This project is co-funded by three members of the Duchenne Forum - Muscular Dystrophy UK, Duchenne Children's Trust and The Duchenne Research Fund. The Duchenne Forum is a group of charities working together to accelerate progress in the search for treatments and eventually cures for Duchenne muscular dystrophy.

Developing a cell- and gene-based therapy for Duchenne muscular dystrophy

Dr Tedesco and his PhD student will use a mouse model to test the feasibility of a novel therapeutic approach for Duchenne muscular dystrophy. The project aims to combine cutting edge cell- and gene-therapies and develop methods that could be used by clinicians to repair a patient’s own stem cells before using them to repair and replace damaged muscle in individuals with the condition. This research is also relevant for Becker muscular dystrophy.

What are the researchers aiming to do?

The aim of this PhD studentship is to test the feasibility of a novel cell therapy that could be used to restore dystrophin production in boys with Duchenne muscular dystrophy. The researchers will take skin cells from boys with Duchenne muscular dystrophy and genetically re-programme them to become a type of stem cell called induced pluripotent stem (iPS) cells, which can develop into any cell or tissue type, including muscle.

The mutated dystrophin gene in the iPS cells will be repaired by inserting a human artificial chromosome (HAC) containing a functional copy of the dystrophin gene and the cells will be grown in the laboratory and developed into a type of cell known to develop into muscle cells. These cells will be injected into mdx mice - an animal model of Duchenne muscular dystrophy – where researchers believe they will develop into healthy human muscle cells that will repair the muscle damage in the mouse model.

These tests will allow researchers to investigate the potential effectiveness and safety of this therapeutic approach. The development of the stem cells must be carefully controlled to stop cells developing into the wrong type of cell or growing...
uncontrollably and the researchers will use the mouse model to better understand these challenges.

**How will the outcomes of the research benefit patients?**

This project will be an important step in the development of a potential approach using combined cell and gene therapy for boys with Duchenne muscular dystrophy. If this therapeutic approach was successful it could address one of the key challenges of stem cell biology: If a patient could one day be treated using their own, repaired, stem cells then the risk of the stem cells being killed by the immune system (as would happen to donor stem cells) would be much reduced.

However, this work is at an early stage – performing initial studies of effectiveness and safety in a mouse model – so it would be some time before it could be tested in clinical trials.

**Grant information**

Project leader: Dr Saverio Tedesco  
Location: University College, London  
Conditions: Duchenne muscular dystrophy, Becker muscular dystrophy  
Duration: four years, starting 2014  
Total project cost: £114,326  
Official title: Towards a genomic integration-free, iPS cell- and human artificial chromosome based therapy for Duchenne muscular dystrophy

**For further information**

If you would like further details about this research project, please contact:

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