

## Developmental aspects of the adipose tissue. From fetal to adult humans

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Brown and white adipocytes are found together at discrete anatomical locations; the multilocular UCP1-positive adipocytes that are interspersed among white adipocytes are also known as brite or beige adipocytes (1). Brown adipose tissue (BAT) undergoes a significant reduction in the course of human life. This study aims to characterize developmental patterns of BAT and white AT in specific anatomical locations by comparing fetal and adult human fat depots. Several depots of the subcutaneous and visceral compartments were evaluated in 12 subjects during fetal development (from 16 up to 39 weeks) using immunohistology, morphometry and TEM. Comparison with the corresponding fat depot found in adults was then performed. Fat tissue was first detected in the vasculo-adipocytic anlagen in the upper portion of the subcutaneous area. In particular, the cervical depot had a layered structure where the vast majority of adipocytes in deep as well as superficial layers had a clear multilocular UCP1-positive aspects. Adrenergic fibers appear in the fat anlagen only in the final stage of development and after UCP1 protein expression. Zic1 (brown) and Hoxc8 (white/brite) adipocytes markers have been tested in different depots and at different time points of development (2). Findings suggest that phenotypic conversion and/or other mechanisms may drive the “whitening” of some depots, leading to BAT disappearance in adult humans. Uncovering the mechanisms involved in brown/brite adipocyte recruitment and maintenance in adult humans would have the potential to inspire therapeutic strategies that increase energy expenditure and to curb obesity and metabolic diseases.

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### References

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### Keywords

Brown adipose tissue; White adipose tissue; development; morphology; immunohistochemistry.