

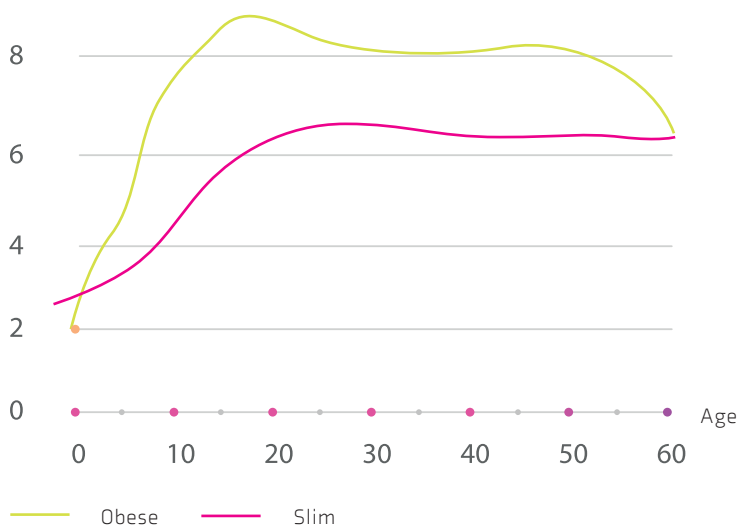
ADIPOSE TISSUE:

AN ORGAN WITH UNSUSPECTED RESOURCES

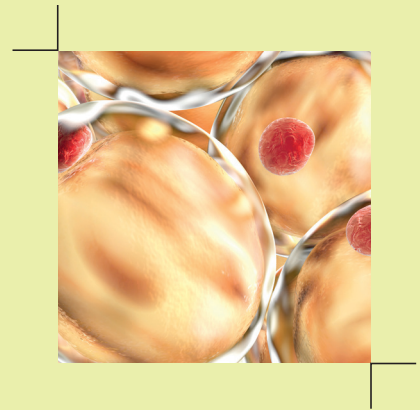
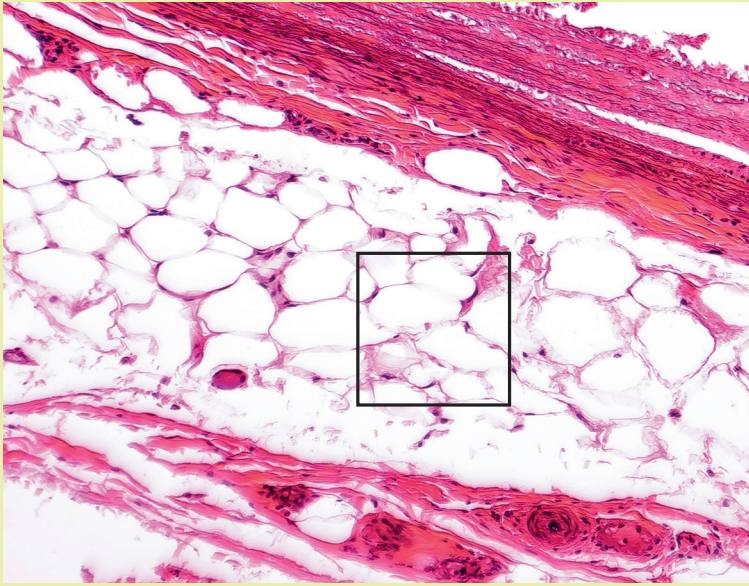
Adipose tissue (AT), which was poorly studied until the middle of the last century, has experienced a boom with the increase in obesity in the western world and in some emerging countries. It is mainly composed with mature adipocytes which do not divide in vivo. **Their numbers increase especially during early childhood and adolescence and remain stable in adulthood.** The rate of adipocyte turnover in subcutaneous AT is about 10% per year. The adipocytes of an obese man are 730 times bigger in volume and 35% more numerous than the adipocytes of a thin man. The fight against obesity is essentially at the level of preventing the onset of obesity in young people.



NUMBER OF ADIPOCYTES IN TEN BILLIONS



**THE NUMBER OF
ADIPOCYTES INCREASES
DURING CHILDHOOD
AND ADOLESCENCE
AND REMAINS STABLE
IN ADULTHOOD.**



- Storage via the **synthesis of triglycerides** or lipogenesis: results from the combination of glucose on the one hand, and lipids on the other hand, both penetrating through the membrane of the adipocyte with the help of transporters.
- Fat release via the degradation of triglycerides or lipolysis: triglycerides are hydrolysed into glycerol and three free fatty acids. This process is conditioned by two receptors: The Alpha receptors which inhibit lipolysis and the Beta receptors which stimulate it. The released fatty acids join the bloodstream and are transported to the muscles to provide energy.

