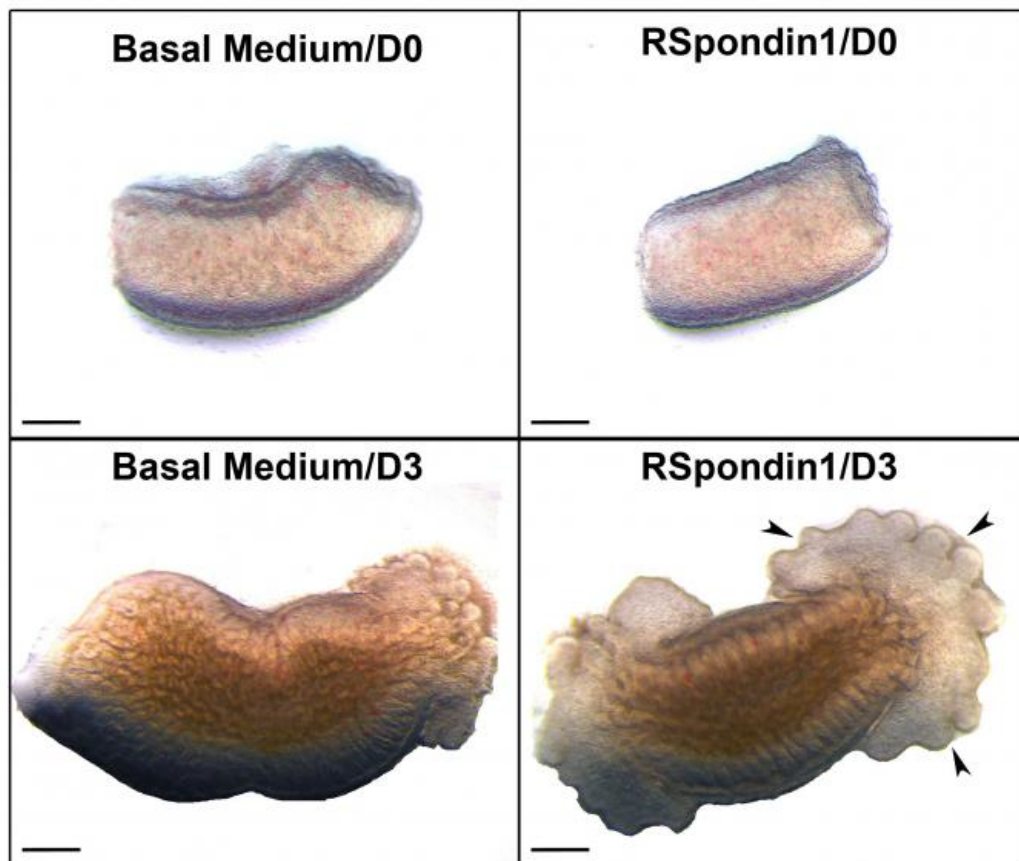


Gut feeling restored by growth outside the body

August 25 2015

Supplement File 3



Embryonic bowel explants were cultured for three days in basal media alone or this media supplemented with R-Spondin1. Note that, in the latter condition, there was exuberant growth of tissue from the ends of explants. Bars are 250 μm

University of Manchester scientists have bridged a gap between two separate pieces of small intestine kept alive outside the body, in an advance which could have implications for surgery in human adults and babies.

It is not currently possible to study the intestine in embryos when inside the body, which holds back advances in treatment for conditions causing damage in infants. However, new techniques used by the researchers in this study have allowed organs to be kept alive and grown on supports which allow the absorption of nutrients.

In the new research, two pieces of embryonic mouse intestine were placed on the supports with a small gap between them. A thread was inserted to link the two and the researchers observed the two pieces grow together to such an extent that in three quarters of the 36 tests, [nerve signals](#) were passed between them causing the now joined piece to operate as a single section of gut.

Professor Adrian Woolf, from the University's Institute of Human Development led the study. He said: "The ability to study organs outside of the body is delivering new insights into how they work. In this case we've been able to study damaged intestines and instigate repairs which could lead to treatment in a number of conditions."

On such condition is short bowel syndrome (SBS) – a condition caused by the dysfunction of sections of the bowel. It can occur in [premature babies](#) or in adults due to Crohn's disease or surgery. SBS prevents

absorption of vitamins and nutrients and can cause weight loss and is fatal in severe cases.

The new research will allow treatments in the form of growth stimulating compounds to be tested *ex vivo* and perfected before being trialled in the body and eventually in humans.

As well as using the basic nutrient base to bridge the gap, the study also experimented with the use of a growth factor called R-spondin 1 to try and speed up growth and make it more successful. Although this caused faster growth it failed to establish the bridge in as uniform a way and fusion was less successful.

Professor Woolf added: "In this study we managed to bridge a gap of less than 1mm, but for this to be useful in [conditions](#) like short bowel syndrome we'll need to promote growth across much larger distances. Having the ability to test different vitamins and hormones which promote [growth](#) opens up many new possibilities for future treatments."

More information: "Bridging the gap: functional healing of embryonic small intestine *ex vivo*." *J Tissue Eng Regen Med*. 2015 Aug 3. [DOI: 10.1002/term.2073](https://doi.org/10.1002/term.2073)

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