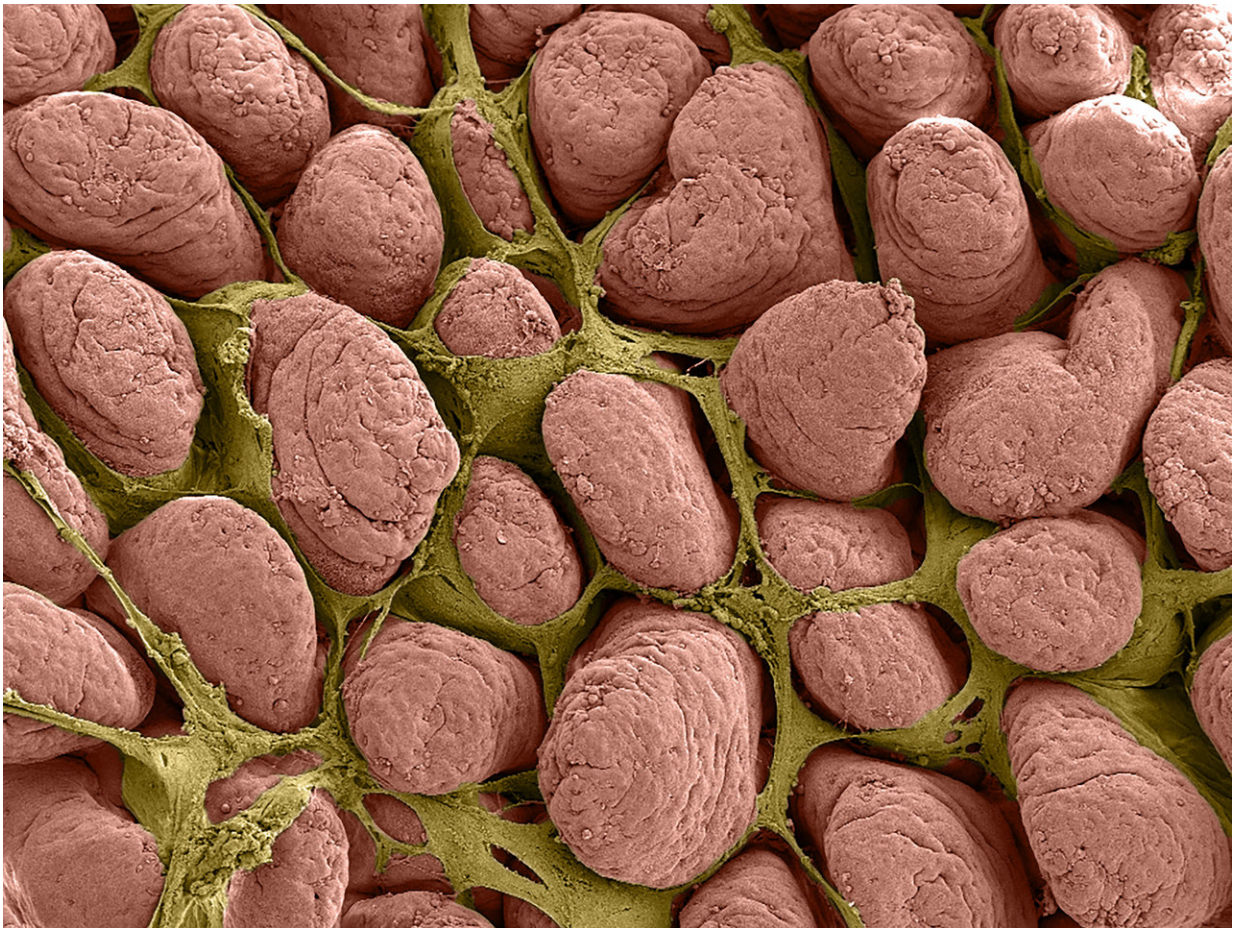


# Mucosal environment of older pigs helps newborn piglets with intestinal injury recover

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Close-up of the finger-like 'villi' that make up the lining of the small intestine in the pig. Credit: Amanda Ziegler, NC State University

Researchers from North Carolina State University have found that the intestinal mucosal environment of juvenile pigs can stimulate repair of intestinal injuries in newborn piglets. The findings have implications both for understanding why newborns of many species—including humans—are unable to repair these injuries on their own, as well as for potential future treatments.

Intestinal ischemic [injury](#) occurs when blood flow to a portion of the intestine is cut off, resulting in the loss of [epithelial cells](#) that line intestinal walls. Once this barrier is damaged, intestinal contents can leak into the bloodstream, causing sepsis and often fatal infections. Infants are particularly vulnerable to these injuries; this research shows it may be because they lack the ability to quickly [repair](#) the damaged areas.

"In these intestinal injuries, the epithelium sloughs off and creates small holes through which bacteria enter the bloodstream," says Amanda Ziegler, NC State postdoctoral researcher and lead author of a paper describing the research. "Older animals and human adults can repair these holes within minutes to hours, but newborn pigs cannot. We want to understand the repair mechanism—or lack of it—in newborns."

Ziegler and her team looked at ischemia in 2-week-old and 6-week-old pigs by surgically inducing ischemia in small sections of intestine and then removing the injured tissue for study. They noted that in the juvenile (or 6-week-old) pigs, the uninjured epithelial cells flattened out and resealed the intestinal barrier within a couple of hours. The epithelial cells from the newborn [pigs](#), however, did not flatten or resealed the barrier.

The researchers then scraped the mucosal micro-environment—essentially the surface layer—from the 6-week-old intestine and applied it to the newborn intestine, which was then able to repair itself. "There's a signal here that the newborn is either not getting

or not able to respond to," Ziegler says. "Something, or possibly a number of things within this environment, are working to help this process along."

The researchers' next steps will be to look closely at how the epithelial cells "learn" to repair these injuries.

"This work is a first step toward understanding what is happening on the cellular level in young patients with ischemic intestinal injuries," Ziegler says. "Plus we've shown that we can rescue this tissue, although we don't yet understand the mechanisms behind it. Hopefully future studies will reveal those mechanisms, and lead to better treatments to help improve patient survival rates."

The research appears in *PLOS ONE*.

**More information:** Amanda L. Ziegler et al, Epithelial restitution defect in neonatal jejunum is rescued by juvenile mucosal homogenate in a pig model of intestinal ischemic injury and repair, *PLOS ONE* (2018). [DOI: 10.1371/journal.pone.0200674](https://doi.org/10.1371/journal.pone.0200674)

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