

PROJECT REVIEW

“Exosome proteomics to detect biomarkers of erythropoietin (EPO) use in athletes”

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Erythropoietin (EPO) is a natural glycoprotein hormone in the body that controls red blood cell production, and there is conclusive evidence that administering exogenous EPO results in significant performance enhancement in endurance sports. Current methods of EPO detection are unable to reliably detect micro-dosing where the drug is given at lower doses but more frequently. Exosomes are small cell derived particles in the blood and urine which contain protein. It is only recently that the importance of exosomes containing miRNAs and other proteins in cell-to-cell communication has become apparent in physiological processes, and the functions are complex and still largely unknown. Exosomes appear to have an intricate and important role in a range of blood processes related to hematopoiesis (creation of new blood cells) which is highly relevant to oxygen carrying capacity via red blood cells and endurance performance. Recent developments in sample preparation will allow us to isolate exosomes from blood and urine, and perform proteomics (simultaneous determination of protein levels across a large number of proteins using LC-MS/MS and bioinformatics) on athletes before and after treatment with EPO at low doses. Due to the intricate involvement of exosomes in red blood cell production, it is anticipated that this project will lead to identification of a number of candidate exosome proteins that will be indicative of administration of micro-dose exogenous EPO.