

# Publications CMRC 2006

## ***Research Area 1. Regulation of carbohydrate and fat metabolism. Association with insulin sensitivity/resistance and type 2 diabetes.***

### **PhD-theses**

Sebastian Beck Jørgensen; The role of AMPK in regulation of glucose metabolism and expression of metabolic genes and proteins in skeletal muscle. Supervised by Jørgen Wojtaszewski and Erik Richter

### **Papers in accordance with the CMRC research strategy**

Akerstrom TC, Birk JB, Klein DK, Erikstrup C, Plomgaard P, Pedersen BK and Wojtaszewski J. Oral glucose ingestion attenuates exercise-induced activation of 5'-AMP-activated protein kinase in human skeletal muscle. *Biochem Biophys Res Commun* 342: 949-955, 2006.

Birk JB and Wojtaszewski JF. Predominant alpha2/beta2/gamma3 AMPK activation during exercise in human skeletal muscle. *J Physiol* 577: 1021-1032, 2006.

Carey A, Pedersen E, Southgate R, Bruce C, Pilegaard H, Hawley J, Pedersen BK, Febrario M. Discordant gene expression in skeletal muscle and adipose tissue of patients with Type 2 Diabetes: effect of IL-6 infusion. *Diabetologica* 49: 1000-1007, 2006

Hanisch F, Hellsten Y, Zierz S. Ecto- and cytosolic 5'-nucleotidases in normal and AMP deaminase deficient human skeletal muscle. *Biol Chem.*;387(1): 53-8, 2006.

Haugaard SB, Andersen O, Pedersen SB, Dela F, Deacon CF, Holst JJ, Iversen J, & Madsbad S. Glucose-stimulated prehepatic insulin secretion is associated with circulating alanine, triglyceride, glucagon, lactate and TNF-alpha in patients with HIV-lipodystrophy. *HIV Med* 7, 163-172, 2006.

Haugaard SB, Andersen O, Pedersen SB, Dela F, Fenger M, Richelsen B, Madsbad S, & Iversen J. Tumor necrosis factor alpha is associated with insulin-mediated suppression of free fatty acids and net lipid oxidation in HIV-infected patients with lipodystrophy. *Metabolism* 55, 175-182, 2006..

Helge JW, Biba TO, Galbo H, Gaster M, & Donsmark M. Muscle triacylglycerol and hormone-sensitive lipase activity in untrained and trained human muscles. *Eur J Appl Physiol* 97, 566-572, 2006.

Helge JW, Overgaard K, Damsgaard R, Sorensen K, Andersen JL, Dyrskog SE, Hermansen K, Saltin B, & Wojtaszewski JF. Repeated prolonged whole-body low-intensity exercise: effects on insulin sensitivity and limb muscle adaptations. *Metabolism* 55, 217-223, 2006.

Iqbal SI, Helge JW, & Heitmann BL. Do energy density and dietary fiber influence subsequent 5-year weight changes in adult men and women? *Obesity (Silver Spring)* 14, 106-114, 2006.

Joseph AM, Pilegaard H, Letvintsev A, Leick L, Hood DA. Control of gene expression and mitochondrial biogenesis in the muscular adaptation to endurance exercise. *Essays Biochem*, 42:13-29 (review), 2006.

Lauritzen HP, Ploug T, Prats C, Tavares JM, & Galbo H. Imaging of insulin signaling in skeletal muscle of living mice shows major role of T-tubules. *Diabetes* 55, 1300-1306, 2006.

Lundby C, Gassman M, Pilegaard H. Regular endurance training reduces the exercise induced HIF-1 $\alpha$  and HIF-2 $\alpha$  mRNA expression in human skeletal muscle in normoxic conditions. *Eur J Appl Physiol* 96: 363-9, 2006.

Mourtzakis M, Saltin B, Graham T, Pilegaard H. Carbohydrate Metabolism During Prolonged Exercise and Recovery: Interactions between Pyruvate Dehydrogenase, Fatty Acids and Amino Acids. *J Appl Physiol* 1822-30, 2006.

Nordby P, Saltin B, & Helge JW. Whole-body fat oxidation determined by graded exercise and indirect calorimetry: a role for muscle oxidative capacity? *Scand J Med Sci Sports* 16, 209-214, 2006.

Ostergard T, Andersen JL, Nyholm B, Lund S, Nair KS, Saltin B, Schmitz O. Impact of exercise training on insulin sensitivity, physical fitness, and muscle oxidative capacity in first-degree relatives of type 2 diabetic patients. *Am J Physiol.*, May;290(5):E998-1005, 2006.

Pilegaard H, Birk JB, Sacchetti M, Mourtzakis M, Hardie DG, Stewart G, Saltin B, Neufer PD, van Hall G, Wojtaszewski JFP. PDH-E1 $\alpha$  dephosphorylation and activation in human skeletal muscle during exercise; effect of intralipid infusion. *Diabetes*: 55: 3020-3027, 2006.

Plomgaard P, Penkowa M, Pedersen BK, Saltin B, Pilegaard H. The mRNA expression profile of metabolic genes relative to MHC isoform pattern in human skeletal muscles. *Am J Physiol* 101: 817-25, 2006.

