

Relationship between osteocytes and bone microstructure in vertebral and iliac crest trabecular bone of osteoporotic sheep and lambs

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BACKGROUND

There is mounting evidence in support of osteocytes regulating osteoclasts and osteoblasts on the bone surface through the lacunae-canalicular network. The purpose of this study is to investigate the relationship between trabecular bone histomorphometric parameters and the density of osteocytes, empty lacunae, hyper calcified lacunae and micro cracks.

METHODS:

Osteoporosis was induced in 10 mature ewes and 10 lambs. Five ewes and four lambs were used as controls. Trabecular bone biopsies from the iliac crest and lumbar spine were embedded without decalcification and assessed for bone volume (BV/TV), bone formation rate (BFR), and osteoid surface area (OS/BS). The number of osteocytes, and empty lacunae will be measured by light microscopy and the density of hyper calcified lacunae and micro cracks will be determined by backscattered electron imaging. The data will be correlated with the previously acquired histomorphometric data.

POTENTIAL OUTCOME

Osteoporosis is the most common musculoskeletal disorder, characterized by low bone mineral density and structural deterioration of bone, leading to fractures. In osteoporotic patients, the balance between osteoblasts (bone forming cells) and osteoclasts (bone resorbing cells) is compromised. There is mounting evidence in support of osteocytes regulating osteoclast and osteoblast activity. This study will assist in further characterisation of osteocyte function and the role of these cells in bone metabolism at different age groups under osteoporotic conditions.