

Sunday, 22 September 2024

08.30 – 12.00 REGISTRATION

08.30 – 12.00 Early Careers Association (ECA) Symposium

08.30 – 10.00 ECA SESSION I

Chairs: Franziska Koser (Germany) and Maria Rosaria Pricolo (Spain)

08.30 – 08.35 Introduction by chairs

08.35 – 08.50 **Saba Gharibi (Australia)**: Gestational stress altered femoral bone microarchitecture but not skeletal muscle contractile function in the dystrophin-deficient mdx mouse

08.50 – 09.05 **Marie Kervella (France)**: Exploring three-dimensional architecture in inherited dilated cardiomyopathy: an overview of genome organization in cardiac cells

09.05 – 09.20 **Albin Berg (Sweden)**: Miniaturized actin-activated myosin ATPase assay requires almost 1000-fold less protein than traditional methods – applications to omecamtiv mecarbil effects on human β cardiac myosin

09.20 – 09.35 **Annika J. Klotz (Germany)**: Precise titin cleavage in intact cardiac muscle tissue using cell-penetrating peptides

09.35 – 09.50 **Nejc Umek (Slovenia)**: In situ spatial transcriptomic analysis of human skeletal muscle using the Xenium platform

09.50 – 10.00 Introduction of the ECA – Christine Loescher, Franziska Koser, Maria Rosaria Pricolo and Emrulla Spahiu

10.00 – 10.30 Coffee break

10.30 – 11.20 ECA SESSION II

Chairs: Christine Loescher (Germany), Emrulla Spahiu (Germany)

10.30 – 10.35 Introduction by chairs

10.35 – 10.50 **Christine Delligatti (USA)**: Methylglyoxal glycation competes with ubiquitination, disrupting Sarcomere Function

10.50 – 11.05 **Momcilo Prodanovic (Serbia)**: Integrating a 3D explicit multi-sarcomere model with finite element solver for cardiac tissue simulation

11.05 – 11.20 **Osman Esen (The Netherlands)**: From stability to flexibility: the crucial role of cytoskeleton in muscle cell functionality across time

11.20 – 11.55 Career story/Advice: Josine de Winter (The Netherlands) and Diederik Kuster (The Netherlands)

Chair: Christine Loescher (Germany)

11.55 – 12.00 ECA closing remarks



12.00 – 12.45 Lunch break

12.45 – 13.00 OPENING

13.00 – 14.00 Keynote lecture I: The Jean Hanson Lecture

Chairs: Elisabeth Ehler (United Kingdom), Kristina Carugo Djinovic (France, Austria)

Juleen R. Zierath (Sweden, Denmark):

Exercise metabolism and adaptation in skeletal muscle: Implications for Type 2 Diabetes

14.00 – 14.30 Coffee break

14.30 – 16.00 SESSION S1: REGULATION OF ENERGY METABOLISM

Chairs: Jitka Žurmanová (Czech Republic), Igor Križaj (Slovenia)

14.30 – 14.45 **Igor Križaj (Slovenia):** Unraveling snake venom sPLA2 neuromuscular blockade mechanism provides insight into pathophysiology of Alzheimer's disease

14.45 – 15.00 **Jan Kopecký (Czech Republic):** Adaptive induction of nonshivering thermogenesis in muscle rather than brown fat could counteract obesity

15.00 – 15.15 **Lilya Lehka (Poland):** Loss of unconventional myosin VI results in altered muscle energy metabolism*

15.15 – 15.30 **Martino Franchi (Italy):** Unexpected molecular and physiological adaptations of human muscle in response to resistance exercise recovery after short-term unloading*

15.30 – 15.45 **Stanislava Stevanovic (Norway):** Time-dependent reduction in oxidative capacity among cultured myotubes from spinal cord injured individuals*

15.45 – 16.00 **Breanne Newell-Stamper (USA):** Tension and temperature modulation of oxygen consumption in resting murine skeletal muscle

16.00 – 16.30 Coffee break

16.30 – 17.30 Keynote Lecture II

Chair: Simon Sedej (Austria)

Guido Kroemer (France):