Prats C, Donsmark M, Qvortrup K, Londos C, Sztalryd C, Holm C, Galbo H, & Ploug T. Decrease in intramuscular lipid droplets and translocation of HSL in response to muscle contraction and epinephrine. *J Lipid Res* 47, 2392-2399, 2006.

Rabol R, Boushel R, & Dela F. Mitochondrial oxidative function and type 2 diabetes. *Appl Physiol Nutr Metab* 31, 675-683, 2006.

Ralston E, Lu Z, Biscocho N, Soumaka E, Mavroidis M, Prats C, Lomo T, Capetanaki Y, & Ploug T. Blood vessels and desmin control the positioning of nuclei in skeletal muscle fibers. *J Cell Physiol* 209, 874-882, 2006.

Roepstorff C, Donsmark M, Thiele M, Vistisen B, Stewart G, Vissing K, Schjerling P, Hardie DG, Galbo H and Kiens B. Sex differences in hormone-sensitive lipase expression, activity, and phosphorylation in skeletal muscle at rest and during exercise. *Am J Physiol Endocrinol Metab* 291: E1106-E1114, 2006.

Roepstorff C, Thiele M, Hillig T, Pilegaard H, Richter EA, Wojtaszewski JF and Kiens B. Higher skeletal muscle  $\alpha$ 2AMPK activation and lower energy charge and fat oxidation in men than in women during submaximal exercise. *J Physiol* 574: 125-138, 2006.

Rose AJ, Kiens B and Richter EA.  $\text{Ca}^{2+}$ -calmodulin-dependent protein kinase expression and signalling in skeletal muscle during exercise. *J Physiol* 574: 889-903, 2006.

Silveira LR, Pilegaard H, Kusuhara K, Curi R, Hellsten Y. The effect of reactive oxygen species and antioxidants on basal and contraction-induced gene expression of PGC-1 $\alpha$ , UCP3 and HKII in primary rat skeletal muscle cells. *Biochim Biophys Acta* 1763: 969-976, 2006.

Stisen AB, Stougaard O, Langfort J, Helge JW, Sahlin K, & Madsen K. Maximal fat oxidation rates in endurance trained and untrained women. *Eur J Appl Physiol* 98, 497-506, 2006.

Treback JT, Glund S, Deshmukh A, Klein DK, Long YC, Jensen TE, Jorgensen SB, Viollet B, Andersson L, Neumann D, Wallimann T, Richter EA, Chibalin AV, Zierath JR and Wojtaszewski JF. AMPK-mediated AS160 phosphorylation in skeletal muscle is dependent on AMPK catalytic and regulatory subunits. *Diabetes* 55: 2051-2058, 2006.

Walz HA, Harndahl L, Wierup N, Zmuda-Trzebiatowska E, Svannelid F, Manganiello VC, Ploug T, Sundler F, Degerman E, Ahren B, & Holst LS. Early and rapid development of insulin resistance, islet dysfunction and glucose intolerance after high-fat feeding in mice overexpressing phosphodiesterase 3B. *J Endocrinol* 189, 629-641, 2006.

### **Papers giving an expression of other activities in which CMRC researchers are involved**

Dela F & Kjaer M. Resistance training, insulin sensitivity and muscle function in the elderly. *Essays Biochem* 42, 75-88, 2006.

Fogelholm, M., B. Stallknecht, and M. van Baak. ECSS position statement: Exercise and Obesity. *Eur.J.Sport Sci.* 6, 15-24, 2006.

Helge JW & Dela F. [Eating for top performance in sports?]. *Ugeskr Laeger* 168, 4510, 2006.

Pedersen JO, Zimmermann E, Stallknecht BM, Bruun JM, Kroustrup JP, Larsen JF, & Helge JW. [Lifestyle intervention in the treatment of severe obesity]. *Ugeskr Laeger* 168, 167-172, 2006.

Ploug, T. and Vinten, J.: Counterpoint: Glucose phosphorylation is not a significant barrier to glucose uptake by the working muscle. *J. Appl. Physiol.* 101:1805-1806, 2006.

Ploug, T. and Vinten, J.: Last Word: Point:Counterpoint authors respond to the commentaries on "Glucose phosphorylation is/is not a significant barrier to glucose uptake by the working muscle" that appear in this issue. *J. Appl. Physiol.* 101: 1811, 2006.

Wasserman DH, Fueger P, Ploug T, & Vinten J. Point: Counterpoint Glucose Phosphorylation is/is not a Significant Barrier to Muscle Glucose Uptake By the Working Muscle. *J Appl Physiol*, 2006.

Bangsbo, J, Mohr M, Poulsen A, Perez-Gomez J and Krstrup P. Training and testing the elite athlete. *Journal of Exercise Science Fitness* 4, 1-14, 2006.

Bangsbo J, Mohr M & Krstrup P. Physical and metabolic demands of training and match-play in the elite football player. *J Sports Sci.* 24(7):665-74. 2006

Krstrup P, Mohr M, Nybo L, Jensen JM, Nielsen JJ & Bangsbo J. The Yo-Yo IR2 test: physiological response, reliability, and application to elite soccer. *Med Sci Sports Exerc.* 38(9):1666-73. 2006

Krstrup P, Mohr M, Steensberg A, Bencke J, Kjaer M & Bangsbo J. Muscle and blood metabolites during a soccer game: implications for sprint performance. *Med Sci Sports Exerc.* 38(6):1165-74. 2006

### ***Research area 2. Ion transport in muscle cells and its importance for metabolism, blood flow and fatigue.***

#### **Ph. D. theses**

Nielsen JJ. Control of interstitial potassium in human skeletal muscle during exercise.

