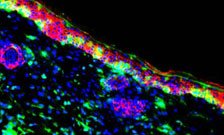
**Scientists make skin repair discovery**

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Researchers at King’s College London and Osaka University in Japan have identified specific bone marrow cells that can transform into skin cells to repair damaged skin tissue, according to a study published today in the journal, *Proceedings of the National Academy of Sciences (PNAS)*.

The team has uncovered how this process works, providing new insights into the mechanisms behind skin repair.

This significant advance has the potential to revolutionise approaches to wound treatment in the future, which could benefit people with chronic wounds such as leg ulcers, pressure sores and burns, as well as genetic skin diseases such as epidermolysis bullosa, which causes painful blisters on the skin.

The current management of chronic wounds in UK patients costs more than a billion pounds every year so this new scientific discovery could lead to significant future cost savings for the NHS.

It was already known that bone marrow may play a role in skin wound healing, but until now it was not known which specific bone marrow cells this involves, how the process is triggered, and how the key cells are recruited to the affected skin area.

The team of researchers carried out experiments in mice, specifically looking at the mechanisms involved when skin grafts are used, compared with non-grafted wound healing.

The findings showed that in mice with non-grafted wound healing, very few bone marrow cells travelled to the wound to repair it and they did not make a major contribution to epidermal repair.

But in mice where a skin graft was used, a significantly higher number of specific bone marrow-derived cells travelled to the skin graft to heal the area more quickly and build new skin directly from the bone marrow cells.

The research showed that around one in every 450 bone marrow cells has the capacity to transform into skin cells and regenerate the skin.

The team also identified the signal that triggers recruitment of the bone marrow cells to repair skin.

Damaged skin can release a distress protein called HMGB1 that can mobilise the cells from bone marrow and direct them to where they are needed.

Mice with skin grafts express high levels of HMGB1 in their blood that can drive the bone marrow repair process.

The findings provide new insight into how skin grafts work in medicine – they do not simply cover wounds, but act as bioreactors that can kick-start regenerative skin repair.

The research also showed that patients with epidermolysis bullosa have high levels of HMGB1 in their blood and that the source here is the roofs of the blisters in their skin.

This finding demonstrates that HMGB1 is also important in human skin damage and wound healing responses.

Professor John McGrath, Head of the Genetic Skin Disease Group at King’s, recently spent several months working on the project in Osaka.

He said: 'This work is tremendously exciting for the field of regenerative medicine.

The key achievement has been to find out which bone marrow cells can transform into skin cells and repair and maintain the skin as healthy tissue, and to learn how this process happens.

'Understanding how the protein HMGB1 works as a distress signal to summon these particular bone marrow cells is expected to have significant implications for clinical medicine, and could potentially revolutionise the management of wound healing.

'Chronic wounds and tissue injury represent a significant cost to the NHS, not to mention the debilitating effects on peoples’ quality of life.

Our plan is to see if we can now use this scientific advance to develop more effective treatments to improve tissue repair in skin and perhaps other organs.'

Professor McGrath is working together with colleagues at Osaka University to harness the key parts of the HMGB1 protein to create a drug treatment that can augment tissue repair.

It is expected that the developed treatment will be tested in animal models in about a year and enter clinical trials shortly afterwards.

**Notes to editors**

**\*Image courtesy of K. Tamai, Osaka University.**

**King's College London**

King's College London is one of the top 25 universities in the world (2010 QS international world rankings), *The Sunday Times* 'University of the Year 2010/11' and the fourth oldest in England. A research-led university based in the heart of London, King's has nearly 23,500 students (of whom more than 9,000 are graduate students) from nearly 140 countries, and some 6,000 employees. King's is in the second phase of a £1 billion redevelopment programme which is transforming its estate.

King's has an outstanding reputation for providing world-class teaching and cutting-edge research. In the 2008 Research Assessment Exercise for British universities, 23 departments were ranked in the top quartile of British universities; over half of our academic staff work in departments that are in the top 10 per cent in the UK in their field and can thus be classed as world leading. The College is in the top seven UK universities for research earnings and has an overall annual income of nearly £450 million.

King's has a particularly distinguished reputation in the humanities, law, the sciences (including a wide range of health areas such as psychiatry, medicine, nursing and dentistry) and social sciences including international affairs. It has played a major role in many of the advances that have shaped modern life, such as the discovery of the structure of DNA and research that led to the development of radio, television, mobile phones and radar. It is the largest centre for the education of healthcare professionals in Europe; no university has more Medical Research Council Centres.

King's College London and Guy's and St Thomas', King's College Hospital and South London and Maudsley NHS Foundation Trusts are part of King's Health Partners. King's Health Partners Academic Health Sciences Centre (AHSC) is a pioneering global collaboration between one of the world's leading research-led universities and three of London's most successful NHS Foundation Trusts, including leading teaching hospitals and comprehensive mental health services. For more information, visit:

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