**University of Leicester**

**Future 50 PhD Scholarship**

|  |  |
| --- | --- |
| **Project Reference** | CVS Watson |

|  |  |
| --- | --- |
| **First Supervisor** | Dr Emma Watson |
| **School/Department** | Cardiovascular Sciences |
| **Email**  | Emma.watson@leicester.ac.uk  | **Telephone Ext** | 252 5033 |

|  |  |
| --- | --- |
| **Second Supervisor** | Prof James Burton |
| **School/Department** | CVS |
| **Email**  | Jb343@leicester.ac.uk | **Telephone Ext** | 252 3061 |

|  |  |
| --- | --- |
| **Additional Supervisor** |  |

**Section 2 – *Project Information***

|  |  |
| --- | --- |
| **Project Title** | The efficacy of neuromuscular stimulation to be used as a treatment for sarcopenia in patients on maintenance haemodialysis |
| **Project Highlights:** | 1. | Translational research, understand mechanisms to develop a therapy for a hard to reach group of patients |
| 2. | Working within the new developing centre for sarcopenia and muscle health |
| 3. | Project has the potential to have direct patient benefit |
| **Project Summary**  |
| **Research question:** Does neuromuscular electrical stimulation (NMES) result in an increase in muscle mass in patients on maintenance haemodialysis?**Background:** Chronic Kidney Disease (CKD) affects one in eight people worldwide, with no cure. When kidney function falls to the point it can no longer sustain life, patients require kidney replacement therapy, i.e. haemodialysis. Whist lifesaving, haemodialysis has a dramatic effect upon patient’s quality of life, both physically and psychologically. Functional status can fall by up to 61% in the first three months after starting dialysis, and by as much as 87% after one year. Muscle wasting is highly prevalent and a key component in this functional decline. Importantly, skeletal muscle is highly adaptive and easily remodelled through interventions such as exercise, thus muscle loss observed in these patients is likely to be reversible or preventable making it an attractive target for therapy. Whilst exercise is proven to be effective, not all patients can, or want to exercise and therefore an alternative strategy to deliver the same benefits is required. Research has shown that NMES is capable of improving physical function in haemodialysis patients and appears to be an alternative to exercise. However, its ability to improve muscle mass, and therefore act as treatment for sarcopenia is unknown.In this project the student will determine the efficacy of 8-weeks of NMES to increase skeletal muscle mass in haemodialysis patients. This will be supplemented with a mechanistic sub-study in which the student will investigate the molecular effect of NMES within skeletal muscle.**Aims:** To determine the effect of NMES on muscle mass at the whole body (MRI) and molecular level (skeletal muscle biopsies)**Clinical Objectives:** 1. Determine the effect of 8-weeks of NMES on quadriceps volume by MRI compared to usual care.
2. Determine the effect of 8-weeks of NMES on physical function and quality of life compared to usual care

**Mechanistic Objectives:**1. Characterise the effect of NMES upon fibre size
2. Characterise the metabolic response to NMES

This project will sit within the developing centre for sarcopenia and muscle research.  |