### **Papers in accordance with the CMRC research strategy**

Akerstrom TC, Birk JB, Klein DK, Erikstrup C, Plomgaard P, Pedersen BK, Wojtaszewski J. Oral glucose ingestion attenuates exercise-induced activation of 5'-AMP-activated protein kinase in human skeletal muscle. *Biochem Biophys Res Commun* 14; 342(3): 949-955, 2006.

Bangsbo J. In health and in a normoxic environment, VO<sub>2</sub> max is limited primarily by cardiac output and locomotor muscle blood flow. *J Appl Physiol*. 100(5):1742. 2006

Bangsbo J, Gibala MJ, Howarth KR & Krstrup P. Tricarboxylic acid cycle intermediates accumulate at the onset of intense exercise in man but are not essential for the increase in muscle oxygen uptake. *Pflugers Arch*. 452(6):737-43. 2006

Bangsbo J & Juel C. Counterpoint: lactic acid accumulation is a disadvantage during muscle activity. *J Appl Physiol*. 100(4):1412-1423. 2006.

Ferguson RA, Krstrup P, Kjaer M, Mohr M, Ball D & Bangsbo J. Effect of temperature on skeletal muscle energy turnover during dynamic knee-extensor exercise in humans. *J Appl Physiol*. 101(1):47-52. 2006

Silveria LR, Pilegaard H, Kusuhara K, Curi R, Hellsten Y. The contraction induced increase in gene expression of peroxisome proliferator-activated receptor (PPAR)-gamma coactivator 1alpha (PGC-1alpha), mitochondrial uncoupling protein 3 (UCP3) and hexokinase II (HKII) in primary rat skeletal muscle cells is dependent on reactive oxygen species. *Biochim Biophys Acta*. Sep;1763(9):969-76, 2006.

### **Papers giving an expression of other activities in which CMRC researchers are involved**

Bangsbo J, Juel C. Point:Counterpoint: Lactic acid accumulation is an advantage/disadvantage during muscle activity. *J Appl Physiol* 100: 1410-1414, 2006.

Juel C. Muscle fatigue and reactive oxygen species. *J Physiol* 576:1, 2006. (Perspective)

### **Papers giving an expression of other activities in which CMRC researchers are involved**

Bangsbo J, Mohr M & Krstrup P. Physical and metabolic demands of training and match-play in the elite football player. *J Sports Sci*. 24(7):665-74. 2006.

Bangsbo, J, Mohr M, Poulsen A, Perez-Gomez J and Krstrup P. Training and testing the elite athlete. *Journal of Exercise Science Fitness* 4, 1-14, 2006.

Krstrup P, Mohr M, Nybo L, Jensen JM, Nielsen JJ & Bangsbo J. The Yo-Yo IR2 test: physiological response, reliability, and application to elite soccer. *Med Sci Sports Exerc*. 38(9):1666-73. 2006.

Krstrup P, Mohr M, Steensberg A, Bencke J, Kjaer M & Bangsbo J. Muscle and blood metabolites during a soccer game: implications for sprint performance. *Med Sci Sports Exerc*. 38(6):1165-74. 2006.

### ***Research area 3. Hormone secretion from fat and muscle cells during exercise.***

#### **Doctor of medical sciences theses (DMSc)**

Helle Bruunsgaard . The clinical impact of systemic low-level inflammation in elderly populations - with special reference to cardiovascular disease, dementia and mortality. København:

Lægeforeningens Forlag: 2006: 1-30. Forsvaret den 27. juni 2006 ved Københavns Universitet, Det Sundhedsvidenskabelige Fakultet.

### **PhD-theses**

Peter S. Plomgaard. TNF- $\alpha$ 's effects on muscle and adipose tissue - in relation to low-grade inflammation. Eget forlag: 2006: 1-46. Forsvaret den 13. oktober 2006 ved Københavns Universitet, Det Sundhedsvidenskabelige Fakultet.

Pernille Keller. Regulation of IL-6 and leptin by exercise. København: Eget forlag: 2006: 1-65. Forsvaret den 21. april 2006 ved Københavns Universitet, Det Sundhedsvidenskabelige Fakultet.

### **Papers in accordance with the CMRC research strategy**

Bruun JM, Helge JW, Richelsen B, & Stallknecht B. Diet and exercise reduce low-grade inflammation and macrophage infiltration in adipose tissue but not in skeletal muscle in severely obese subjects. *Am J Physiol Endocrinol Metab* 290, E961-E967, 2006.

Carey AL, Petersen EW, Bruce CR, Southgate RJ, Pilegaard H, Hawley JA, Pedersen BK, Febbraio MA. Discordant gene expression in skeletal muscle and adipose tissue of patients with type 2 diabetes; effect of interleukin-6 infusion. *Diabetologia* 49(5): 1000-10007, 2006.

Carey AL, Steinberg GR, Macaulay SL, Thomas WG, Holmes AG, Ramm G, Prelovsek O, Hohnen-Behrens C, Watt MJ, James DE, Kemp BE, Pedersen BK, Febbraio MA. IL-6 increases insulin stimulated glucose disposal in humans and glucose uptake and fatty acid oxidation in vitro via AMPK. *Diabetes* 55(10): 2688-2697, 2006.

