

Role of Hypoxia, Hyperoxia, and ROS in Skeletal Muscle Conditioning

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Military personnel committed to carry out various missions experience different unusual environments during their service life. Accordingly, being fit for missions is of utmost significance in military health care issues. A fairly recent approach in reducing the risk of permanent sequels imposed by trauma, injury or any kind of environmental factors (i.e., extreme hot or very cold) is organ preconditioning; the cardiovascular system being at the center of focus. Skeletal muscles are no exception to this approach. Any deterioration in muscular performance in harsh environments might put their life at risk.

Skeletal muscles have enormous capacity to withstand high levels of stress. They are highly resistant to heat exposure, deformation, and hypoxia. Due to the great interests of various communities (e.g., military, elite sportsmen) to generate peak muscular capabilities and albeit a massive literature on the subject, the current working hypothesis in many laboratories is centered on the idea that Reactive Oxygen Species (ROS) produced in hypoxia, hyperoxia and physical activity have a multiple role in protecting skeletal muscles against different stressors.

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