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Publication date:
2011

Document version:
Submitted manuscript

Citation for published version (APA):

Levin Andersen, T., Abdelgawad, M. E., Hauge, E. M., Rolighed, L., Bollerslev, J., Kjærsgaard-Andersen, P., & Delaissé, J.-M. (2011). *Are reversal cells critical players in the bone loss occurring in postmenopausal osteoporosis?*. Abstract from Åben Forskerdag, Fredericia, Denmark.

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Are reversal cells critical players in the bone loss occurring in postmenopausal osteoporosis?

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Formål	In adults the bones are continuously remodelled by numerous temporary and tightly coupled bone resorption and formation events, occurring in bone remodelling units. These microscopic units include bone resorbing osteoclasts and bone forming osteoblasts separated by a reversal phase involving mononuclear reversal cells. In postmenopausal osteoporosis (PMO), bone loss and fragilization result from an insufficient bone reconstruction. The aim of the current study is to investigate the possible involvement of the reversal phase in the insufficient bone reconstruction in PMO.
Metode	Bone biopsies from 23 PMO patients, 9 control and 4 primary hyperparathyroidism (PHPT) patients were subjected to histomorphometry and immunohistochemical analysis with special attention on the reversal surfaces and bone formation parameters.
Resultater	In PMO, we observed that the reversal surfaces often occur without any connection to neighbouring osteoclasts and osteoblasts, suggesting that they got in an arrested state. This absence of connection was validated by 3D-reconstruction. The morphology and density of reversal cells occupying these arrested reversal surfaces resembled cells lining the quiescent bone surfaces, and appeared different from the reversal cells positioned close to osteoclasts and osteoblasts. This suggests that the reversal cells on arrested reversal surfaces become dormant and thereby uncoupled from subsequent bone reconstruction. This was further supported by the inverse correlations between the ratio of arrested reversal surfaces over total reversal surface and the bone volume or bone formation parameters.
Konklusion	Collectively, these findings led to the conclusion that the arrest of the reversal phase may play a critical role in the insufficient bone formation in PMO. This highlights that the reversal phase may be an important therapeutic target for PMO and similar bone diseases.