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# Adipose-Derived Stem Cells from Fat Tissue of Breast Cancer Microenvironment Present Altered Adipogenic Differentiation Capabilities.

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**Abstract**

Mesenchymal stem cells (MSCs) are multipotent cells able to differentiate into multiple cell types, including adipocytes, osteoblasts, and chondrocytes. The role of adipose-derived stem cells (ADSCs) in cancers is significantly relevant. They seem to be involved in the promotion of tumour development and progression and relapse processes. For this reason, investigating the effects of breast cancer microenvironment on ADSCs is of high importance in order to understand the relationship between tumour cells and the surrounding stromal cells. With the current study, we aimed to investigate the specific characteristics of human ADSCs isolated from the adipose tissue of breast tumour patients. We compared ADSCs obtained from periumbilical fat (PF) of controls with ADSCs obtained from adipose tissue of breast cancer- (BC-) bearing patients. We analysed the surface antigens and the adipogenic differentiation ability of both ADSC populations. C/EBP*δ* expression was increased in PF and BC ADSCs induced to differentiate compared to the control while PPAR*γ* and FABP4 expressions were enhanced only in PF ADSCs. Conversely, adiponectin expression was reduced in PF-differentiated ADSCs while it was slightly increased in differentiated BC ADSCs. By means of Oil Red O staining, we further observed an impaired differentiation capability of BC ADSCs. To investigate this aspect more in depth, we evaluated the effect of selective PPAR*γ* activation and nutritional supplementation on the differentiation efficiency of BC ADSCs, noting that it was only with a strong differentiation stimuli that the process took place. Furthermore, we observed no response in BC ADSCs to the PPAR*γ* inhibitor T0070907, showing an impaired activation of this receptor in adipose cells surrounding the breast cancer microenvironment. In conclusion, our study shows an impaired adipogenic differentiation capability in BC ADSCs. This suggests that the tumour microenvironment plays a key role in the modulation of the adipose microenvironment located in the surrounding tissue.

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# Mesenchymal stem versus stromal cells: International Society for Cellular Therapy Mesenchymal Stromal Cell committee position statement on nomenclature.

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**Abstract**

The International Society for Cellular Therapy's Mesenchymal Stromal Cell (ISCT MSC) committee offers a position statement to clarify the nomenclature of mesenchymal stromal cells (MSCs). The ISCT MSC committee continues to support the use of the acronym "MSCs" but recommends this be (i) supplemented by tissue-source origin of the cells, which would highlight tissue-specific properties; (ii) intended as MSCs unless rigorous evidence for stemness exists that can be supported by both in vitro and in vivo data; and (iii) associated with robust matrix of functional assays to demonstrate MSC properties, which are not generically defined but informed by the intended therapeutic mode of actions.

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# A new method to confirm the absence of human and animal serum in mesenchymal stem cell culture media.

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**Abstract**

Mesenchymal stem cells are an ideal source for regenerative medicine. For clinical use, cell culture should be done at stable conditions, thus the use of serum should be avoided because of the batch-to-batch variations of serum. Although several kinds of serum-free media are available, a method to confirm whether they contain serum has not been established yet. During studies on effect of adipocyte mesenchymal stem cells (Ad-MSCs) on pain using a human pain gene array, we noticed that BDKRB1 gene was constantly upregulated when serum was used in the culture medium. In this study, we attempted to establish further the potential of this gene as a new marker indicative of the presence of serum in media. Using a real-time quantitative PCR gene array screening containing 84 functional genes, we verified BDKRB1 as a specific gene upregulated in the presence of serum. The expression of BDKRB1 in Ad-MSCs was induced not only by bovine serum but also by human serum. The BDKRB1 expression was induced even when Ad-MSCs was cultured with 0.1% serum in the medium. We concluded that BDKRB1 is a valuable marker to detect traces of both human and animal serum in Ad-MSCs cultures. Our study provides a new method to confirm the absence of serum in media and ensure a stable cell culture condition.