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"Effect of Mitochondrial ROS in Binge EtOH Bone Toxicity"

The molecular basis of ethanol (EtOH) toxicity on bone turnover has yet to be fully understood. It is known that chronic consumption increases bone resorption by osteoclast activation while at the same time decreasing bone formation by downregulating osteoblast functions. Our previous work indicated oxidative stress and reactive oxygen species (ROS) generation having a role, as dietary antioxidants such as N-acetyl cysteine partially blocked EtOH-induced bone loss in female mice. Mitochondria are a source of ROS such as superoxide and hydrogen peroxide. MitoTEMPO is a superoxide dismutase mimic that accumulates in mitochondria and scavenges superoxide radicals. Our aim was to test if the mitochondrial superoxide scavenger MitoTEMPO could ameliorate ethanol's toxicity on bone. MitoTEMPO or saline was provided by osmotic minipumps implanted subcutaneously six days ahead of an ethanol challenge consisting of gavage for four consecutive days with 3, 3, 4 and 4.5 g EtOH per kg bodyweight. Markers for osteoblast function and osteoclast differentiation in the femoral shaft were determined by qRT-PCR. The amino-terminal propeptide of type 1 procollagen (P1NP) as a marker of bone formation was determined in serum. bone formation marker procollagen ELISA. As a marker of oxidative stress, 8-hydroxy 2-deoxyguanosine, was determined in bone marrow DNA. MitoTEMPO failed to rescue most effects of ethanol, except for potential repression of RANKL mRNA by osteocytes. Further studies are needed to evaluate the effect of MitoTEMPO and mitochondrial superoxide in skeletal ethanol toxicity.