Erikstrup C, Mortensen OH, Pedersen BK. Retinol-binding protein 4 and insulin resistance. *N Engl J Med* 355(13): 1393-1394; 1394-1395, 2006.

Fischer CP. Interleukin-6 in acute exercise and training: What is the biological relevance? *Exerc Immunol Rev* 2006; 12: 6-33, 2006.

Fischer CP, Berntsen A, Perstrup LB, Eskildsen P, Pedersen BK. Plasma levels of IL-6 and CRP are associated with physical inactivity independent of obesity. *Scand J Med Sci Sports* – Nov 1, 2006.

Fischer CP, Hiscock NJ, Basu S, Vessby B, Kallner A, Sjoberg LB, Febbraio MA, Pedersen BK. Vitamin E isoform-specific inhibition of the exercise-induced heat shock protein 72 expression in humans. *J Appl Physiol* 100(5): 1679-1687, 2006.

Keller C, Hellsten Y, Steensberg A, Klarlund-Pedersen B. Differential regulation of IL-6 and TNF- $\alpha$  via calcineurin in human skeletal muscle cells. *Cytokine*. Nov;36(3-4):141-7, 2006.

Krogh-Madsen R, Plomgaard P, Møller K, Mittendorfer B, Pedersen BK. Influence of TNF- $\alpha$  and IL-6 infusions on insulin sensitivity and expression of IL-18 in humans. *Am J Physiol Endocrinol Metab* 291(1): E108-814, 2006.

Pedersen BK. The anti-inflammatory effect of exercise: its role in diabetes and cardiovascular disease control. *Essays Biochem* 42:105-117, 2006.

Pedersen BK. The anti-inflammatory effect of exercise – its role in diabetes and CVD control. In: Wagenmaker A (ed). *Essays in Biochemistry: The Biochemical Basis of the Health Effects of Exercise*. London: Portland Press: vol. 42(8): 105-117, 2006.

Pedersen BK. [Fitness, physical activity and death from all causes]. *Ugeskr Laeger* 168(2): 137-44, 2006.

Pedersen BK, Febbraio MA. JAP Counterpoint on IL-6 - Last Word. *J Appl Physiol* 2006.

Pedersen BK, Febbraio M. Exercise and interleukin-6 action. *Expert Rev Endocrinol Metab* 1(3): 319-321, 2006.

Pedersen BK, Saltin B. Evidence for prescribing exercise as therapy in chronic disease. *Scand J Med Sci Sports* 16 (suppl 1): 3-63, 2006.

Plomgaard P, Penkowa M, Leick L, Pedersen BK, Saltin B, Pilegaard H. The mRNA expression profile of metabolic genes relative to MHC isoform pattern in human skeletal muscles. *J Appl Physiol Endocrin Metab* 101(3): 817-825, 2006.

Ruderman NB, Keller C, Richard AM, Saha AK, Luo Z, Xiang X, Giralt M, Ritov VB, Menshikova EV, Kelley DE, Hidalgo J, Pedersen BK, Kelly M. Interleukin-6 Regulation of AMP-Activated Protein Kinase: Potential Role in the Systemic Response to Exercise and Prevention of the Metabolic Syndrome. *Diabetes* 55; Suppl 2: S48-54, 2006.

Steensberg A, Dalsgaard MK, Secher NH, Pedersen BK. Cerebrospinal fluid IL-6, HSP72 and TNF- $\alpha$  in exercising humans. *Brain Behav Immun* 20(6): 585-589. 2006.

#### **Papers giving an expression of other activities in which CMRC researchers are involved**

Bonini S, Bonini M, Bousquet J, Brusasco V, Canonica GW, Carlsen KH, Corbetta L, Cummiskey J, Delgado L, Del Giacco SR, Haahtela T, Jaeger S, Moretti C, Palange P, Passalacqua G, Passali D, Pedersen BK, Popov T, Rasi G, Ventura MT, Vignola AM. Rhinitis and asthma in athletes: an ARIA document in collaboration with GALEN. *Allergy* 61(6): 681-692, 2006

Erikstrup C, Ullum H, Pedersen BK. Short-term simvastatin treatment has no effect on plasma cytokine response in a human in vivo model of low-grade inflammation. *Clin Exp Immunol* 144(1): 94-100, 2006.

Grunnet L, Poulsen P, Klarlund Pedersen B, Mandrup-Poulsen T, Vaag A. Plasma cytokine levels in young and elderly twins: genes versus environment and relation to in vivo insulin action. *Diabetologia* 49(2): 343-50, 2006.

Hegaard HK, Damm P, Nielsen BB, Pedersen BK. [Pregnancy and recreational physical activity]. *Ugeskr Laeger* 168 (6): 564-566, 2006.

Iversen AK, Stewart-Jones G, Learn GH, Christie N, Sylvester-Hviid C, Armitage AE, Kaul R, Beattie T, Lee JK, Li Y, Chotiyanwong P, Dong T, Xu X, Luscher MA, Macdonald K, Ullum H, Pedersen BK, Skinhoj P, Fugger L, Buus S, Mullins JI, Jones EY, van der Merwe PA, McMichael AJ. Conflicting selective forces affect T cell receptor contacts in an immunodominant human immunodeficiency virus epitope. *Nat Immunol* 7(2): 179-89, 2006.

