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The pink adipocytes

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Most of white and brown adipocytes, in spite of their well-known different functions: i.e. storing energy (white) and thermogenesis (brown), are contained together in visceral and subcutaneous depots (adipose organ) in all mammals including humans (1, 2). A growing body of evidence suggests that the reason for this anatomical mixture could reside in the fact that adipocytes have peculiar plastic properties allowing them to convert directly each other under appropriate stimuli (3). Under chronic cold exposure white convert into brown to support the need for thermogenesis and under obesogenic diet brown convert into white to satisfy the need of energy storing. Adipocyte population in the mammary gland offers another striking example of adipocyte plasticity: during pregnancy and lactation adipocytes transdifferentiate into milk-producing epithelial cells (we propose to call them: pink adipocytes) and vice versa in the post-lactation period (4, 5, 6). The white into brown transdifferentiation is of great medical interest because the brown phenotype of the adipose organ is associated with obesity resistance and drugs inducing the brown phenotype curb obesity and related disorders (7).

We recently showed by transmission electron microscopy that in the post-lactating mammary gland interscapular multilocular adipocytes found close to the mammary alveoli contain milk protein granules. Lineage tracing system allowed showing that the involuting mammary gland of whey acidic protein-Cre/R26R mice, whose secretory alveolar cells express the lacZ gene during pregnancy, contains some X-Gal-stained and uncoupling protein 1 immunoreactive interscapular multilocular adipocytes. These data suggest that during mammary gland involution some milk-secreting epithelial cells in the anterior subcutaneous depot may transdifferentiate to brown adipocytes, highlighting a hitherto unappreciated feature of mouse adipose organ plasticity (8).

References

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Keywords

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