

Job Title	Marie Curie postdoctoral Fellowship : Prevention of Metabolic Syndrome by several modalities of physical activity: an integrative study at physiologic, mitochondrial and molecular levels
Main Research Field	<ul style="list-style-type: none"> • Life Sciences (LIF)
Sub Research Field	Medicine Health
Key words	Metabolic syndrome (MetS), physical activity, training, cardiometabolic diseases.
Job Description	<p>Our integrative approach will assess physiological, mitochondrial and molecular events responsible for beneficial effects of training on metabolic pathology. Our group is focusing on MetS. It is a cardiovascular disease risk factor which increases morbidity, mortality and induces metabolic disorders as insulin resistance (IR), endothelial dysfunction associated with an increased oxydative stress which modifies bioavailability of NO and promotes vasoconstrictors action. A chronic hypertension progressively sets up in patients.</p> <p>Our group has validated a murine model of Metabolic Syndroms without obesity which is close to what happen in human in (MetS) term of risk, of pathology development or of prevention by an appropriate exercise training. Its originality consists in the development of cardiovascular risk factors at early age after consumption of a real-like fructose enriched diet at similar levels to those children could be exposed.</p> <p>The prevention of metabolic dysfunctions by different training modalities (continuous or intermittent) is a very current topic, but the underlying mechanisms are only partially understood.</p> <p>Exercise training is known to stimulate mitochondrial biogenesis, to improve energetic efficiency and to induce free radicals production that must be also tightly regulated to avoid oxidative stress. The mechanisms underlying these metabolic responses and their kinetics of implementation are not yet elucidated in the MetS cases. Recent advances in the field of Next Generation Sequencing (NGS), whole genome analysis and epigenetic revealed a complex network of interactions between DNA methylation, miR production and differential expression of genes related to exercise training in patients. Thus, many genes whose expression varies in skeletal muscle according to exercise intensity, training modes and recovery time, are involved in muscular plasticity, energetic metabolism, mitochondrial biogenesis, oxidant stress response and angiogenesis. For these reasons, a characterization of molecular changes and the investigation of the mechanisms involved in the regulation of mitochondrial function during chronical training would be very interesting regarding MetS.</p> <p>For this project, we expected from the fellow to investigate the impact of different training modalities (continuous and/or intermittent) on our</p>

	<p>MetS model of rat to assess cellular, metabolic, functional and transcriptomic events. He will work in a highly and matured physiological laboratory environment. He will also receive a real expertise in experimental animal research especially on rat and all ethics surrounded. Several collaboration with national and international teams are set up and we expected from the fellow to reinforce them.</p> <p><i>References</i> Batacan, R.B., Duncan, M.J., Dalbo, V.J., Buitrago, G.L., and Fenning, A.S. (2016). Effect of different intensities of physical activity on cardiometabolic markers and vascular and cardiac function in adult rats fed with a high-fat high-carbohydrate diet. <i>J. Sport Health Sci.</i></p> <p>Botezelli, J.D., Mora, R.F., Dalia, R.A., Moura, L.P., Cambri, L.T., Ghezzi, A.C., Voltarelli, F.A., and Mello, M.A. (2010). Exercise counteracts fatty liver disease in rats fed on fructose-rich diet. <i>Lipids Health Dis.</i> 9, 116.</p>
Supervisor(s)	<p>Christelle Goanvec is a senior researcher at UBO where she is leading the experimental research group in ORPHY laboratory (Optimisation des Régulations Physiologiques), which is composed of 34 persons (engineer, technicians, PhD, postdoc etc...) . She is an expert in Animal ethics and experimentations. She spend the last 4 years in developping a MetS model of rats without obesity to adapt to several physical activity protocol. Christelle Goanvec has already supervised 6 up-graduated students (Master degree and PhDs). She is implicated in several research projects dealing with different protein misfolding disorders.</p> <p>She is involved in several research project such as "Contrat PRIR APAS 212 A / VALORIAL » with industrial collaboration (UMR SENAH (INRA Agrocampus Rennes), EA3879 ORPHY (U. de Brest), Sociétés TRIBALLAT et ARMOR-PROTEINES).</p> <p>She is specialised on endothelium dysfunction in cardiometabolic disease and works in close relationship with CHRU Brest that follows strong connection with clinical research.</p> <p><i>Most significant publications/productions</i> Dupas, J., Goanvec, C., Feray, A., Guernec, A., Alain, C., Guerrero, F., and Mansourati, J. (2016). Progressive Induction of Type 2 Diabetes: Effects of a Reality-Like Fructose Enriched Diet in Young Wistar Rats. <i>PLoS ONE</i> 11, e0146821.</p> <p>Dupas, J., Feray, A., Goanvec, C., Guernec, A., Samson, N., Bougaran, P., Guerrero, F., and Mansourati, J. (2017). Metabolic Syndrome and Hypertension Resulting from Fructose Enriched Diet in Wistar Rats. <i>Bio Med International</i> Volume 2017, Article ID 2494067, 10 pages, https://doi.org/10.1155/2017/2494067</p> <p>Farhat, F., Dupas, J., Amérand, A., Goanvec, C., Feray, A., Simon, B., Guegueniat, N., and Moisan, C. (2015). Effect of exercise training on oxidative stress and mitochondrial function in rat heart and gastrocnemius muscle. <i>Redox Rep. Commun. Free Radic. Res.</i> 20, 60–68.</p> <p>http://www.physiology-orphy.fr/index.php?vrs=research_laboratory_orphy</p>

<p>Department/Research</p>	<p>ORPHY (EA4324) is a research unit in animal and human physiology. Located on two sites (UFR Sciences and Medicine), ORPHY is part of the Institute of health-agro-material (IBSAM) of the Université de Bretagne Occidentale (UBO, Brest, France). UBO is a comprehensive university based in Brittany (France). It offers degree programs in the fields of science, humanities, technology, medicine and law and health is one of its area of excellence. ORPHY studies cardiovascular and muscular adaptations, from cell to human in physiological and pathophysiological conditions. Clinical and fundamental approaches are used through in vivo and in vitro methodologies adapted to Health questions in strong links with the University Hospital of Brest., one of the major research hospital in the west of France. Our group is studying physical activity and nutrition beneficial effects at vascular, myocardial and muscular levels with several murine endothelial dysfunction models.</p> <p>ORPHY is involved in several national and international project such as :</p> <ul style="list-style-type: none"> - The European project ITN project PHYPODE - Projet HEMOXYCHOC - MODATHEX-inter UBO - DACMES-inter SFR Scinbios
<p>Suggestion for interdisciplinary / intersectoral secondments</p>	<p>We have collaboration with University of the West of Scotland on human physical activity.</p>
<p>Skills Requirements :</p>	<p>Required Languages : English Others Languages : French as possible</p> <p>Publications:</p> <ul style="list-style-type: none"> - At least 2 publications which at least one in first author for a PhD - 2 papers during PhD and since PhD, 1 paper/year as 1st author as well as papers in each lab frequented - Participation to international conference and initiate collaboration with international lab. <p>Technical Skills :</p> <p>Need experimentation skills on animals especially in rats. The fellow must have knowledge in molecular biology and biochemistry and would be a specialist in training program in physical activity.</p>