

New hope for short bowel syndrome

4 May 2015, by Maggie Kuo

Researchers at Children's Hospital Los Angeles have successfully made a small intestine that has the structural and molecular components of a healthy intestine.

Short bowel syndrome (SBS) is a [gastrointestinal disorder](#) that occurs when the [small intestine](#)—where fluid and nutrients are absorbed from food into the body—is damaged, such as from genetic disorders or surgery, and has to be removed. As a result, the body does not get enough fluid and nutrients and becomes malnourished. Patients with SBS must receive nutrient supplements through an IV to stay healthy, which can disrupt their lives. With the number of cases of SBS on the rise in both children and adults, intestine transplantation offers a permanent solution but is limited because of a shortage of donors and it requires patients to rely on drugs to suppress their immune system and avoid organ rejection.

Tissue-engineered small intestine (TESI) is a promising alternative to transplantation because it would not be limited by supply. Moreover, TESI can potentially be generated from a patient's own [cells](#), avoiding the immune complications of transplantation. Led by Tracy C. Grikscheit, the research team had previously developed a process to create TESI by isolating [intestinal cells](#) from a portion of a donor's intestine and placing the cells onto biodegradable tubes. The cell-loaded tubes were then implanted into mice where the cells developed around the tube and formed a new intestine segment.

The researchers had observed that their engineered intestine segment had the general features of a small intestine, and in this new study, demonstrated that it also has the structural details and molecular parts to function like one. The intestinal cell types in the TESI were oriented correctly and possessed the proteins involved in breaking down food and absorbing water and nutrients. Similar to a natural intestine, the TESI also had the inner lining critical for maximizing fluid and nutrient absorption and the fluid-tight junctions

between cells that prevent the intestine's contents from leaking out.

More information: "Human and mouse tissue-engineered small intestine both demonstrate digestive and absorptive function." *American Journal of Physiology - Gastrointestinal and Liver Physiology* Published 15 April 2015 Vol. 308 no. 8, G664-G677 [DOI: 10.1152/ajpgi.00111.2014](#)

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