

Direct role of estrogen receptor (ER) α and ER β activation for bone mass and architecture

Host School/Institute: Andrology Laboratory, ANZAC Research Institute

Project Code: ANZAC8

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Description of Project:

The decrease in estrogen levels after menopause is the major cause of osteoporosis in women. Estrogen acts through the binding to, and activation of, two ERs, commonly referred to as ER α and ER β . However, these receptors activate different signalling pathways and ER knockout mouse models demonstrate that ER α and ER β have different roles in regulation of bone morphology. Although both ER α and ER β are expressed in bone cells of mice and humans, their specific physiological roles are not yet well understood and more research is needed.

This project will specifically focus on understanding the relative importance of the estrogen mediated signalling via either ER α or ER β on bone mass and architecture. Experiments using blockers of estrogen synthesis or action are hard to interpret in normal mice due to negative feedback effects. This project will use male mice lacking steroid hormones treated with selective ER α or ER β agonists to stimulate either ER α or ER β , but not both receptors at the same time as estradiol does. The project provides good understanding on steroid hormones and receptors and bone biology.

Techniques involved:

- 1) Tissue collection from mice to generate samples histological analyses (mouse anatomy, introduction to tissue processing)
- 2) Bone microCT analysis (Bone mass and structure)
- 3) Tissue sectioning (paraffin) to generate tissue sections for histological analysis (microtome use and handling of paraffin sections)
- 3) Basic histology staining techniques like hematoxylin and eosin staining for analysis of cellular structures within tissue (staining methods and microscopy)
- 4) Immunohistochemistry for detection of structural and functional protein expression within tissue (use of antibodies in detection of cellular proteins)

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