRT1 is activated by resveratrol.

- **Adipose tissue**

Adipose tissue constitutes the body's fat store and mainly consists of cells specialized in fat storage: adipocytes.

- **Transcription**

Transcription is the mechanism that enables cells to produce RNA from the DNA template contained in the cell nucleus. The mechanism involves numerous enzymes, transcription factors and co-factors. The RNA thus generated is translated into the proteins indispensable for cell life.

- **Vitamin B3 (vitamin PP, niacin or nicotinic acid)**

Vitamin B3 is a water-soluble vitamin necessary for the metabolism of carbohydrates, lipids and proteins. Vitamin B3 plays an important role in the activation of sirtuins, particularly SIRT1. Fish, white meat and liver are the principal food sources of vitamin B3.