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Indicating/Quantifying Oxidative Stress Response to Exercise Stimuli

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Oxidative stress is imbalance between oxidant and antioxidant levels in living systems. Human cells are protected from reactive oxygen species by endogenous enzymatic antioxidants. Most of these compounds require particular redox metals in their structures as cofactors to allow them to scavenge the free radicals such as Cu, Zn-SOD, Mn-SOD and catalase (Fe). This study aimed to quantify these elements as oxidative stress biomarkers *in vitro* in skeletal muscle cells (C2C12) which were incubated under hypoxia/hyperoxia conditions generated by varying oxygen level from 1%-60% for 24 and 48 hours. ICP-MS was applied to quantify Zn, Cu, Fe and Mn in cell populations. Their concentration increased dramatically in cells grown at 25%-60% O2, the most significant increase being 85% in Cu at 60%O2. None showed any increase at 5%-15% O2 indicating normoxia states. At 1%O2, all elements except Fe showed a significant increase and the most remarkable growth was in Mn by 33%. Interestingly, increasing incubation to 48 hours had differing effects on the elements. Zn and Cu concentrations were unaffected by increasing incubation time except at 60%O2 where they showed further growth. In contrast, Mn concentration grew sharply over oxygen levels of 30%-50% with no further effect at 1%, while Fe concentration decreased at 1%O2 and grew steadily over oxygen levels of 5%-60%. It can be concluded that all four elements were significantly affected by stress conditions applied to cells, but at different rates. Further work comparing these studies with single cell analysis using laser ablation-ICP-MS will also be reported.

Biography

Taghreed Fagieh is a PhD student in the final year at Chemistry Department, Loughborough University, UK. She is from Saudi Arabia working as a lecturer at Chemistry Department, King Abdulaziz University, Jeddah, KSA. She has been awarded a full scholarship to pursue her higher education in the UK.

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