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Researchers generate artificial skin

Scientists in Spain have generated artificial human skin via tissue engineering based on agarose-fibrin biomaterial – a move which may allow the clinical use of human skin in laboratories to replace testing on laboratory animals.



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José María Jiménez Rodríguez from the Tissular Engineering Research Group at the University of Granada used skin from small biopsies of patients who had undergone surgery to create an artificial human skin, which was then grafted on the back of nude mice to observe how it developed in vivo.

"We have created a more stable skin with similar functionality to normal

human skin," said Jiménez Rodríguez.

Researchers first selected the cells that would be used for tissue generation – human fibrin from the plasma of healthy donors and added tranexamic acid to prevent fibrolysis and calcium chloride to precipitate fibrin coagulation.

The substitute skin was then grafted on to nude mice and analysed by transmission and scanning light and electron microscopy. Several immunofluorescence microscopy techniques had to be developed in order for the researchers to evaluate factors such as cell proliferation, the presence of differentiating morphological markers, the expression of cytokeratin, involucrine and filaggrin, angiogenesis and artificial skin development into the recipient organism.

The artificial skin showed adequate biocompatibility rates with the recipient and no rejection, dehiscence – reopening of a previously closed wound – or infection was recorded. Skin started to show granulation or healing six days after implantation, and after 20 days cicatrisation was complete.

The experiment - the first to create artificial skin with a dermis of fibrinagarose biomaterials - "added resistance, firmness and elasticity to the skin" according to Jiménez Rodríguez. Printer Friendly version

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