A new tissue hormone regulating body mass and composition



18.30 – 20.30 Satellite Event at the National Gallery

Art & Science Lecture: Gregor Borut Ernst Jemec (Denmark):

The muscles behind our changing view of the world

Welcome reception

Monday, 23 September 2024

09.00 – 10.00 Keynote lecture III

Chair: Marija Pfeifer (Slovenia)

Bente K. Pedersen (Denmark):

Exercise as Medicine in a translational perspective – focus on the role of myokine IL-6

10.00 – 11.00 Ambiguity in science (panel discussion)

Panellists: Erich Gnaiger (Austria), Anne Houdusse (France), Coen Ottenheijm (The Netherlands), Michelle Peckham (United Kingdom), Bente K. Pedersen (Denmark), Nada Rotovnik Kozjek (Slovenia)

11.00 – 11.30 Coffee break

11.30 – 13.00 SESSION S2: MYOSIN EXPRESSION, FUNCTION, AND REGULATION

Chairs: Maria Jolanta Rędownicz (Poland), Marko Ušaj (Sweden)

11.30 – 11.36 **Maria Jolanta Rędownicz (Poland):** In memoriam Ed Korn

11.36 – 11.48 **Amani Odeh (Israel):** Myosin heavy-chain isoform distribution and fiber-type composition in skeletal muscle of sarcopenia-resistant subterranean rodent

11.48 – 12.00 **Fanny Rostedt (Finland):** Investigating myosin dysregulation in X-linked myotubular myopathy

12.00 – 12.12 **David Heeley (Canada):** Myosin essential light chain isotype influences the mechanism of actomyosin ATP hydrolysis MM

12.12 – 12.24 **Mamta Amrute-Nayak (Germany):** Dysfunctional human ventricular myosin as a consequence of light chain-2 mutation linked to hypertrophic cardiomyopathy (HCM)

12.24 – 12.36 **Emrulla Spahiu (Germany):** Effect of native thin filament source on motility driven by atrial and ventricular myosin*

12.36 – 12.48 **Irene Pertici (Italy):** β -cardiac and slow skeletal muscle myosins share the heavy chain isoform, but exhibit different power outputs in the synthetic nanomachine*

12.48 – 13.00 **Marko Ušaj (Sweden):** Actomyosin under heavy metals

13.00 – 15.00 Lunch & Poster session I (S1 – S4)

15.00 – 16.30 SESSION S3: Myosin structure and regulation in the thick filament

Chairs: Michael Geeves (United Kingdom), Stefan Raunser (Germany)

15.00 – 15.05 Introduction

15.05 – 15.20 **Neha Nandwani (USA):** One drug does not fit all - HCM mutations differentially impact the inhibitory effect of mavacamten and aficamten*

- 15.20 – 15.35 **Giulia Arecchi (Italy)**: Probing the super-relaxed myosin state in cardiac myofilaments by second harmonic-generation microscopy*
- 15.35 – 15.55 **Elisabetta Brunello (United Kingdom)**: Effect of load on the activation of myosin filaments in heart muscle cells
- 15.55 – 16.10 **Ilaria Morotti (Italy)**: The dependence on the afterload of the degree of thick filament activation in the heart*
- 16.10 – 16.30 **Marco Linari (Italy)**: Transition kinetics between OFF and ON states of titin upon stimulation of skeletal muscle depends on temperature as expected from the Ca²⁺ transient

16.30 – 17.00 Coffee break

17.00 – 18.30 SESSION S4: Structure of sarcomere across scales

Chairs: Kristina Djinovic Carugo (France, Austria), Mathias Gautel (United Kingdom)

- 17.00 – 17.20 **Anne Houdusse (France)**: Atomic resolution insights into thick filament regulation
- 17.20 – 17.40 **Michelle Peckham (United Kingdom)**: Exploiting cryo-EM structures of actomyosin-5a to reveal the physical properties of its lever
- 17.40 – 17.52 **Belinda Bullard (United Kingdom)**: Drosophila flight muscle has two titin-like molecules (SIs) associated with each thin filament
- 17.52 – 18.04 **Sreeparna Biswas (Germany)**: Cryo-ET analysis to reveal the structural organization of Zebrafish skeletal myofibrils*
- 18.04 – 18.16 **Qiuping Zhang (United Kingdom)**: Nesprin-2 is a novel scaffold protein for telethonin and FHL-2 in the cardiomyocyte sarcomere
- 18.16 – 18.28 **Péter Görög (Hungary)**: Flightless-I and Drosophila LRRFIP work together to regulate radial growth of the sarcomeres



