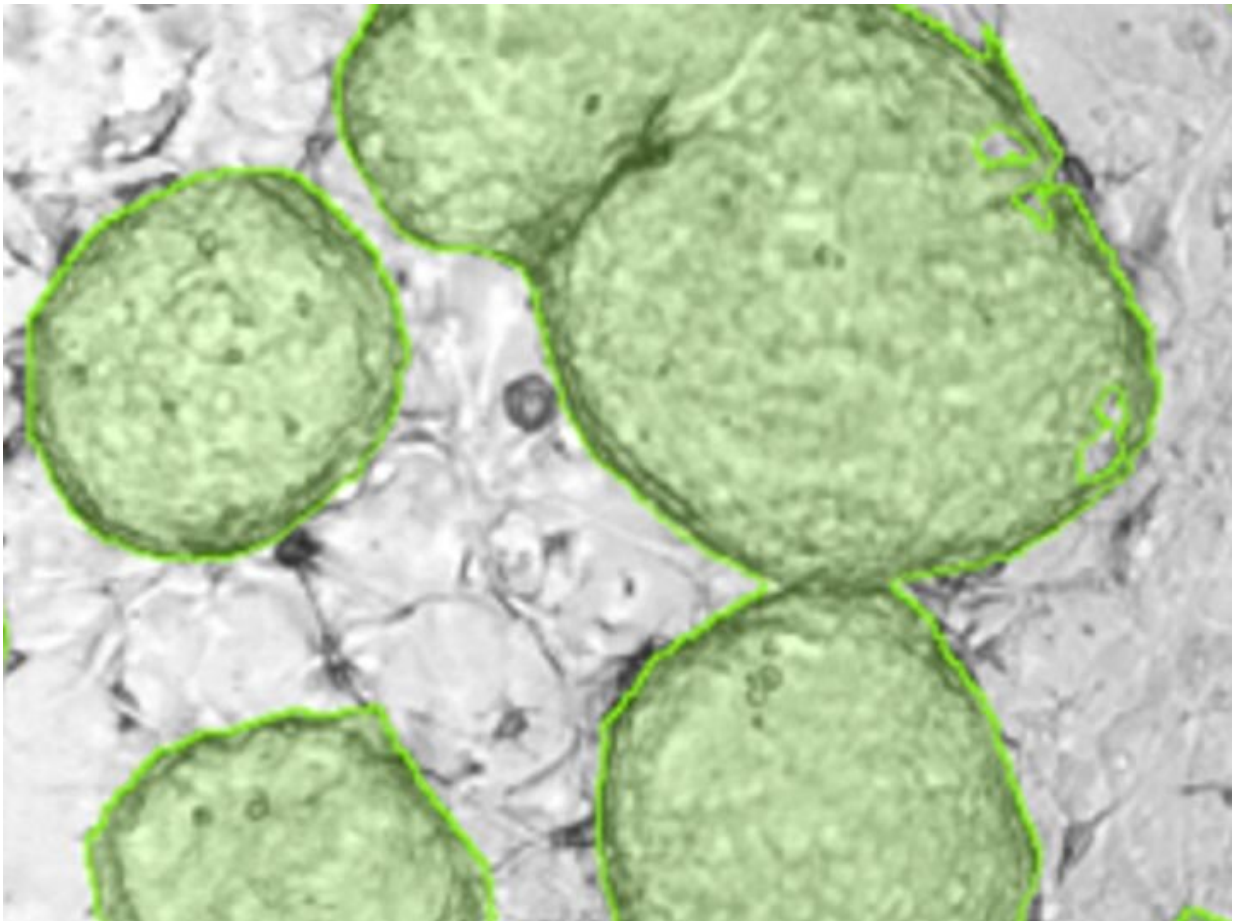


# Cloning stem cells to find a cure for Crohn's disease

June 19 2020, by Laurie Fickman

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Researchers at the UH Stem Cell Center are developing new drug therapies to selectively destroy rogue cells they found in biopsies of pediatric Crohn's patients, to create new treatments for the disease. Credit: University of Houston

For over a decade, Wa Xian, research associate professor of biology and biochemistry at the University of Houston Stem Cell Center, has been perfecting technology for cloning stem cells. Now she is using it to take aim at pediatric Crohn's disease. Xian, who received a \$1.9 million grant from the National Institute of Diabetes and Digestive and Kidney Diseases, along with Frank McKeon, professor of biology and biochemistry and director of the center, are developing new drug therapies to selectively destroy rogue cells they found in biopsies of pediatric Crohn's patients, to create new treatments for the disease.

Crohn's disease is a condition marked by [chronic inflammation](#) and fibrosis of the gastrointestinal tract that often requires surgery to manage life-threatening blockages and perforations common in patients. Usually diagnosed in those between 20 to 35, about 15% of cases first show up in children and tend to be more severe. Xian's work reveals that the intestines of these children are dominated by abnormal [stem cells](#), and identifies three different stem cells in all Crohn's biopsies—one type is responsible for the normal regeneration of the intestinal tract while the other two greatly outnumber these normal clones and seem to collaborate in promoting a highly-damaging state of inflammation and fibrosis that defines Crohn's disease.

"We are now working to understand the origin of these unusual subpopulations of mucosal stem cells, how they orchestrate the immune system to damage the intestines, and how they differ in a molecular sense from normal intestinal stem cells," said Xian. "Armed with this knowledge, we can set about to identify drugs that will selectively eliminate them all the while sparing the normal stem cells.

"Crohn's is an enormously complex disease involving interactions between the immune system, the bacteria that inhabit the intestinal tract, and the cells that line the intestine that keep these two antagonists apart," said Xian, who considers Crohn's disease an intestinal stem cell disease

rather than the product of a hyperactive [immune system](#).

"Defects in any one of these components could be the basis of this disease, and most of the present-day therapies are directed at the [immune response](#) with only limited success."

Xian is placing her bet that these stem cell variants seen in all pediatric and adult cases of Crohn's are the culprits, and together with [graduate student](#) Rahul Neupane and postdoctoral fellows Shan Wang and Yan-Ting Zhang, is working with chemists at UH and the Texas Medical Center to selectively target these rogue stem cells for elimination.

The efforts are aided by a new state-of-the-art drug-screening platform made possible by a High Priority Area Research Equipment Grant from the University of Houston.

"The same technology that enabled Wa (Xian) to identify these pathogenic stem cells can now be exploited in altogether new approaches for find cures for pediatric and adult Crohn's," said McKeon. "By examining the stem cell clones, we can better understand the cause of what has been a very confusing disease.

"It's really not until you break down the heterogeneity of the intestinal stem [cells](#) that you can realize it's the variants and not some hyperactive immune cell at the core of this disease."

Provided by University of Houston

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