Ostrowski SR, Katzenstein TL, Pedersen M, Hoyer-Hansen G, Gerstoft J, Pedersen BK, Ullum H. Plasma levels of intact and cleaved urokinase receptor decrease in HIV-1-infected patients initiating highly active antiretroviral therapy. *Scand J Immunol* 63(6): 478-486, 2006.

Pedersen BK. [Metabolic fitness]. *Månedsskr Prakt Lægegern* 84: 1277-6, 2006.

#### ***Research area 4. Central and peripheral circulation***

##### **PhD-theses**

Foss Ø. What is the optimal cadence in cycling? The Norwegian School of Sport Sciences, 2006

**Papers in accordance with the CMRC research strategy**

Calbet JA, Lundby C, Koskolou M, & Boushel R. Importance of hemoglobin concentration to exercise: acute manipulations. *Respir Physiol Neurobiol* 151, 132-140, 2006.

Calbet JA, Lundby C, Sander M, Robach P, Saltin B, & Boushel R. Effects of ATP-induced leg vasodilation on VO<sub>2</sub> peak and leg O<sub>2</sub> extraction during maximal exercise in humans. *Am J Physiol Regul Integr Comp Physiol* 291, R447-R453, 2006.

Dalsgaard MK. Fuelling cerebral activity in exercising man. *J Cerebral Blood Flow Metab*, 26: 731-50, 2006.

Dalsgaard MK, Madsen FF, Secher NH, Laursen H, Quistorff B. High glycogen levels in the hippocampus of the human brain. *Cerebral Blood Flow Metab* in press 2006.

Fisher JP, Ogoh S, Dawson EA, Fadel PJ, Secher NH, Raven P, White, MJ. Cardiac and vasomotor components and the carotid baroreflex control of arterial blood pressure during isometric exercise in humans. *J Physiol*, 572: 869-80, 2006.

Gallagher KM, Fadel PJ, Smith SA, Strømstad M, Ide K, Secher NH, Raven PB. The interaction of central command and the exercise pressor reflex in mediating baroreflex resetting during exercise in humans. *Exp Physiol*, 91: 79-87, 2006.

González-Alonso J, Mortensen, SP, Dawson EA, Secher NH, Damsgaard R. Erythrocytes and the regulation of human skeletal muscle blood flow and oxygen delivery: role of erythrocyte count and oxygenation state of haemoglobin. *J Physiol*, 572: 295-305, 2006.

Hart E, Dawson E, Rasmusen P, George K, Secher NH, Whyte G, Shave R.  $\beta_1$ -Adrenergic receptor desensitization in man: Insight into post-exercise attenuation and cardiac function. *J Physiol*, 577: 717-25, 2006.

Immink RV, Secher NH, Roos CM, Pott F, Madsen PL, van Lieshout JJ. The postural reduction in middle cerebral artery blood velocity is not explained by PaCO<sub>2</sub>. *Eur J Appl Physiol*, 96: 609-14, 2006.

Nielsen HB, Astrup, AV, Richelsen B, Kroustrup JP. Adipositas I Danmark-hvorfor er det ikke gået så galt? *Ugeskr Læger*, 168: 132-35, 2006.

Ogoh S., Yoshiga CC, Secher NH, Raven PB. Carotis-Cardiac baroreflex function does not influence blood pressure regulation during head-up tilt in humans. *J Physiol Sci*, 56: 227-33, 2006.

Pedersen BL, Arendrup H, Secher NH, Quistorff B. Energy metabolism of perfused intercostal pig muscles as evaluated by <sup>31</sup>PMRS. *Exp Physiol*, 91: 755-63, 2006.

Rasmussen P, Plomgaard P, Krogh-Madsen R, Kim Y-S, van Lieshout JJ, Secher NH, Quistorff B. MCA. V<sub>mean</sub> and the arterial lactate-to-pyruvate ratio correlate during rhythmic handgrip. *J Appl Physiol*, 101:1406-11, 2006.

Richardson RS, Secher NH, Tschakovsky ME, Proctor DN, Wray WD. Metabolic and vascular limb differences affected by exercise, gender, age and disease. *Med Sci Sports Exerc*, 38: 1792-95, 2006.

Secher NH, Volianitis S. Are the arms and legs in competition for cardiac output? *Med Sci.Sports Exerc*. 38: 1797-1803, 2006.

Trautner, S., O. Amtorp, S. Boesgaard, C. B. Andersen, H. Galbo, S. Haunsoe and M. Sheykhzade: Noradrenaline-induced increases in calcium and tension in skeletal muscle conductance and resistance arteries from rats with postinfarction heart failure. *Eur J Pharmacol*, 537, 143-154, 2006.

Vogelsang TW, Yoshiga CC, Højgaard M, Kjær A, Warberg J, Secher NH, Volianitis S. The Plasma atrial natriuretic peptide response to arm and leg exercise in humans: effect of posture. *Exp Physiol*, 91: 765-771, 2006.

Westerhof BE, Gisolf J, Karemaker JM, Wesseling KH, Secher NH, Van Lieshout JJ. Time course analysis of baroreflex sensitivity during postural stress. *Am. J Physiol*, 291: 2864-74, 2006.