20.00 – 23.30 Dinner in Grand Hotel Union

Tuesday, 24 September 2024

09.00 – 10.30 SESSION S5: E-C coupling and calcium homeostasis

Chairs: Vincenzo Sorrentino (Italy), Pompeo Volpe (Italy)

- 09.00 – 09.20 **Daniela Rossi (Italy)**: The excitation-contraction coupling mechanisms in skeletal muscle: assembly and interactions of proteins of the calcium release complex
- 09.20 – 09.40 **Paola Lorenzon (Italy)**: A novel role for Homer2 in the functional nAChRs/IP3Rs1 interplay regulating the endplate plasticity
- 09.40 – 10.00 **Vincent Jacquemond (France)**: Pharmacological modulation of autophagy and excitation-contraction coupling in single isolated muscle fibers
- 10.00 – 10.15 **Lorenzo Marcucci (Italy)**: A diffusion-reaction model to quantify the role of mitochondria calcium uptake and buffer in regulating the cytosolic calcium in murine skeletal muscle fibers
- 10.15 – 10.30 **Vid Jan (Slovenia)**: Electroporation-induced decoupling of action potentials, calcium release, and contraction in adult rat cardiomyocytes

10.30 – 11.00 Coffee break

11.00 – 12.30 SESSION S6: *In vitro* models of striated muscle diseases

Chairs: Chiara Tesi (Italy), Albano C. Meli (France)

- 11.00 – 11.15 **Katja Gemlich (United Kingdom)**: Using stem cell derived cardiomyocytes to model rare cardiac diseases
- 11.15 – 11.30 **Albano C. Meli (France)**: Can we model Duchenne cardiomyopathy in a dish?
- 11.30 – 11.45 **Jose R. Pinto (USA)**: Hypertrophic and dilated cardiomyopathy associated TNNT2 variants induce divergent nucleus remodeling in human iPSC-CMs
- 11.45 – 12.00 **Tom Kerkhoff (The Netherlands)**: Impaired force generating capacity by single skeletal muscle fibers from immune-mediated necrotizing myopathy patients*
- 12.00 – 12.15 **Kerstin Filippi (Germany)**: Skeletal muscle disruption and mitochondrial dysfunction cause BAG3P209L-myofibrillar myopathy*
- 12.15 – 12.30 **Carole Dabadie (France)**: Nerve stimulation induced skeletal muscle contraction: an ex vivo model to better understand skeletal muscle biology*

12.30 – 14.30 Lunch & Poster session II (S5 – S8)

14.30 – 16.00 SESSION S7: Cardiac Sarcomeres: disease mutations and targeted therapeutics

Chairs: Michael Regnier (USA), Josine de Winter (The Netherlands)

- 14.30 – 14.48 **Michael Regnier (USA)**: Mechanisms of contractile dysfunction with the MYH7 R403Q mutation in porcine ventricle muscle
- 14.48 – 15.00 **Rylan Beckingham (United Kingdom)**: Biophysical characterisation of human myomesin-2 mutations and their implications for cardiomyopathy*

- 15.00 – 15.12 **Alexander Matyushenko (Russian Federation):** The properties of cardiac tropomyosin have been significantly impacted by the novel Lys30Glu mutation associated with dilated cardiomyopathy
- 15.12 – 15.30 **Sila Algül (The Netherlands):** Hypophosphorylation of S286 in cMyBP-C is associated with dephosphorylation and acetylation of microtubules in hypertrophic cardiomyopathy*
- 15.30 – 15.42 **Josè Manuel Pioner (Italy):** Long-term effect of mavacamten impact force and sarcomere density in a mybpc3 ipsc-cardiomyocyte model of hypertrophic cardiomyopathy
- 15.42 – 16.00 **Theresia Kraft (Germany):** Hypertrophic Cardiomyopathy: Burst-like transcription, allelic and contractile imbalance likely contribute to early development of hallmarks of the disease

