

## **3D Printed Foods – Are They safe?**

3D printing technology is all the rage currently with such rapid developments that it is even difficult for the best of us to keep up. So, let's bring everyone up to date.

As opposed to regular printing on paper with ink, 3D printers are able to print using a wide variety of materials, from plastic and metals to human cells and of course, food. Whereas a regular ink printer goes over the sheet of paper once, a 3D printer makes multiple passes over the printing area, each time printing a new layer on top of the previous one. Therefore, the image is no longer 2-dimensional; it extends upwards into a 3-dimensional object. Since the printer sources the object from a computer aided design (CAD) 3D drawing file, we are virtually limited by only our imaginations.

Some of the latest developments with respect to 3D printed food include:

**Chocolate** - International chocolate producers Hershey has partnered with a company called 3D Systems to develop new, innovative and customized chocolate designs using 3D printing technology.

**Pizza** - NASA is exploring the use of 3D printers to produce pizza in outer-space. The benefit of this technology here is that the machine will be able to use powdered ingredients with a longer shelf life, combining them with water just prior to printing. The printer would be capable of printing first dough, then a tomato paste layer, followed by cheese and a protein layer.

**Pasta** - This has been explored by several individuals and includes products from corn pasta to stuffed ravioli. Of course, cooking of the pasta is required after printing, but just think that with the press of a few buttons, a gourmet meal customized to your preferences (such as salt, flavour etc.) can be prepared whilst you finish other work.

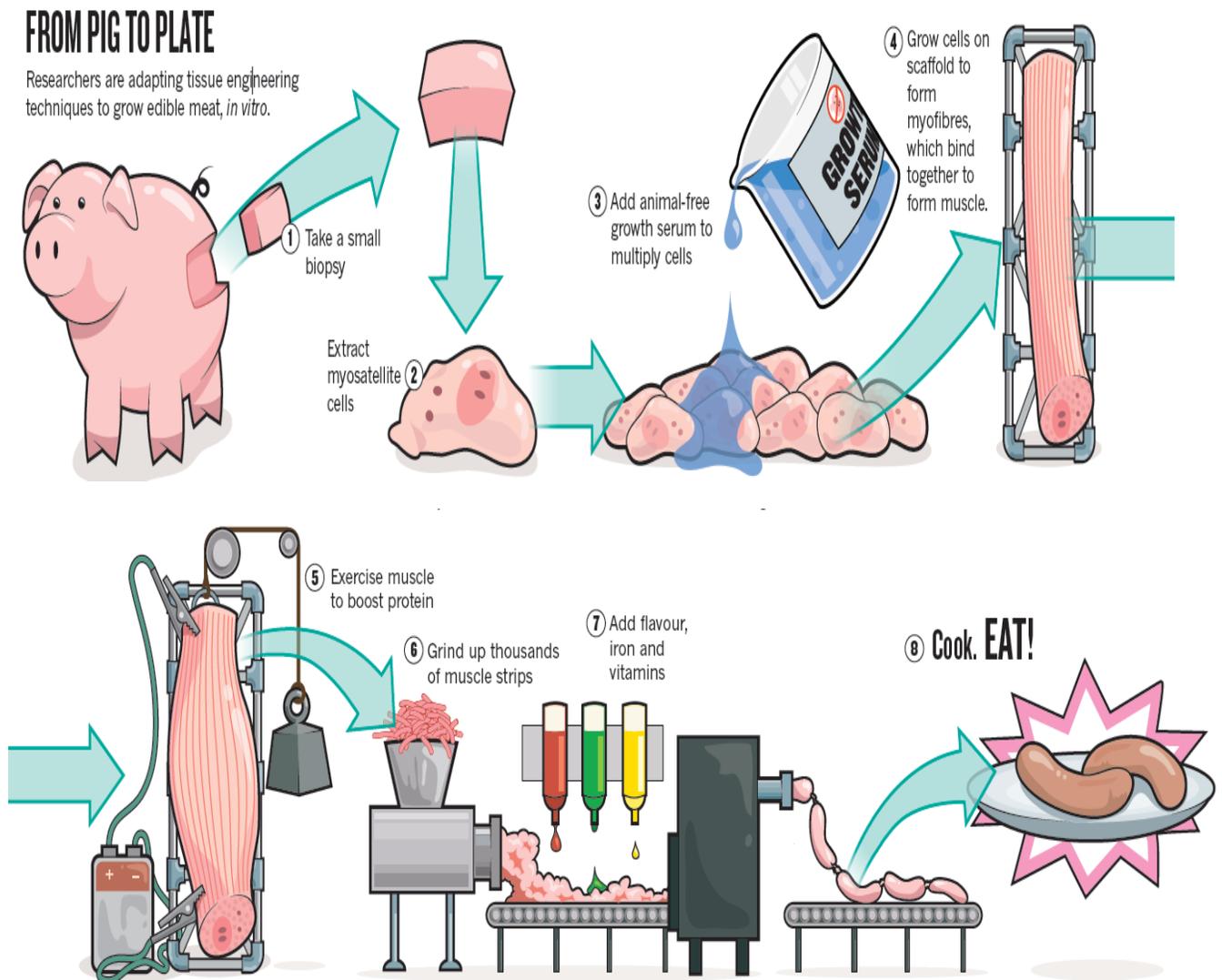
**Meat products** - Though this hasn't been officially produced yet, the technology exists and the possibility is very real through 3D bio-printing using a biopsy of the animal tissue. One of the leads in this area is a U.S. based company called Modern Meadows. 3D printed meat cannot only reduce and in some cases eliminate the vast resources required to cultivate natural meat, but also introduce a new food source to vegetarians or vegans who have a stand against the treatment of animals in the industry as well as improve or modify the flavour, texture and taste of the meat.

As with anything that we consume, the big question is how food safe are these 'new' products? Currently, in most cases, the food to be printed is either in the form of a powder or a paste. These are extruded onto the print surface through syringe-type piston heads and then the printed product cooked as necessary.

There exists local as well as foreign regulations, standards, and guidelines that detail the design of food equipment as well as the constituents of food products, e.g. Public Health, USFDA,

National Sanitation Foundation (NSF), Codex Alimentarius, WHO, etc. Provided that the printer and its raw materials follow these principles and that effective cleaning and sanitation methods are developed and practiced, then the safety of 3D printed food would be like any other food product on the market. Quality, nutritional content and personal preferences however, are, of course, an entirely different story.

Nevertheless, it is crucial that we monitor this rapidly developing sector of the food industry. As the technology advances, it may become necessary for governing agencies to create or modify food safety laws and regulations to accommodate these new products that we are almost certain to see on grocery shelves and food service establishments in the very near future.



Source: Jones, Nicola, "A taste of things to come?," *Nature* 469 (2010): 752-753.

See: [http://img2.timq.co.il/forums/1\\_147825029.pdf](http://img2.timq.co.il/forums/1_147825029.pdf)

## References

Wong, Vanessa. 2014. A Guide to all the Food That's Fit to 3D Print (So Far).  
<http://www.businessweek.com/articles/2014-01-28/all-the-food-thats-fit-to-3d-print-from-chocolates-to-pizza> Accessed on 05.03.2014

Kuneinen, Eetu. 2014. Update: Andreas Forgacs on 3D Printed Meat.  
<http://3dprintingindustry.com/2013/03/07/update-andreas-forgacs-on-3d-printed-meat/>  
Accessed on 05.03.2014