### **Papers giving an expression of other activities in which CMRC researchers are involved**

Brynskov T. Effekten af højdetræning. *Olympen*, 6-7, 2006.

Calbet JA, Boushel R, & Lundby C. Comment on Point:Counterpoint "positive effects of intermittent hypoxia (live high:train low) on exercise performance are/are not mediated primarily by augmented red cell volume". *J Appl Physiol* 100, 749, 2006.

Hove LD, Nielsen HB, Christoffersen JK. Patient injuries in response to anaesthetic procedures: cases evaluated by the Danish Patient Insurance Association. *Acta Anaesthesiol Scand*, 50: 530-35, 2006.

Hove J, Rosenberg I, Sejersen P, Hove KD, Secher NH. Supraorbital cutaneous blood flow rate during carotid endarterectomy. *Clin Physiol Func Imaging*, 26: 323-27, 2006.

Hove L, Nielsen HB, Christoffersen JK. Anæsthesiskader anmeldt til Patientforsikringen i perioden 1996-2002. *Ugeskr Læger*, 168: 3134-37, 2006.

Juul AB, Wetterslev J, Gluud C, Kofoed-Enevoldsen A, Jensen G, Callesen T, Nørgaard P, Fruergaard K, Bestle M, Vedelsdal R, Miran A, Jacobsen J, Roed J, Mortensen MB, Jørgensen L, Jørgensen J, Rosing ML, Petersen PL, Haas M, Albret R, Nielsen LL, Johansson G, Stjernholm P, Mølgaard Y, Foss NB, Elkjær J, Dehlie B, Boysen K, Zaric D, Munksgaard A, Madsen JB, Øberg B, Khanykin B, Blemmer T, Yndgaard S, Perko G, Wang LP, Winkel P, Hilden J, Jensen P, Salas N, DIPOM Trail Group. Effect of perioperative  $\beta$  blockade in patients with diabetes undergoing major non-cardiac surgery: randomised placebo controlled, blinded multicentre trial. *BMJ*: 332: 1482-88, 2006.

Kalliokoski KK, Langberg H, Ryberg AK, Scheede-Bergdahl C, Doessing S, Kjaer A, Kjaer M, & Boushel R. Nitric oxide and prostaglandins influence local skeletal muscle blood flow during exercise in humans: coupling between local substrate uptake and blood flow. *Am J Physiol Regul Integr Comp Physiol* 291, R803-R809, 2006.

Kalliokoski KK, Scheede-Bergdahl C, Kjaer M, & Boushel R. Muscle perfusion and metabolic heterogeneity: insights from noninvasive imaging techniques. *Exerc Sport Sci Rev* 34, 164-170, 2006.

Kjaergaard J, Svendsen JH, Sogaard P, Chen X, Nielsen HB, Koeber L, Kjaer A, Hassager C. Advanced quantitative echocardiography in arrhythmogenic right ventricular cardiomyopathy. *J Am Soc Echocardiography* in press 2006.

Secher NH. Danmarks første "anæstesilæge". *DASINFO*, 27, 2006.

Secher NH. Lumbalpunktur. Ugeskr Læger, 186: 596, 2006.

Secher NH, Krantz T. Inden operation, lokalanæstesi og hypotension mv. Kirurgisk Kitebog 2. udg. Nyt Nordisk Forlag, København, 4-6:30-41, 2006.

Secher NH, Quistorff B, Dalsgaard MK. Musklerne arbejder, men hjernen bliver træt. Ugeskr Læger, 168: 4503-4506, 2006.

Secher NH, Swiatek FAa, Egfjord M. Den nyresyge patient. Ugeskr Læger, 168: 4309-43, 2006.

### ***Research area 5. Studies of patients with monogenetic skeletal muscle diseases.***

#### **Papers in accordance with the CMRC research strategy**

Andersen ST, Dunø M, Schwartz M, Vissing J. Do carriers of *PYGM* mutations have symptoms of McArdle disease? *Neurology*; 67: 716-718, 2006.

Chinnery P, Vissing J. Treating MNGIE: Is reducing blood nucleosides the first cure for a mitochondrial disorder? *Neurology*; 67: 1330-1332, 2006.

Colding-Jørgensen E, Dunø M, Vissing J. Autosomal dominant monosymptomatic myotonia permanens. *Neurology*; 67: 153-155, 2006.

Frederiksen AL, Andersen PH, Kyvik KO, Jeppesen TD, Vissing J, Schwartz M. Tissue specific distribution of the 3243A>G mtDNA mutation. *J Med Genet*; 43: 671-677, 2006.

Haller RG, Wyrick P, Taivassalo T, Vissing J. Aerobic conditioning: An effective therapy in McArdle disease. *Ann Neurol*; 59: 922-928, 2006.

Jeppesen TD, Schwartz M, Frederiksen AL, Wibrand F, Olsen DB, Vissing J. Muscle phenotype and mutation load in 51 persons with the 3243A>G mitochondrial DNA mutation. *Arch Neurol*; 63: 1701-1706, 2006.

Jeppesen TD, Schwartz M, Olsen DB, Wibrand F, Krag T, Dunø M, Hauerslev S, Vissing J. Aerobic training is safe and improves exercise capacity in patients with mitochondrial myopathy. *Brain*; 129: 3402-3412, 2006.

