

The healing power of hair

Stem cells from human hair follicles are being used to develop a revolutionary new treatment to heal chronic wounds which could be used to treat patients on the NHS.

The need

Chronic wounds caused by leg ulcers, burns or old injuries are notoriously difficult to treat. The healing process is slow and painful and scarring is common.

Treatment usually involves a long and protracted process of cleaning and dressing wounds, extended stays in hospital as well as regular visits from health professionals to prevent infection. Very often the wound never heals.

Cell-based therapies which have proven more effective have, up to now, been very expensive and used primarily in cosmetic surgery, but research by UK scientists could lead to a treatment that is not only better than ones currently available but also more affordable.

The results

Research led by Avecia Biologics and part-funded by the Technology Strategy Board could lead to a new cell-based treatment for healing chronic wounds which could bring life-changing benefits for thousands of patients across the UK.

As the master cells of the body, stem cells can be manipulated and turned into other types such as nerve, bone or cardiovascular cells. Though still an emerging technology, there is hope that they could lead to unique therapies targeted at individual diseases. Using stem cells from adult hair follicles, researchers at Avecia and the universities of Durham and Brighton have taken a step closer to that aim, by developing new cells from them with specific wound healing properties.

The three-year project has resulted in a therapy and manufacturing route where cells are able to trigger the healing process when attached to an affected wound. Once applied to the skin, the cells start to 'remodel' the area, resulting in less scarring and better regeneration of the skin. The research is ready to progress to pre-clinical studies and ultimately clinical trial.

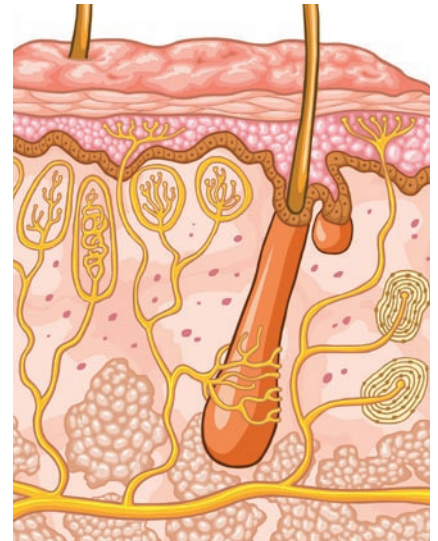
Those involved believe they have found a treatment which is not only more effective than current cell-based treatments but also one that can be manufactured more cheaply. The cost benefits could make it a real treatment option for NHS patients in the future but also one that could save the service money in the long term by reducing hospital stays, and improving outcomes.



Making it happen

A highly interactive project team was assembled with scientists at Avecia Biologics to look at bio-processing aspects of the therapy and how to develop a robust, economic manufacturing process for the stem cells. World-renowned researchers from the Centre for Stem Cell Biology and Regenerative Medicine at Durham University examined stem cell biology, characterisation and *in-vivo* proof of

concept wound healing studies, while researchers at the University of Brighton focused on biomaterial development for tissue engineered products. In addition, the Centre of Excellence Life Sciences, Newcastle, provided valuable project coordination support. Smith and Nephew, a leading medical devices company, provided important cell therapy market related consultancy.



The market

The main benefit of this treatment is reduced cost. Typical treatment costs for chronic wounds range from around £2,000 for venous leg ulcers through to more than £10,000 for more serious pressure ulcers. The NHS spends more than £300m per year treating leg ulcers in the elderly, which affect 2% of those aged over 80. The demand for chronic wound treatment looks set to increase as the UK's ageing population continues to grow. The number of people aged 85 and over is expected to double

by 2033 to reach 3.2 million or 5% of the total population (ONS, Mid-Year Population Estimates, September 2009). Stem cells produced via the bioprocessing route could increase the speed of healing and provide a lower cost-base product. The selling prices of current tissue engineered products for wound healing applications are strongly linked to the costs of manufacture. The manufacturing route developed will reduce the cost of cell production.

'Investment from the Technology Strategy Board has helped us develop a potentially cutting edge treatment in what is still an emerging area of research.'

BO KARA, DIRECTOR OF SCIENCE AND TECHNOLOGY, AVECIA BIOLOGICS LTD.



Technology Strategy Board Driving Innovation

Collaborative research and development projects are one of the tools that the Technology Strategy Board uses to drive innovation in the UK. The Technology Strategy Board is a business-led executive non-departmental public

body, established by the Government. Its role is to promote and support research into, and development and exploitation of, technology and innovation for the benefit of UK business, in order to increase economic growth and improve the quality of life. It is sponsored by the Department for Business, Innovation and Skills (BIS).

Tel: 01793 442700 www.innovateuk.org

Project no. CRD2235

Project partners

Avecia Biologics Ltd
University of Durham
Centre for Stem Cell Biology and Regenerative Medicine
University of Brighton
Centre of Excellence Life Sciences, Newcastle
Smith and Nephew PLC

Technology Strategy Board
investment £500,000

Total project investment £1m

Project contact details

Bridget Hall
Communications Manager
Avecia Biologics

biotech@avecia.com

www.avecia.com/biotechbiologics