University Alliance
Doctoral Training Alliance

DTA3/COFUND Programme Research Project Proforma

Page 1 – General Information

Partner University	Coventry University
Faculty/School/Department/Research Centres	Faculty of Health and Life Sciences/Research Centre for Sport, Exercise and Life Sciences
First supervisor Please provide name and weblink	Dr Neil Clarke https://pureportal.coventry.ac.uk/en/persons/neil-clarke/activities/
Second supervisor Please provide name and weblink	Dr Peter Mundy https://pureportal.coventry.ac.uk/en/persons/peter-mundy
Third supervisor Please provide name and weblink	Dr Irmgard Haussmann https://pureportal.coventry.ac.uk/en/persons/irmgard-haussmann
Fourth (external) supervisor	
External/industrial supervisor	Professor Philip McTernan, NTU
Which of the supervisors listed above is an early-career-researcher	Dr Peter Mundy
Contact details for project for informal applicant queries Email address	h.maddock@coventry.ac.uk ab1633@coventry.ac.uk
DTA Programme: Please delete as necessary which DTA programme this project relates to:	DTA Applied Biosciences for Health
Project title	A comparison of transcriptome signature of resistance exercise adaptations in young, older adults and athlete

Co-funded by the Horizon 2020 programme of the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 801604.

Page 2 – Project Description

Scientific Excellence (500 words)	Drs Mundy and Clarke have a proven track record of sport science and physical activity research and already have a proven track record of working with athletes. Dr Neil Clarke provides in depth expertise in Physical Activity. Dr Haussman has a proven track record in molecular biology and experience in producing high impact outputs – they are both separate authors on Nature papers (IF: 41.6). This interdisciplinary approach capitalises on the teams experience and applies it directly to the area of "Healthy Ageing" and will provide innovate research outputs and strengthen alliance training opportunities between institutes.
Aim (400 words)	Greater muscular strength is strongly associated with improved physical performance in athletes. A recent investigation identified 16 loci associated with handgrip strength; however, handgrip strength is a poor indicator of athletic performance. Therefore, investigation into more ecologically valid strength measures is warranted. Furthermore, there is a large variability in both muscle size and strength gains in response to resistance training. It has been suggested that an up-regulation of myonuclear transcriptional activity during the early stages of myofiber hypertrophy leads to altered expression of genes known to modulate myofiber size. In addition, follow-up functional annotation revealed networks favouring growth, ribosomal activity, and stem cell activity in extreme 'responders' versus pro-inflammatory processes in 'non-responders', which suggests that the pre-training muscle transcriptome profile is highly influential in the resistance training myofiber hypertrophy adaptation. Therefore, the overall aim of this investigation is to establish the genetic basis and molecular regulation for measures of strength associated with athletic performance in comparison to older adult performance, and the responses to resistance training in trained individuals. Methodology and innovations Study 1: Relationship between polymorphic variants, ecologically valid strength measures and performance in university athletes (with comparison across ethnicity, sex, etc., as well as vs. control) versus control and elderly populations.

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	Study 2: Genotypes associated with changes in ecologically valid strength measures and athletic performance in response to normal university training in university athletes versus control and elderly populations. **Study 3:** Genotypes associated with changes in ecologically valid strength measures and athletic performance in response to resistance training in university athletes versus control and elderly populations.
Strategic Relevance (300 words)	Study of the inter-relationships between sarcopenia across the life course will enable causal associations to be identified and inform the timing of interventions to maximise capability and wellbeing in later life. The findings could provide evidence for the development of clinical interventions to reduce sarcopenia and improve the health and quality of life of older people. The project will involve subsequent activity as a pathway to impact. During the project we will apply for funding from the MRC to expand this research further. Furthermore, if planned strategically, we would use this project as a springboard to move towards an Impact Case Study for REF. We would use the results of the whole project to promote take up and use of the cut-points with other groups, particularly the Loughborough-Leicester NIHR Biomedical Research Unit. This unit is important as this particular unit directs PA assessment practice for the whole of the NIHR. Should we be able to push our cut-points into practice here they will be taken up nationally and further afield. We could then base an impact case study around the reach and significance of this work in modifying how accelerometer based PA is quantified. This is ambitious however and may take longer than 12 months to realise as it relies on traction via citations and use of the cut-points developed in other contexts.

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Interdisciplinarity and fit with DTA3	The researchers have a proven track record of sport science and physical activity research along with established experience of working with a range of athletes. In addition, Dr Haussman has a proven track record in molecular biology and experience in producing high impact outputs. This interdisciplinary approach capitalises on the teams experience and applies it directly to the area of "Healthy Ageing" and will provide innovate research outputs and strengthen alliance training opportunities between institutes. Furthermore, completing the series of proposed studies aims to produce independent, highly-employable researchers with knowledge, expertise and skills in a strategically-important research area.
Industrial Relevance (300 words) Detail external placement opportunities or collaborations available as part of the project	Older age is known to be accompanied with a loss of skeletal muscle mass, strength and function which is known clinically as sarcopenia. Differences in gene expression between young and older men have been reported in a basal state, however insight has not been provided into the transcriptome profile between young athletes and older adults (both sedentary or athletes) in relation to exercise and resistance exercise training in order to understand age-related pre and post-training muscle transcriptome in relation to myofibre hypertrophy adaptation. This project aligns with the DTA Healthy Ageing programme. This study could provide a novel insight into human muscle adaptations to diverse exercise modes by investigating the transcriptome to provide further insight into the molecular basis of sarcopenia and the impact of resistance exercise. Findings from this study could provide evidence for the development of clinical interventions to reduce sarcopenia and improve the health and quality of life of older people. The project will be conducted by and at UHCW (University Hospitals Coventry and Warwickshire) NHS Trust, main study - at Coventry University and in collaboration with Professor Philip McTernan (Nottingham Trent University).

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Economic and Societal Impact (300 words)	This proposal is also seeking to bring together members of the Sport and Human Performance and Genomics theme within SELS in a strategic manner. It will comprise multiple members of FRC/School recognising that, at present, the theme comprises disparate research areas which are not particularly cohesive. Positioning the proposal will result in 3*/4* papers that link theme staff together and hopefully will act as a focus to initiate closer internal collaboration. Without such a venture it is unlikely the potential of the theme and then FRC will be realised. We acknowledge however that not all applicants will go on all the papers arising from the project. The project aligns to Coventry University's and Centre for Sport, Exercise and Life Sciences Health and Well-being strategic theme. This project aligns with the DTA Healthy Ageing programme.

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Page 3 – Admission Requirements

Specific Admission Requirements Detail any subject specific degree qualifications or disciplines, relevant skills, experience	All applicants for the post(s) on offer must ensure that they are eligible for the integral doctoral study element of these opportunities, applicants who do not meet the entry requirements in full will not be considered entry criteria for applicants to PhD • A minimum of a 2:1 first degree in a relevant discipline/subject area with a minimum 60% mark in the project element or equivalent with a minimum 60% overall module average. • Plus the potential to engage in innovative research and to complete the PhD within a 3.5 years • A minimum of English language proficiency (IELTS overall minimum score of 7.0 with a minimum of 6.5 in each component) For further details see: https://www.coventry.ac.uk/research/research-students/makingan-application/ The successful candidate for this opportunity will also need to apply to study with us. The application for study will be made via our on line application system PGR+ available at http://pgrplus.coventry.ac.uk
Minimum IELTS score	Overall 7 with a minimum of 6.5 in each component

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