Olsen DB, Gideon P, Jeppesen TD, Vissing J. Leg muscle involvement in facioscapulohumeral muscular dystrophy assessed by MRI. *J Neurol*; 253(11) 1437-1441, 2006.

Sveen ML, Schwartz M, Vissing J. High prevalence and phenotype-genotype correlations of limb girdle muscular dystrophy type 2I in Denmark. *Ann Neurol*; 59(5): 808-815, 2006.

Vissing J. Lactic acid accumulation is an advantage/disadvantage during muscle activity. *J Appl Physiol*; 100(6): 2101, 2006.

#### **Papers giving an expression of other activities in which CMRC researchers are involved**

Vissing J. Muskelsygdomme. I; *Neurologi og Neurorehabilitering*, 1. udgave. Wæhrens E, Winkel A, Gyiring J. (red). Munksgaard, København. 163-169, 2006.

### ***Research area 6. Interaction between muscle and connective tissue. Relationship with everyday activities.***

**PhD-theses**

Jens Lykkegård Olesen: Insulin-like growth factor I (IGF-I), IGF binding proteins and collagen synthesis – relation to mechanical loading of tendon. Institut for Idrætsmedicin, Bispebjerg Hospital, Københavns Universitet, 20 juni 2006.

Steen S Olsen: Long-term creatine supplementation and resistance training: effects on muscle strength and muscle adaptation. Institut for Idrætsmedicin, Bispebjerg Hospital, Københavns Universitet, 8 februar 2006.

Birgitte Esmarck Meibom: Elderly and resistance training: timing and composition of the exercise meal. Institut for Idrætsmedicin, Bispebjerg Hospital, Københavns Universitet, 9 juni 2006.

**Papers in accordance with the CMRC research strategy**

Andersen LL, Magnusson SP, Nielsen M, Haleem J, Poulsen P, Aagaard P: Neuromuscular activation in physiotherapy and resistance exercises. *Physical Therapy* 86:683-97, 2006.

Bandholm T, Rasmussen LR, Aagaard P, Jensen BR, Diederichsen L: Force steadiness, neuromuscular activation and maximal muscle strength in subjects with subacromial impingement syndrome. *Muscle and Nerve*, 34:631-9, 2006.

Bojsen-Møller J, Kalliokoski K, Seppänen M, Kjaer M, Magnusson SP: Low intensity tensile loading increases intratendinous glucose uptake in the Achilles tendon. *Journal of Applied Physiology* 101: 196-201, 2006.

Boesen MI, Koenig MJ, Torp-Pedersen S, Bliddal H, Langberg H. Tendinopathy and Doppler activity: the vascular response of the achilles tendon to exercise. *Scandinavian Journal of Medicine and Science in Sports* 16:463-9, 2006.

Boesen MI, Torp-Pedersen S, Koenig MJ, Christensen R, Langberg H, Holmich P, Nielsen MB, Bliddal H. Ultrasound guided electrocoagulation in patients with chronic non-insertional Achilles tendinopathy: a pilot study. *British Journal of Sports Medicine* 40:761-6, 2006.

Dela F, Kjaer M. Resistance exercise, insulin sensitivity and muscle function in the elderly. *Essays in Biochemistry* 42: 75-88, 2006.

Hansen P, Bojsen-Møller, Aagaard P, Magnusson SP: Mechanical properties of the human patellar tendon, in vivo. *Clinical Biomechanics* 21: 54-58, 2006.

Haraldsson BT, Langberg H, Aagaard P, Kjær M, J Groot, Magnusson SP: Corticosteroids reduce the tensile strength of isolated collagen fascicles. *American Journal of Sports Medicine* 34: 192-197, 2006.

Hauer K, Becker C, Lindemann U, Beyer N. Effectiveness of physical training on motor performance and fall prevention in cognitively impaired older persons: a systematic review. *American Journal Physical Medicine Rehabilitation* 85: 847-57, 2006.

Holm L, Esmarck B, Mizuno M, Hansen H, Suetta C, Hölmich P, Krogsgaard M, Kjaer M: The effect of protein and carbohydrate supplementation on strength training outcome of rehabilitation in ACL patients. *Journal of Orthopaedic Research* 24: 2114-23, 2006.

Jespersen J, Kjaer M, Schjerling P. The possible role of myostatin in skeletal muscle atrophy and cachexia. *Scandinavian Journal of Medicine and Science in Sports* 16: 74-82, 2006.

Kalliokoski K, Scheele-Bergdahl C, Kjær M, Boushel R. Muscle perfusion and metabolic heterogeneity: Insights from non-invasive image techniques. *Exercise Sports Science Reviews* 34: 1662-1670, 2006.

Kalliokoski KK, Langberg H, Ryberg AK, Scheede-Bergdahl C, Doessing S, Kjaer A, Kjaer M, Boushel R. Nitric oxide and prostaglandins influence local skeletal muscle blood flow during exercise in humans: coupling between local substrate uptake and blood flow. *American Journal of Physiology* 291: R803-9, 2006.

Kjær M, Magnusson SP, Krogsgaard M, Boysen Moller J, Olesen J, Heinemeier K, Hansen M, Haraldsson B, Koskinen S, Esmarck B, Langberg H. Extracellular matrix adaptation of tendon and skeletal muscle to exercise. *Journal of Anatomy* 208:445-50. 2006.

