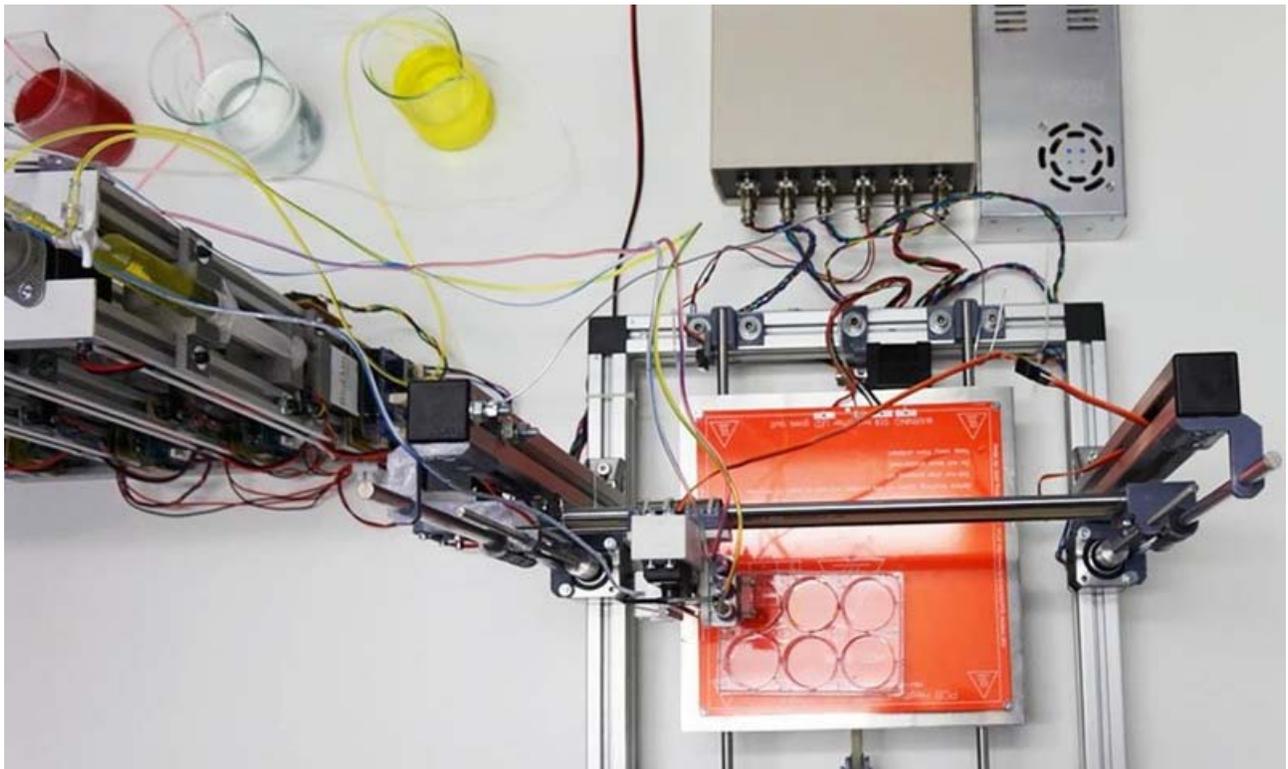




Posted on January 25, 2017

## Scientists create a 3D bioprinter to print human skin



Scientists from the Universidad Carlos III de Madrid (UC3M), CIEMAT (Center for Energy, Environmental and Technological Research), Hospital General Universitario Gregorio Marañón, in collaboration with the firm BioDan Group, have presented a prototype for a 3D bioprinter that can create totally functional human skin. This skin is adequate for transplanting to patients or

for use in research or the testing of cosmetic, chemical, and pharmaceutical products.



This research has recently been published in the electronic version of the scientific journal Biofabrication. In this article, the team of researchers has demonstrated, for the first time, that, using the new 3D printing technology, it is possible to produce proper human skin. One of the authors, José Luis Jorcano, professor in UC3M's department of Bioengineering and Aerospace Engineering and head of the Mixed Unit CIEMAT/UC3M in Biomedical Engineering, points out that this skin *"can be transplanted to patients or used in business settings to test chemical products, cosmetics or pharmaceutical products in quantities and with timetables and prices that are compatible with these uses."*

This new human skin is one of the first living human organs created using bioprinting to be introduced to the marketplace. It replicates the natural structure of the skin, with a first external layer, the epidermis with its stratum corneum, which acts as protection against the external environment, together with another thicker, deeper layer, the dermis. This last layer consists of fibroblasts that produce collagen, the protein that gives elasticity and mechanical strength to the skin.

Bioinks are key to 3D bioprinting, according to the experts. When creating skin, instead of cartridges and colored inks, injectors with biological components are used. In the words of Juan Francisco del Cañizo, of the Hospital General Universitario Gregorio Marañón and Universidad Complutense de Madrid researcher. *"Knowing how to mix the biological components, in*



*what conditions to work with them so that the cells don't deteriorate, and how to correctly deposit the product is critical to the system."* The act of depositing these bioinks, which are patented by CIEMAT and licensed by the BioDan Group, is controlled by a computer, which deposits them on a print bed in an orderly manner to then produce the skin.

