Crown-Like Structures as Biomarkers for Cancer Risk and Cancer Prognosis

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Technology description

This invention identifies a crown-like structure (CLS) in adipose tissue and demonstrates that CLS' s can be used as biomarkers for risk or poor prognosis in breast cancer and other malignancies in overweight or obese individuals.
For example, obesity is a risk factor for the development of hormone receptor (HR)-positive breast cancer in postmenopausal woman. However, the potential link between obesity and increased risk of breast cancer is unknown. The invention established for the first time that CLS exists in the fat of human breast. CLS is a structure formed in adipose tissue when the necrotic adipocytes are surrounded by infiltrating macrophages, which produce pro-inflammatory mediators, such as TNF-, IL-1 and Cox2. The intensity of CLS in breast is correlated with body mass index (BMI).
This invention establishes that the increased number of CLS in the mammary glands is associated with increased levels of pro-inflammatory mediators. It further establishes that the increased levels of pro-inflammatory mediators contribute to the induction of aromatase, which is an enzyme involved in the catalysis of androgen to estrogen. Elevated levels of circulating estrogen have attributed in part to the increased risk of HR-positive breast cancer in obese postmenopausal women. Further investigations have shown a relationship between CLS and other malignancies.

Application area

1. A biomarker for determining cancer risk and cancer prognosis.
2. A basis for recommending a particular treatment regime for patients with increased pro-inflammatory mediators and increased levels of aromatase expression or aromatase activity.
3. Methods to treat a CLS-related cancer.
4. Screening compounds for anti-cancer activities in vitro and in vivo.
5. Screening compounds for anti-diabetogenic and anti-obesity activity.

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