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Title: Eccentric Exercise-Induced Muscle Damage and Adaptations
Date: Thursday 7 December
Time: 3pm
Venue: Murdoch University, South Street Campus, Learning Link building (building no. 513), room 1.005.
Further information: abstract below
Seminar Series: Western Australian Neuroscience Methods Group

Abstract

Exercise consisting of lengthening (eccentric) muscle contractions (eccentric exercise) induces muscle damage that is characterised by prolonged decreases in force generating ability, delayed onset muscle soreness (DOMS), and increased levels of muscle proteins such as creatine kinase (CK) and myoglobin (Mb) in the blood. However, skeletal muscles adapt rapidly after the initial exposure to eccentric exercise, and the magnitude of muscle damage induced by subsequent bouts of the same exercise is significantly reduced. This adaptation is referred to as the repeated bout effect (RBE) and is represented by faster recovery of force generating ability, attenuated DOMS, and smaller increases in CK and Mb. The protective characteristics are conferred by “non-damaging” exercises such as low-intensity eccentric contractions and maximal isometric contractions at a long muscle length, and also endowed upon the contralateral (non-exercised) limb. The underpinning mechanisms of the RBE are not fully understood, but a combination of neural adaptations, alterations to muscle mechanical properties, structural remodeling of the extracellularmatrix, and increased inflammation sensitivity is thought to contribute to the RBE. When eccentric exercise is repeated over time (i.e., eccentric exercise training), it increases muscle strength, muscle mass and functional physical fitness, and improves insulin sensitivity and blood lipid profiles much greater than exercise mainly consisting of concentric (shortening) muscle contractions (concentric exercise). It is also possible that eccentric exercise stimulates the brain better than concentric exercise. In the presentation, muscle damage and adaptations induced by eccentric exercise, and potential benefits of eccentric exercise interventions in rehabilitation and health promotion will be discussed.