The process for producing these tissues can be carried out in two ways: to produce allogeneic skin, from a stock of cells, done on a large scale, for industrial processes; and to create autologous skin, which is made case by case from the patient's own cells, for therapeutic use, such as in the treatment of severe burns. *"We use only human cells and components to produce skin that is bioactive and can generate its*



own human collagen, thereby avoiding the use of the animal collagen that is found in other methods," they note. And that is not the end of the story, because they are also researching ways to print other human tissues.



There are several advantages to this new technology. "This method of bioprinting allows skin to be generated in a standardized, automated way, and the process is less expensive than manual production," points out Alfredo Brisac, CEO of BioDan Group, the Spanish bioengineering firm specializing in regenerative medicine that is collaborating on this research and commercializing this technology.

Currently, this development is in the phase of being approved by different European regulatory agencies to guarantee that the skin that is produced is adequate for use in transplants on burn patients and those with other skin problems. In addition, these tissues can be used to test pharmaceutical products, as well as cosmetics and consumer chemical products where current regulations require testing that does not use animals.

Source and top image: Universidad Carlos III de Madrid (UC3M)

---

Tags: [3D bio printing](#)

 Print  Comment  Forward  Tweet  Like  Pin  reddit  Plus  Share

[Stay updated with developments: subscribe to our newsletter](#)

NEXT 

---

## Related Posts

[3D-printed synthetic bone to be developed for landmine blast survivors](#)



A new bio-ink for 3D printing with stem cells

---

First heart structure 3D printed in zero gravity with human stem cells

---

Project to 3D print human skin

---

## Related IDTechEx Events



Berlin, Germany  
10 - 11 May 2017

---



Berlin, Germany  
10 - 11 May 2017

---



Berlin, Germany  
10 - 11 May 2017

---



Berlin, Germany  
10 - 11 May 2017

---

[More IDTechEx Events](#)

---

## Related Research Reports from IDTechEx

[Fuel Cell Electric Vehicles 2017-2027: Land, Water, Air](#)

---

[Electric Vehicles for Construction, Agriculture and Mining 2017-2027](#)

---

[Energy Independent Electric Vehicles Land, Water, Air 2017-2037](#)

---

[Renewable Energy Off-Grid 2017-2027](#)

---



## Leave a Comment

Your email address will not be published.

Name \*

Email \*

Comment \*



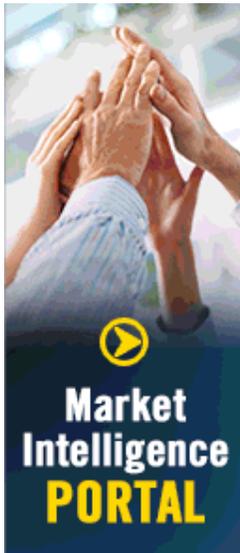
Please enter the numbers and/or letters in the image.

Required fields are marked \*

Post Comment

[Stay updated with developments: subscribe to our newsletter](#)



Popular

Recent

Comments

### **3D printing mends a heart**

Tens of thousands of patients each year are diagnosed with heart valve disease, with many in need of lifesaving surgery to treat the condition.

### **Researchers design one of the strongest, lightest materials known**

The new configurations have been made in the lab using a high-resolution, multimaterial 3-D printer.

### **Markforged unveils new metal 3D Printing technique**

Markforged announces a breakthrough technology in metal manufacturing - Atomic Diffusion Additive Manufacturing, along with the introduction of the Metal X - the first ADAM 3D printer.

### **Artificial fingertip that feels**

Pushing the boundaries of soft robotics, the open-source tactile fingertip, known as TacTip, is a 3D-printed tactile sensor that has been developed by the Tactile Robotics Team from Bristol Robotics...

### **3D printing and nanotechnology to detect toxic liquids**

Carbon nanotubes have made headlines in scientific journals for a long time, as has 3D printing. But when both combine with the right polymer, in this case a thermoplastic, something special occurs:...



## IDTECHEX RESEARCH

---

3D Printing 2017-2027: Technologies, Markets, Players

3D Printing Materials 2016-2026: Status, Opportunities, Market Forecasts

3D Printed Electronics and Circuit Prototyping 2015-2025

3D Printing of Metals 2015-2025

## IDTECHEX TV

---

*TV*

### **Advanced Inkjet Microdeposition Technology**

Video interview with SIJ Technology at the IDTechEx Show! in Santa Clara, USA (November 16-17 2016)

*TV*

### **Key Emerging Technology Trends from the IDTechEx Show!**

In this recording of the opening presentation at the IDTechEx Show! in Silicon Valley on Nov 16, 2016, Raghu Das, the CEO of IDTechEx, discusses some of the key technological trends that are creating huge opportunities.



## 3D PRINTING PROGRESS TAGS

---

[3D bio printing](#)   [3D Printing Technology Watch](#)   [Equipment](#)   [Materials](#)  
[Applications and end users](#)   [Services](#)

 [Site Map](#)

 [Submit Press Release](#)

 [About Us](#)

 [Contact Us](#)

 [Authors](#)

 [Privacy Policy](#)

 [Terms & Conditions](#)

ISSN: 2399-4428 © Copyright 2017 - IDTechEx

 [Sign-up or Login](#)

