Fat and Bone: an odd couple.

Host School/Institute: Aging Bone Research Program, Nepean Clinical School
URL: http://www.nepean.med.usyd.edu.au/
Project Code: NEPEAN2

Supervisor: Associate Professor Gustavo Duque

Contact Phone: + 61 2 4734 4278
Contact Email: gduque@med.usyd.edu.au

Description of Project:

Senile osteoporosis is the consequence of predominant differentiation of mesenchymal stem cells (MSC) into fat at expense of osteoblastogenesis and bone formation. We have obtained recent evidence that increasing marrow fat is toxic to osteoblasts and create an unfriendly bone marrow milieu. This toxicity includes the induction of osteoblast apoptosis.

Hypothesis: Lipoapoptosis in bone happens after activation of Fas-related pathways.
Aim: To elucidate the mechanism of lipoapoptosis in bone.
Experimental approach: Normal human osteoblasts will be exposed to adipocytes supernatants and fatty acids. Levels of apoptosis will be quantified using TUNEL and Annexin V assays. Apoptosis arrays will be used to identify the predominant elements of the apoptotic pathways in osteoblasts.

The student will be involved in the growth and differentiation of human osteoblasts. He/she will also be responsible for induction of lipoapoptosis in osteoblasts and identification of apoptosis by TUNEL and Annexin. This is a good opportunity for the student to experience with a methodology that has been developed in our laboratory and also to understand the mechanisms of bone cell differentiation. Usually, osteoblast differentiation takes around four weeks. We consider that the student will be able to obtain good results in a short period of time and to present his/her results in a scientific meeting.

Administration contact details:
Sue Dowd
Contact Phone: +61 2 4734 2682
Contact Email: sdowd@med.usyd.edu.au