

## **Impact of white adipose tissue in AD pathology**

**Introduction:** Alzheimer's disease (AD) is a complex disorder and multiple cellular and molecular mechanisms are involved in AD onset and progression. Recent evidences has suggested that metabolic alterations are an important pathological feature in disease progression in AD. Likewise, diabetes and obesity, two mayor metabolic illnesses, are risk factors for AD. In addition, novel studies has suggested that AD induces peripheral metabolic alterations, facilitating the development of diabetes. Overall, these studies suggest that there is an important two-way crosstalk between AD and peripheral metabolic disorders. Here, we seek to understand the mechanisms underlying this association and we hypothesize that the white adipose tissue may serve as a key communicator organ between the brain and peripheral metabolic illnesses and alterations in this organ may affect both types of disorders.

**Methods:** Here, we used histological stains, immunohistochemistry and biochemical means to determine changes in the white adipose tissue from wt and 3xTg-AD mice. Moreover, similar techniques were used in the brain of 3xTg-AD mice that received white fat pads from wt and 3xTg-AD donors to determine any changes in amyloid and tau pathology.

**Results:** Our study shows that 3xTg-AD mice develop significant peripheral metabolic alterations which in turn affected the white adipose tissue biology. Moreover, adipose tissue transplanted from donor 3xTg-AD and wt mice into recipient 3xTg-AD mice indicate that AD associated white fat tissue induced profound AD pathology changes in recipient 3xTg-AD mice.

**Conclusions:** Overall, our study demonstrate a novel important crosstalk between AD and peripheral metabolic disorders thought white adipose cells. A more profound understanding in these processes may turn in novel and promising therapeutic strategies for AD and metabolic illnesses.

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