

How To Adjust Diet and Physical Activity With Your Genes
Focus on Preventing Osteoporosis
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It is estimated that worldwide an osteoporotic fracture occurs every 3 seconds. At 50 years of age, one in 3 women and 1 in 5 men will suffer a fracture in their remaining lifetime cause by osteoporosis. Eating well and staying physically active are two essential components of a healthy lifestyle. These are also the pillars of osteoporosis prevention at all stages of life.

Genetic variation also contributes to differences in the size and bone mineral density (BMD) level across individuals. Research shows that a genetic variant in the WNT 16 gene is associated with a greater risk of low BMD and increased risk of fracture. Individuals who possess the CC or TC version of the WNT 16 gene are predisposed to having a lower BMD, so its important for individuals with this variant to engage in weight bearing exercises and to ensure they consume adequate amounts of vitamin D, calcium, magnesium and high quality proteins that are required to maintain bone and muscle strength.

Engaging in physical activity has many health benefits and is absolutely essential for strong bones and muscles. Thus, it is important to strengthen your muscles and bones to reduce your risk of osteoporosis and fracture. Delayed muscle soreness (DOMS) is commonly experienced in long-lasting weight-bearing sports, which causes a temporary reduction in strength and range of motion. DOMS is caused by oxidative stress, damage to the active muscle fibers, inflammation, and the activation of muscle protein degradation pathways. Research shows that variation in the ACTN3 gene influences one's susceptibility to muscle damage. Ensuring adequate intake of protein for muscle repair and consume plenty of antioxidant-rich plant foods to reduce inflammation and negative effects of oxidative stress.

References :

1. Three steps to unbreakable bones, vitamin D, calcium and exercise. www.iofbonehealth.org@2011
2. Zheng H-F, Tobias JH, Duncan E, Evans DM, Eriksson J, et al. (2012) WNT16 Influences Bone Mineral Density, Cortical Bone Thickness, Bone Strength, and Osteoporotic Fracture Risk. *PLoS Genet* 8(7):e1002745. doi:10.1371/journal.pgen.1002745
3. Juan Del Coso, Marjorie Valero, Juan José Salinero , Beatriz Lara, et al (2017) ACTN3 genotype influences exercise-induced muscle damage during a marathon competition. *Eur J Appl Physiol* 117:409–416 DOI 10.1007/s00421-017-3542-z
4. Stater NA et al, (2015) Genetic variation in CYP2R1 ang GC gene associated with vitamin D deficiency status. *Journal of pharmacy practice* 1-6
5. Ahmed El-Soheemy, Nutrigen-me personalised nutrition & fitness report. *Exercise physiology, fitness and injury risk*