NIHR GOSH BRC Vacation Studentship

PROGRESS FORM – VACATION STUDENTS 2017

Student's name:	**Rebecca Locke**
Primary supervisor:	**Dr Anastasia Petrova**
Subsidiary supervisor (where applicable):	**Professor Waseem Qasim**
Project title(s):	**Gene editing for epidermolysis bullosa**

Summary

What are you trying to do in this studentship?

Epidermolysis bullosa (EB) constitutes a group of rare genetic skin blistering diseases with no current cure. Dominant dystrophic EB (DDEB) is caused by dominant negative mutations in the gene *COL7A1* coding for collagen VII, secreted by fibroblasts and keratinocytes. Collagen VII is a component of anchoring fibrils that adhere the top layer of the skin (epidermis) to the underlying layer (dermis); if missing or abnormal, the two layers separate, causing blisters. If patients have one dominant mutated allele of *COL7A1* and one wild-type (normal) then knocking out the dominant allows expression of the wild-type. By injecting gene-edited cells back into the patient this would restore function and, therefore, ameliorate disease symptoms.

We aimed to use the gene editing tool CRISPR/Cas9 to target a mutation within *COL7A1* in patient fibroblasts to knockout the mutant allele and reprogram patient-derived fibroblasts into induced pluripotent stem cells (iPSCs).

Why is this research important?

The current lack of treatment for EB exhibits a need to develop and optimise gene therapy strategies, while reprogramming DDEB patient fibroblasts into iPSCs provides an unlimited source of cell transplantation material unlike the limited lifespan of primary cells. In the future, combining iPSC and CRISPR/Cas9 technology offers new approaches for DDEB as stem cells represent longer-term therapeutic benefit.

Value of Your Experience

From previously basic laboratory experience, I now know how to culture a variety of cell types such as 293Ts, fibroblasts and iPSCs while working in a hood under aseptic conditions and have learned and utilised a variety of new techniques. Outside of my project, I had the opportunity to shadow my supervisor during quiet periods which allowed me to gain useful and interesting extra skills surrounding immunostaining, cryosectioning, fluorescence-activated cell sorting (FACS), SDS-PAGE and Western blotting. This experience will be beneficial both in my third year of university and in the future, while the chance to work alongside scientists to see how scientific research translates into medical breakthroughs have made this studentship especially valuable.

Special thanks to my supervisor Dr Anastasia Petrova for her time, patience and for being so helpful and to everyone at MCI for making me feel welcome.