

OSTEOCYTES AND BONE MINERAL DENSITY IN TRABECULAR BONE OF OSTEOPOROTIC SHEEP

Primary Supervisor: Dr Reza Zarrinkalam (IVMS)

Email: Reza.Zarrinkalam@health.sa.gov.au

Co-supervisors: Dr Rob Moore (IMVS) and Dr Cindy Bottema

BACKGROUND

There is mounting evidence to support the role of osteocytes in the regulation of osteoclasts and osteoblasts on the bone surface through the lacunar-canalicular network within the bone matrix. The purpose of this study is to investigate the relationship between standard trabecular bone histomorphometric parameters and the number and characteristics of osteocytes and their lacunae, as well as the number of microcracks present in bone.

METHODS

Samples of iliac crest and lumbar vertebrae from osteoporotic and control sheep that were embedded without decalcification will be used to estimate trabecular bone volume, bone formation rate, and osteoid surface area using light microscopy. The number of viable osteocytes and the number of empty osteocyte lacunae will be estimated from decalcified sections. The areal density of hyper-calcified lacunae and microcracks will be estimated using backscattered electron imaging techniques. The data will be correlated with previously acquired histomorphometric data.

POTENTIAL OUTCOME

Osteoporosis is the most common musculoskeletal disorder, characterized by low bone mineral density and structural deterioration of bone. In osteoporotic patients, the balance between the activity of osteoblasts (bone forming cells) and osteoclasts (bone resorbing cells) is compromised, leading to fractures. There is mounting evidence in support of osteocytes regulating osteoclast and osteoblast activity. This study will further characterise osteocyte function and the role of these cells in bone metabolism in the osteoporotic condition, using sheep as a model.