Kongsgaard M, Aagaard P, Jensen M, Olsen D, Riskjær S, Magnusson SP: Decline eccentric squats increases patella tendon loading compared to standard eccentric squats. *Clinical Biomechanics* 21: 748-54, 2006.

Krustrup P, Mohr M, Steensberg A, Bencke J, Kjaer M, Bangsbo J. Muscle and blood metabolites during a soccer game: implications for sprint performance. *Medicine Science Sports & Exercise* 38: 1165-1174, 2006.

Mackey AL, Donnelly AE, Swanton A, Murray F & Turpeenniemi-Hujanen T: The effects of impact and non-impact exercise on circulating markers of collagen remodelling in humans. *Journal of Sports Sciences* 24:843-8, 2006.

Miller BF, Hansen M, Olesen JL, Flyvbjerg A, Schwarz P, Babraj JA, Smith K, Rennie MJ, Kjaer M. No effect of menstrual cycle on myofibrillar and connective tissue synthesis in contracting skeletal muscle. *American Journal of Physiology* 290: E163-E168, 2006.

Mortensen OH, Frandsen L, Schjerling P, Nishimura E, Grunnet N. PGC-1alpha and PGC-1beta have both similar and distinct effects on myofiber switching toward an oxidative phenotype. *Am J Physiol Endocrinol Metab* 291(4): E807-16, 2006.

Olesen JL, Heinemeier KM, Haddad F, Langberg H, Flyvbjerg A, Kjaer M, Baldwin KM: Expression of insulin-like growth factor I, insulin-like growth factor binding proteins, and collagen mRNA in mechanically loaded plantaris tendon. *Journal of Applied Physiology* 101:183-8, 2006.

Olesen JL, Heinemeier KM, Langberg H, Magnusson SP, Kjaer M, Flyvbjerg A: Expression, content, and localization of insulin-like growth factor in human Achilles tendon. *Connective Tissue Research* 47:200-206, 2006.

Olesen JL, Langberg H, Heinemeier KM, Flyvbjerg A, Kjaer M: Determination of markers for collagen type I turnover in peritendinous human tissue by microdialysis: effect of catheter types and insertion trauma. *Scandinavian Journal of Rheumatology* 35:312-7. 2006.

Olsen S, Aagaard P, Kadi F, Tufekovic G, Verney J, Olesen JL, Suetta C, Kjær M. Creatine supplementation augments the increase in satellite cell and myonuclei number in human skeletal muscle induced by strength training. *Journal of Physiology* 573.2: 525-534, 2006.

Vinther A, Kanstrup I, Christiansen E, Alkaer T, Larsson B, SP Magnusson, Ekdahl C, Aagaard P: Exercise induced rib stress fractures: potential risk factors to thoracic muscle co-contraction and movement pattern. *Scandinavian Journal of Medicine & Science in Sport* 16:188-196, 2006.

Yardley L, Bishop FL, Beyer N, Hauer K, Kempen GI, Piot-Ziegler C, Todd CJ, Cuttelod T, Horne M, Lanta K, Holt AR. Older people's views of falls-prevention interventions in six European countries. *Gerontologist* 46: 650-60, 2006.

**Papers giving an expression of other activities in which CMRC researchers are involved**

Dias N, Kempen GI, Todd CJ, Beyer N, Freiburger E, Piot-Ziegler C, Yardley L, Hauer K. [The German version of the Falls Efficacy Scale-International Version (FES-I)]. *Z Gerontology geriatrics* 39: 297-300, 2006.

Mikkelsen UR, Fredsted A, Gissel H, Clausen, T: Excitation-induced cell damage and  $\beta$ 2-adrenoceptor agonist stimulated force recovery in rat skeletal muscle. *American Journal of Physiology – Regulatory, Integrative and Comparative Physiology* 290(2): R265-72, 2006.

Kanstrup IL, Hansen M, Kjaer M. Kønsforskelle i sportspræstationer. *Ugeskrift for Læger*. 168: 4507-4510, 2006.

Kjaer M, Suetta C, Tønnesen H: Den fysisk inaktive operationspatient. *Ugeskr Læger* 168: 4322, 2006.

Kjær M. Sudden cardiac death associated with sports in young individuals: Is screening the way to avoid it? (editorial) *Scandinavian Journal of Medicine & Science in Sports* 16(1): 1-3, 2006.

Krogsgaard M, Jacobsen BW, Tordrup P, Kjær M, Magnusson SP, Nielsen M. Referenceprogram for ligamentskader i knæet. *Dansk Selskab for Artroskopisk Kirurgi og Sportstraumatologi (SAKS)*, pp: 1-32, 2006.

Krogsgaard M, Kjaer M. Langtidsfølger på bevægeapparatet af eliteidræt. *Ugeskrift for Læger*. 168: 4535-4537, 2006.

Langberg H. Overbelastningsskader i senevæv: hvad siger den nyeste forskning og hvordan behandler vi skader i senevævet? *Norsk Idrettsmedisin*, 21: 3-9, 2006.

Magnusson P, Renström P: The European College of Sports Sciences Position Statement: The role of stretching exercises in sports. *European Journal of Sport Science* 6: 87-91, 2006.

Østergaard M, Kjær M, Manniche C, Nørregaard J, Wiell C, Hetland ML, Andersen LS. Fremskridt i Reumatologien, *Ugeskrift for Læger*, 168: 1240, 2006.