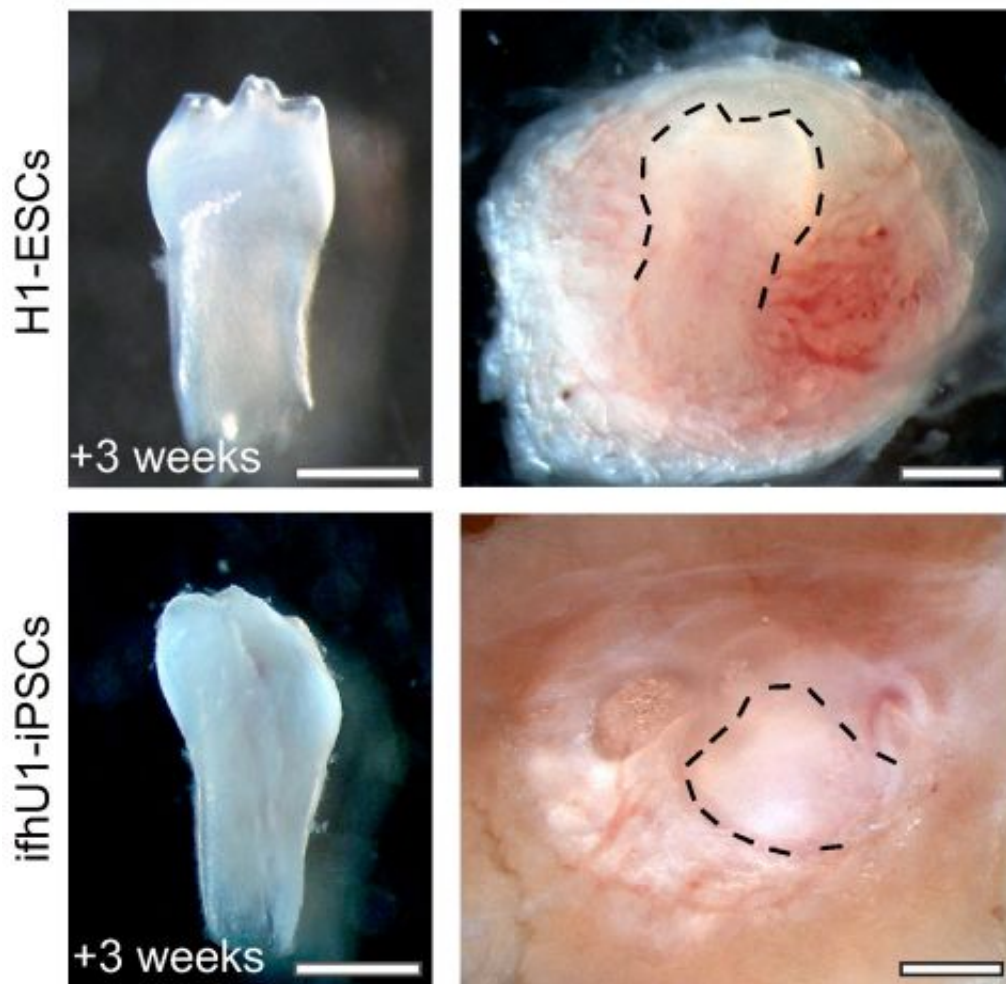


Take urine, add mouse cells and grow a new tooth

July 31 2013, by Nancy Owano



Tooth-like structures formed from H1-ESC line and hiPSC lines in 3 weeks.
Credit: doi:10.1186/2045-9769-2-6

(Medical Xpress)—How to grow new teeth for people who are missing teeth because of old age, accidents, or disease has been an area of interest among researchers. Scientists in China say they have grown teeth out of human urine. The [announcement](#) was made Tuesday about their research results, published in the open-access, peer-reviewed *Cell Regeneration* journal. They were able to generate the structures from human urine induced pluripotent stem cells.

Duanqing Pei from Guangzhou Institutes of Biomedicine and Health, and his colleagues developed a tissue culture system where urine was a starting point of cells that could be grown into teeth. In their paper, "Generation of tooth-like structures from integration-free human urine induced pluripotent stem cells" the authors,inglei Cai, Yanmei Zhang, Pengfei Liu, Shubin Chen, Xuan Wu, Yuhua Sun, Ang Li, Ke Huang, Rongping Luo, Lihui Wang, Ying Liu, Ting Zhou, Shicheng Wei, Guangjin Pan and Duanqing Pei wrote, "Here we describe the generation of tooth-like structures from integration-free human urine induced [pluripotent stem cells](#) (ifhU-iPSCs)."

They said, "Our results demonstrate that ifhU-iPSCs can be used to regenerate patient specific dental tissues or even tooth for further drug screening or regenerative therapies."

The iPSCs were mixed with [mouse cells](#) and grown for two days before being implanted under the outer layer of the mouse's kidney.

As with normal [tooth development](#), the Chinese team made use of the interaction between the epithelial cells and [mesenchymal cells](#), to ensure production of both tooth-coating enamel and the tooth's components. In three weeks, the bundle of cells started to resemble a tooth, with a success rate of 30 percent:

The tooth-like structure contained [dental pulp](#), dentin, enamel space and

enamel organ. However, the teeth that were grown were not as hard as natural teeth.

Their approach has generated concern among some other scientists. In an interview with the [BBC](#), a scientist focused on [stem cells](#) and regenerative medicine, Prof. Chris Mason of University College London, thought that urine was an inefficient starting point. He expressed concern, too, for any risk of contamination that the use of urine as a cell source may pose. Prof. Mark Bartold of the University of Adelaide, director of a dental research center, whose research interest is in periodontal connective tissues in disease and regeneration, also weighed in. He said the work is promising but would need to resolve the challenge of figuring out what governs the size and shape of teeth, from incisor to molar. *New Scientist* [quoted](#) him as saying, "That's going to be very tricky, because we don't really fully understand what's involved in that development."

Pei and colleagues, meanwhile, are aware of the study's limitations. The success rate was around 30 percent and the structure was not as hard as human [teeth](#). Still, the researchers believe in the potential of iPSCs as a source of hope for regenerative medicine.

More information: Journal paper reference: Generation of tooth-like structures from integration-free human urine induced pluripotent stem cells, [doi:10.1186/2045-9769-2-6](https://doi.org/10.1186/2045-9769-2-6) , www.cellregenerationjournal.com/pdf/2045-9769-2-6.pdf

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