THE NUMBER OF ALPHA AND BETA RECEPTORS IS DISTRIBUTED DIFFERENTLY DEPENDING ON THE LOCATION OF THE FAT:

- In intra-abdominal AT, there are as many Alpha receptors as Beta receptors.
- In subcutaneous femoral AT: the number of Beta receptors is much lower than the number of Alpha receptors. In addition, this tissue is lazy and responds very poorly to lipolysis signals. Therefore, it is very difficult to remove fat in this area, even with diet or physical activity.

AT is a complex tissue that is not limited to adipocytes alone. It also includes immune cells such as macrophages and T-lymphocytes, as well as stem cells involved in the renewal of fat cells and the expansion of the vascular network. Thereby the AT is a reservoir of stem cells. Although this type of cell exists in other tissues, AT cells are readily available and are of interest to practitioners of plastic and reconstructive surgery.

In recent years, the adipocyte has emerged as an "intelligent" cell, capable of "talking" to other organs via different hormones and in particular:

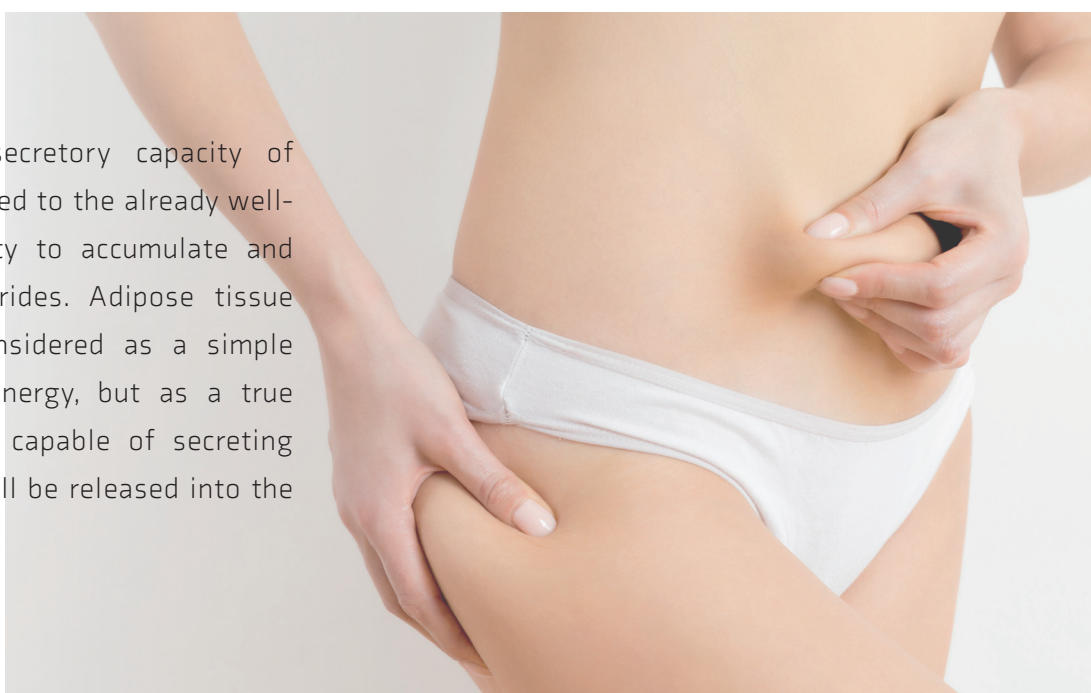
■ **LEPTIN OR SATIETY HORMONE:** Its role is to inform the brain about the state of energy reserves. People with a leptin mutation are massively obese. During fasting or starvation, the leptin level decreases which sends a signal to the brain to increase food intake and decrease energy expenditure.

■ **ADIPONECTIN:** Its action improves insulin sensitivity. In addition, adiponectin can act in the central nervous system to stimulate appetite, reduce energy expenditure, and affect vessel formation.

■ **ASPROSINE:** This is a recently discovered hormone that acts on the liver to release glucose into the blood.

■ **ANGIOTENSINOGEN & ANGIOTENSIN II:** Angiotensinogen is the precursor to angiotensin. These peptides have a role in the development of AT and the regulation of blood pressure. AT is the main source of angiotensinogen after the liver.

Therefore, the secretory capacity of adipocytes is added to the already well-established ability to accumulate and mobilise triglycerides. Adipose tissue is no longer considered as a simple place to store energy, but as a true endocrine organ, capable of secreting hormones that will be released into the bloodstream.



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