**Postdoctoral Position, University Jean Monnet, Saint-Etienne, France**

A 2-year fully funded Postdoctoral position is available at the University Jean Monnet in Saint-Etienne (France) under the supervision of Pr Guillaume MILLET and Dr Laurent GERGELÉ.

Applicants should have (or anticipate having) a Ph.D. and strong research background in exercise physiology. Knowledge in electrical stimulation and clinical experience will be valued.

Applicants should also possess strong interpersonal skills and be able to work independently with minimal supervision. The postdoctoral fellow will be responsible for (i) testing patients in the laboratory and (ii) planning and conducting exercise training interventions. Duties will also include manuscript preparation. The successful applicant will become part of a unique training and research environment, the ActiFS group within the multidisciplinary Inter-university Laboratory of Human Movement (LIBM).

Only NON-French citizen can apply. However, the candidate must (at least rudimentary) speak French or be willing to learn. French citizens can apply only if they have done (part of) their PhD in a foreign country.

Applications should include a cover letter discussing your interest in the position and stating the date when you expect to be available, CV, and the names and contact information of two academic references.

Application deadline: will remain open until filled.

Tentative start date: January 1st, 2019.

**PROJECT SUMMARY**

This Postdoctoral position is part of a larger project (ActiFS) that will examine the ability of objective measures of fatigue resistance due to exercise to explain subjective chronic fatigue, the most debilitating still untreated symptom reported by patients. The ActiFS project will also enable the effects of innovative and/or tailored exercise interventions on fatigue to be better understood. This research will ultimately be translated to rehabilitation programs to minimize fatigue in clinical populations, thus enhancing patients' quality of life. ActiFS also aims to reduce the large societal financial costs due to fatigue as, among others, it often delays return to work and reduces productivity.

**Rationale**. Colorectal cancer patients have a significant risk of muscle mass loss, mainly due to cachexia and reinforced by sedentary lifestyles. This loss of muscle mass results in maximal strength loss and deterioration in exercise fatigue resistance, which may partly explain the chronic subjective fatigue associated with cancer. Muscular atrophy begins very rapidly, can reach up to 10% in the week following surgery and is increased by chemotherapy. It is associated with longer hospital stays and higher healthcare costs. In this project, we wish to address this problem through an approach combining an innovative training program (electromyostimulation and light eccentric resistance training) and nutritional monitoring. Indeed, in addition to muscle strengthening, nutritional monitoring is a key element of muscle mass development. For example, a preoperative exercise and nutritional support program has been shown to have the potential to reduce sarcopenia and improve postoperative outcomes in elderly sarcopenic patients. In the Intervention group, nutrition will be adapted to the needs generated by physical training. In addition, as current data on the impact of physical activity programs on long-term clinical outcomes are limited, we also propose to monitor the effects of the training program 6-month after the **intervention**. Objectives. The main objective of this study is to study the effects of an innovative 12-week intervention on muscle mass and maximum knee extensor strength. Secondary objectives are to study the effects of this training program on (i) fatigue resistance of this muscle group during pedaling exercise, (ii) cancer fatigue (i.e. perceived fatigue) and (iii) patient quality of life. This project will also assess the impact of chemotherapy on perceived fatigue and resistance to muscle fatigue during exercise. **Methods.** For this pilot study, which will also determine the number of patients to be enrolled in a future randomized controlled trial, 100 patients will be initially tested. Among them, 30 patients undergoing chemotherapy will be

randomized in the experimental group, another 30 patients matched by age, sex and tumour severity but not subject to chemotherapy (surgery only) will be placed in the control group. Before the surgery, after the chemotherapy, after the 12 weeks of intervention as well as 6 months post-intervention, the subjects will go to the Regional Institute of Sports Medicine to carry out an evaluation of (i) voluntary maximum contraction of the knee extensor muscles (ii) maximal voluntary activation level and muscular contractility by magnetic stimulation of the femoral nerve, (iii) resistance to fatigue on a custom-made ergocycle. Measurements of vastus lateralis muscle mass by ultrasonography as well as fatigue and quality of life questionnaires will also be carried out. Training (Intervention Group) will consist of an innovative 12-week progressive resistance training program. The sessions will be organized 3 times a week for approximately 60 minutes, one session taking place at the Hôpital Privé de la Loire and two sessions at home. Thirty-six training sessions in total are planned and the adherence rate will be noted. At the Hôpital Privé de la Loire, individualized and/or small groups sessions will be conducted. If patients are too weak for eccentric contractions or related exercises but are able to tolerate electromyostimulation, the latter method will be used alone until the patient can resume voluntary contraction reinforcement. **Expected benefits.** The purpose of this pilot study is to determine whether a future randomized controlled clinical trial should be implemented. If the results are positive, it has the potential to change clinical practice by implementing this innovative exercise program, which can be done independently and at home in cancer patients with the highest risk of cachexia (digestive, head and neck, colorectal).

**CONTACT:**

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