16.00 – 16.30 Coffee break

16.30 – 18.00 SESSION S8: Muscle contractility and its regulation

Chairs: Elisabetta Brunello (United Kingdom), Marco Linari (Italy)

- 16.30 – 16.45 **Alf Månsson (Sweden):** Towards full kinetic characterization of actomyosin chemo mechanics using purified single cardiac myosin II motor fragments
- 16.45 – 17.00 **Hendrik Bruns (Germany):** Sarcomere, troponin, and myosin X-ray diffraction signals can be resolved in single cardiomyocytes*
- 17.00 – 17.15 **Samantha P. Harris (USA):** Loss of myosin binding protein-c confers stretch activation properties to skeletal muscles
- 17.15 – 17.30 **Anthony Hessel (Germany):** Titin underpins the history-dependent properties of residual force enhancement, residual force depression, and the stretch-shortening cycling effect
- 17.30 – 17.45 **Vincenzo Lombardi (Italy):** Regional hierarchy of myosin motor recruitment from the thick filament in relation to heart performance
- 17.45 – 18.00 **Cameron Hill (United Kingdom):** Dynamics of structural changes in the myosin-containing thick filaments of intact rat soleus muscle during twitch and tetanic contraction*



18.15 – 20.15 Walk in Ljubljana Centre

20.15 – Early-Career Researchers Social Gathering

Wednesday, 25 September 2024

08.30 – 10.00 SESSION S9: Neuromuscular diseases: from bedside to molecules

Chairs: Rüdiger Rudolf (Germany), Boris Rogelj (Slovenia)

- 08.30 – 08.45 **Evgeniia Motanova (Italy)**: Effects of chronic inactivity on mitochondria and neuromuscular junctions in older adults*
- 08.45 – 09.00 **Jingyi Song (The Netherlands)**: Developmental processes of the m. gastrocnemius are impacted by nicotinamide nucleotide transhydrogenase (NNT) dysfunction as well as hypoxia exposure of 24-day-old mice*
- 09.00 – 09.15 **Fabio Sarto (Italy)**: Functional and morphological alterations of the human neuromuscular junction following 21-day muscle disuse*
- 09.15 – 09.30 **Rüdiger Rudolf (Germany)**: In a SOD1 D90A hiPSC-derived neuromuscular model evoked calcium signaling and nAChR cluster morphology are altered
- 09.30 – 09.45 **Boris Rogelj (Slovenia)**: Membrane protein dysregulation in C9orf72 mutation-associated ALS and FTD
- 09.45 – 10.00 **Nir Neshet (Israel)**: Dynamics of muscle activation in the soft limbs of the octopus

10.00 – 10.30 ESMR Assembly

10.30 – 11.00 Coffee break

11.00 – 12.30 SESSION S10: Interorgan communication: from cell to bedside

Chairs: Kathryn H. Myburgh (South Africa), Natasa Nikolic (Norway)

- 11.00 – 11.15 **Kathryn H. Myburgh (South Africa)**: Extracellular vesicles derived from myoblasts have more effective uptake by myoblasts than EVs derived from fibroblasts and differential effects on myoblast migration were observed
- 11.15 – 11.30 **Nimo Mukhtar Mohamud Osoble (Norway)**: Interplay between cultured human osteoblastic and skeletal muscle cells: effects of conditioned media on glucose and fatty acid metabolism*
- 11.30 – 11.45 **Annalisa Bernareggi (Italy)**: The pharmacological activation of Piezo1 channels modulates the release of exosomes in myogenic precursor cells
- 11.45 – 12.00 **Elisabeth Barton (USA)**: Prospects for overall benefits of exercise training in the absence of muscle IGF-I
- 12.00 – 12.15 **Ola Ekström (Sweden)**: Genetic variation at RAB3GAP2 is associated with skeletal muscle capillary density*
- 12.15 – 12.30 **Anej Skočir (Slovenia)**: Transcutaneous functional magnetic muscle stimulation in critically ill for prevention of ICU acquired weakness: pilot study

12.30 – 14.30 Lunch & Poster session III (S9 – S13)

