COST Office Science Officer: Dr Federica Ortelli, federica.ortelli@cost.eu
COST MC Chair: Prof Erich Gnaiger, erich.gnaiger@i-med.ac.at

COST STSM Reference Number: COST-STSM-CA15203-35767
Period: 2017-02-06 to 2017-02-24
COST Action: CA15203
STSM type: Regular (from Switzerland to Spain)

STSM Applicant: Dr Nadège Zanou, University of Lausanne, Lausanne (CH), nadege.zanou@unil.ch
STSM Topic: MITOEAGLE COST short scientific mission
Host: Pablo M Garcia-Roves, University of Barcelona, Barcelona (ES), pgarciaroves@ub.edu

Budget Request: Year-2017

Travel	110 Euro
Subsistence (hotel/meals)	1500 Euro
Total	1610 Euro

Short CV:

Lausanne, 31 Octobre 2016.

To the STSM coordinator
Dr Magdalena Labienec-Watala, PhD, DSc magdalab@biol.uni.lodz.pl

Concerns: 1st Call, Short-Term Scientific Missions for COST Action 15203 MITOEAGLE Recommendation for Dr Nadège Zanou

Dear Madam/Sir,

It is with great pleasure that I provide this letter of recommendation for Dr. Nadège Zanou as part of her application for a MITOEAGLE COST scientific mission grant.

Dr. Zanou is an MD with a PhD in skeletal muscle physiology and pathophysiology, which she obtained in 2012 in Brussels, Belgium. After obtaining her PhD she worked as a postdoctoral researcher at the National Scientific Research Foundation of Belgium from 2013 to 2015. She then joined us in November 2015 and was appointed as a first-assistant research.

She works in my team on skeletal muscle adaptations to exercise, especially on the role of the ryanodine receptor type 1 (RyR1) in mitochondrial biogenesis in response to high intensity interval training (HIIT). She uses different models ranging all the way from C2C12 myotubes to humans and muscle biopsies. She was quickly able to set-up an in vitro model mimicking HIIT in C2C12 myotubes with the help of a stimulator and showed that it can rapidly induce markers of mitochondrial biogenesis similarly as observed in mice and humans.

Dr. Zanou is a conscientious, highly motivated and ambitious researcher eager to continue learning new skills. It is in this spirit that she applies for a MITOEAGLE COST scientific mission in respirometry in order to acquire new skills for the measurement

of mitochondrial function.

For our project this skill of respirometry would be of great utility since our final end-outcome is mitochondrial biogenesis. MITOEAGLE provides the perfect opportunity to be introduced to this technique. We are therefore confident that this mission would bring important added value to our research projects. We also hope and expect that her participation would foster collaborations with the various MITOEAGLE COST scientific groups.

Finally, we would match the funds granted, as requested in the call.

For all these reasons, I highly recommend Dr. Zanou for this MITOEAGLE scientific mission, hoping that her application will hold your attention.

Bengt Kayser, MD, PhD
Professor of Physiology
University of Lausanne

Work Plan Summary:

Physical inactivity leads to low fitness associated to morbidity and mortality. High intensity interval training (HIIT), consists in brief, intermittent bursts of vigorous activity interspaced by short periods of rest or low-intensity exercise and can induce similar or greater performance improvements compared to traditional endurance training. In skeletal muscle, this can be explained by signalling through PGC-1? and mitochondrial biogenesis. We recently found that, in recreationally trained volunteers, a single HIIT session (6 x 30 s all-out cycling) induced fragmentation of the sarcoplasmic reticulum Ca2+ release channel (RyR1, ryanodine receptor type 1). We then hypothesized that leak through fragmented RyR1 may trigger mitochondrial biogenesis.
To test this hypothesis, we planned to investigate the different RyR1 changes and mitochondrial function in a C2C12 myotubes submitted to a HIIT-mimicking electrical stimulation or treated with caffeine (the common used activator of RyR1); combined to mouse single muscle fibres, mouse isolated muscles, mice or humans engaging in HIIT to clarify whether HIIT-induced RyR1 modifications and increase intracellular [Ca2+] are linked to mitochondrial biogenesis. Our preliminary data indicated that HIIT-mimicking electrical stimulation of C2C12 myotubes induces RyR1 phosphorylation and PGC-1? increase at protein level. Moreover, myotubes stimulation with caffeine induces intracellular Ca2+ increase and transcription of PGC-1?, suggesting that Ca2+ release through RyR1 is involved in mitochondrial biogenesis. To further address the issue of mitochondrial biogenesis, the lab of Professor Garcia-Roves (who agreed to welcome me) constitutes an excellent opportunity for us to improve our knowledge.
I plan to spend 3 weeks early 2017 in Prof Garcia-Roves lab in Barcelona to:
- learn from the respirometry measurements developed by the group of Professor Garcia-Roves to assess direct mitochondrial functions in our models
- test the effective mitochondrial function increase in our HIIT or HIIT-mimicking exercise conditions on muscle myotubes and single muscle fibres
- establish a collaboration between the lab of Prof. Garcia-Roves and ours to expand our investigative methods towards the most relevant and reliable approaches.
- measure markers of mitochondrial biogenesis at mRNA and protein levels in response to HIIT and to specifically distinguish those related to RyR1 changes.

I request the approval of a COST Short Term Scientific Mission as described above

Applicant:
Dr Nadège Zanou 01 Nov 2016

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