



Workshop Abstract

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Signals in life and death of the osteoclast

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The homeostasis of the skeletal tissues is maintained by a well organized regulation of bone formation and bone resorption. Osteoclasts are terminally differentiated cells primarily involved in bone resorption. The life span of osteoclasts is relatively short both in vitro and in vivo, and once differentiated, they rapidly die in the absence of supporting cells such as osteoblasts or bone marrow stromal cells, or growth factors such as interleukin (IL)-1, receptor activator of NF- κ B ligand (RANKL) and macrophage colony-stimulating factor (M-CSF). Anti-resorptive drugs such as estrogen, raloxifene and bisphosphonates are known to reduce the life span of osteoclasts. Recent studies have revealed that the rapid cell death of osteoclasts is caused by apoptosis. Apoptosis is a form of programmed cell death that is characterized by specific morphological and biochemical properties. Depolarization of mitochondrial transmembrane potential, chromatin condensation and cytochrome *c* release from mitochondria into cytoplasm were observed in the apoptotic osteoclasts, implying that cytokine deprivation triggers the osteoclast apoptosis through the mitochondrial pathway. We previously reported that a proapoptotic Bcl-2 family member Bim plays an essential role in the osteoclast apoptosis. In this workshop, I will show the mechanism of posttranslational regulation of Bim in more detail, and also focus on the role of other Bcl-2 family members on the apoptosis of osteoclasts and their bone-resorbing activity.