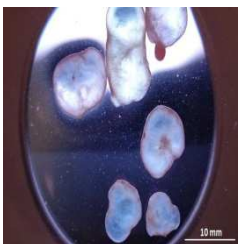


Japanese team produces miniature bowels from embryonic stem cells

- 1) A Japanese research team says it has successfully produced from human cells miniature bowels that can make the muscular movements needed to transport food through the digestive tract – just like natural intestines.
- 2) The bowels, no larger than 1 or 2 cm, were created from human embryonic stem cells and induced pluripotent stem cells, the team said Thursday.
- 3) The team comprises the National Center for Child Health and Development, Tohoku University and Dai Nippon Printing Co.
- 4) In an article in the U.S. journal JCI Insight, the team claimed to be the world's first to produce intestines capable of peristalsis, the muscular activity that moves digested food and body waste, from such cells.
- 5) Almost like natural bowels, the produced intestines absorbed proteins that had been broken down, became active with laxative agents, and inactive with antidiarrheal drugs, the team said.
- 6) The technology “will be a groundbreaking tool to elucidate the mechanism of intractable diseases, such as congenital small-bowel diseases and ulcerative colitis, and develop new medicines and treatment techniques,” the child health center’s Hidenori Akutsu said.
- 7) Using Dai Nippon Printing’s microfabrication technology, the team created miniature environments on culture plates where embryonic and iPS cells could grow. Cells increased and assembled naturally.
- 8) In about two months, the team confirmed miniature bowels that were inside out but functioned like natural small intestines.
- 9) With current technology, it is difficult to use embryonic and iPS cells to produce three-dimensional organs larger than several centimeters on culture plates. The challenge is getting enough nutrients and oxygen to their centers.
- 10) But producing large amounts of mucosal and other cells in miniature bowels for transplant into patients is seen as a promising application, according to the team.
- 11) The bowels can also be used to investigate how medicines are absorbed and whether drugs have any negative side effects, the team said.
- 12) Human embryonic cells are produced from fertilized eggs left over after fertility treatments. In Japan, the cells are made at Kyoto University and the child health center.



- 13) Research into how to apply embryonic cells in regenerative medicine is progressing quickly because the cells better resemble natural embryos than iPS cells. 【Jan 13, 2017／The Japan Times】

- bowel 腸
 embryonic stem cell 胚性幹細胞=ES細胞
 1) digestive tract 消化管
 intestines 腸
 2) induced pluripotent stem cell 人工多能性幹細胞=iPS細胞
 4) peristalsis 蠕動 (ぜんどう)
 waste 排泄物
 5) laxative agent 緩下剤、下剤
 antidiarrheal 下痢止めの
 6) elucidate 解明する
 intractable 難治性の
 congenital 先天性の
 ulcerative colitis 潰瘍性結腸炎
 7) microfabrication マイクロ加工、微細加工
 9) nutrients 栄養になる (薬、食物) (通例 s)
 oxygen 酸素
 10) mucosal 粘膜の
 12) fertilized egg 受精卵
 13) regenerative medicine 再生医療
 embryo 胚芽、胚

☆Ice breaker for active discussion

1. Have you heard about stem cells? What do you know about it?
2. According to the article, human embryonic cells are produced from fertilized eggs left over after fertility treatments. (paragraph #12) What can you say about that?
3. What's your opinion about regenerative medicine? How do you imagine it in the future?
4. Would you recommend regenerative medicine to your relatives or friends who might need it? Why or why not?
5. Make sentences using the following words: miniature, comprise, elucidate, intractable, fertility, dimension and resemble.