Applied Human Physiologyに関する研究会

KOBE UNIVERSITY

The integrated control of skeletal muscle bioenergetics during exercise

運動時における筋の生体エネルギー動態は複合的に調節されているが，その動態に関しては不明な点が多い．今回，単一筋線維から筋全体での，phosphorus magnetic resonance spectroscopy (31P MRS)からみたミトコンドリアでのエネルギー動態を，海外の著名な研究者から紹介していただく．

■日時
2013年5月8日（水） 1530～1730

■場所
神戸大学発達科学部・大会議室（A棟2階）


Dr. Harry B Rossiter


Dr. Graham J Kemp

■講演者

1. Dr. Harry B Rossiter (hrossiter@ucla.edu)
Division of Respiratory & Critical Care Physiology & Medicine, Los Angeles Biomedical Research Institute at Harbor-UCLA Medical Center, USA.

Exercise induced activation of bioenergetic pathways in skeletal muscle

The control of skeletal muscle bioenergetics at exercise onset is a complex integrated process and an important determinant of exercise tolerance. Classically technical limitations have restricted the investigation of the integrated cellular processes determining bioenergetic kinetics, and their dynamic control still poorly understood. This presentation will draw on evidence from isolated mitochondrial complexes to measurements of oxygen uptake across whole muscles to explore the processes controlling and regulating skeletal muscle bioenergetic pathways at exercise onset.

2. Dr. Graham J Kemp (gkemp@liv.ac.uk)
Magnetic Resonance and Image Analysis Research Centre, University of Liverpool, UK.

Measuring human muscle 'mitochondrial capacity' in vivo: physiological implications of a comparison of 31P magnetic resonance spectroscopy measurements of post-exercise phosphocreatine recovery kinetics with invasive direct measurements of muscle O2 consumption

Phosphocreatine recovery measured by phosphorus magnetic resonance spectroscopy (31P MRS) yields information about muscle mitochondrial function in vivo, although quantitative interpretation is complicated by interactions with cellular acid handing, creatine kinase and substrate/O2 supply. Detailed modelling of oxidative phosphorylation has reinforced the classical picture of mitochondrial ATP production matched to ATP demand by ADP-feedback. However, a detailed comparison of 31P MRS measurements of phosphocreatine recovery after submaximal exercise with arteriovenous difference O2 consumption measurements during maximal knee extension shows that mitochondria in the same cellular and vascular context behave very differently in different kinds of exercise - a cardinal feature of the systems perspective.

■連絡先

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