14.30 – 16.00 SESSION S11: Titin and beyond

Chairs: Wolfgang Linke (Germany), Miklós Kellermayer (Hungary)

- 14.30 – 14.45 **Wolfgang Linke (Germany):** Targeting titin in dilated cardiomyopathy
14.45 – 15.00 **Miklós Kellermayer (Hungary):** Unfolding force map of the entire I-band titin
15.00 – 15.15 **Roberto Silva-Rojas (Spain):** Titin mechanical knock-out triggers muscle disease with myonuclei internalization and sarcomere-free myofibers*
15.15 – 15.30 **Sarah Grover (United Kingdom):** Screening for small molecules targeting pathogenic titin domains*
15.30 – 15.45 **Walter Herzog (Canada):** Titin force regulation in skeletal muscle
15.45 – 16.00 **Christine Loescher (Germany):** Deciphering the effects of in vivo titin cleavage levels on cardiac function, structure, and immune response

16.00 – 16.30 Coffee break

16.30 – 18.00 SESSION S12: Cytoskeleton

Chairs: Elisabeth Ehler (United Kingdom), Christine Loescher (Germany)

- 16.30 – 16.45 **Henk Granzier (USA):** Layout of titin's C-terminus in the cardiac sarcomere
16.45 – 17.00 **Maria Rosaria Pricolo (Spain):** Titin cleavage disrupts sarcomere-adhesion tensional homeostasis triggering fast myocardial fibrosis
17.00 – 17.15 **Yaniv Hinitz (United Kingdom):** The Zr-Zq of zebrafish ttn.2 is alternatively spliced in muscle and is dispensable for muscle formation and function under normal development
17.15 – 17.30 **Frieder Schoeck (Canada):** Filamin protects myofibrils from contractile damage through changes in its mechanosensory region
17.30 – 17.45 **Sophie Broadway-Stringer (United Kingdom):** From structure to function: understanding the impact of a FLNC missense variant and its role in hypertrophic cardiomyopathy*
17.45 – 18.00 **Sylvia Bogaards (Netherlands):** The replacement kinetics of the giant muscle protein nebulin are slow and further reduced by a frequently observed mutation in Neb



19.00 – 21.00 Satellite Event at the Academy of Music

Concert & Reception

Thursday, 26 September 2024

09.00 – 10.30 SESSION S13: Mitochondrial physiology and pathophysiology *Chairs: Pablo M. Garcia-Roves (Spain), Arild C. Rustan (Norway)*

- 09.00 – 09.15 **G. Hege Thoresen (Norway):** Loss of AMPK α 2 subunit in cultured myotubes promotes reduced lipid oxidation and lipid synthesis but increases the response to mitochondrial uncoupling
- 09.15 – 09.30 **Erich Gnaiger (Austria):** Functional hypoxia in cardiac mitochondria: oxidative phosphorylation, mitochondrial membrane potential, coenzyme Q redox state, and calcium uptake
- 09.30 – 09.45 **Steen Larsen (Denmark):** Mitochondrial adaptations to weight loss: lifestyle, surgery or medication
- 09.45 – 10.00 **Grzegorz Sumara (Poland):** ERK3 deletion promotes mitochondrial function and oxidative capacity in skeletal muscle
- 10.00 – 10.15 **Jana Disch (Germany):** A computational model to study the control and dynamics of energy metabolism in contracting skeletal muscle fibers
- 10.15 – 10.30 **František Galatík (Czech Republic):** Beta-2 adrenergic signaling and the JAK/STAT pathway are essential for the cardioprotective effect of long-term cold acclimation*

10.30 – 11.00 Coffee break

11.00 – 12.00 Keynote lecture IV: The Closing Lecture *Chair: Carlo Reggiani (Italy)*

Igor Mekjavić (Slovenia):
Mitigating muscle atrophy during the mission to Mars

12.00 – 13.00 Marcus Schaub awards & Closing ceremony

13.00 – 14.00 Lunch break

14.00 – 19.00 Satellite symposium and workshop: “Skeletal Muscle Research – from Cell to Human”

Pablo M. Garcia-Roves, Erich Gnaiger, Christina Karatzaferi, Arild C. Rustan
(Detailed programme, which will include a coffee break, will be announced shortly.)