

Dendritic cells protect against acute pancreatitis

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NYU Langone Medical Center researchers have discovered the novel protective role dendritic cells play in the pancreas. The new study, published in the November issue of journal *Gastroenterology*, shows dendritic cells can safeguard the pancreas against acute pancreatitis, a sudden dangerous swelling and inflammation of the pancreas gland.

"Our study findings demonstrate that an abundance of dendritic cells are needed in the [pancreas](#) for normal, healthy pancreatic function, especially when there are high levels of inflammation caused by [acute pancreatitis](#)," said senior author George Miller, MD, assistant professor, Departments of Surgery and [Cell Biology](#) at NYU Langone Medical Center. "The study shows that dendritic cells can alleviate cellular stress caused by severe inflammation."

In the new study, researchers found high levels of dendritic cells in the pancreas can protect the organ from acute pancreatitis damage while low levels of dendritic cells in the pancreas are associated with exacerbated pancreas injury including pancreatic necrosis, complete pancreas cell and [tissue death](#).

The pancreas is a vital hormone and enzyme-producing gland assisting in the human body's digestion and absorption of food. However, the gland can become inflamed leading to acute pancreatitis, a serious and potentially life-threatening condition, severe cases can lead to pancreatic necrosis. Its two percent overall mortality rate jumps to 10 to 30 percent in patients with pancreatic necrosis. The disorder results in 200,000

[hospital admissions](#) and two billion dollars annually in medical expenses in the United States.

Pancreatitis can be acute or chronic, developing over time. It's caused by gallstones, [alcohol abuse](#), or medications. Symptoms include abdominal pain, nausea and vomiting, and current treatments include hospitalization, medication, restricted diet or surgery. Pancreatitis can be reduced or prevented with removal of the [gall bladder](#), limiting [alcohol intake](#) or [prescription medication](#).

Dendritic cells in the body have emerged as important cellular mediators of inflammation. Previous studies by NYU Langone researchers and others have shown the ability of dendritic cells in the body to suppress inflammation in a number of organ-specific inflammatory conditions including liver injury. Upon exposure to inflammation, dendritic cells suppress inflammation by activating an immune response. However, the cellular regulation of acute pancreatitis was not completely understood until now.

In the new study, researchers induced mice models with acute pancreatitis. As a result, the level of dendritic cells in the pancreas increased by two-fold. This observation identified the innate immune system response of dendritic cells to the excessive swelling and inflammation of the pancreas gland. In addition, researchers tested the effects of dendritic cell depletion in acute pancreatitis mice models. Their experiments showed mice with depleted dendritic cell levels developed pancreatic necrosis and died within four days. Dendritic cell depletion was also associated with a higher infiltration of white blood cells and inflammation markers. The negative effects of dendritic cell depletion experiments show the critical protective role these cells play in pancreatic organ survival.

"We now have a greater understanding of dendritic cells, the key cellular

mediators of inflammation, during dangerous acute pancreatitis. These cells play a central role in acute pancreatitis and are required for the pancreas' viability," said Dr. Miller, a member of the NYU Cancer Institute. "Our novel findings show depletion of dendritic cells result in the massive increase in severe pancreas inflammation, injury and organ destruction. We are now one step closer to more effective treatments for this harmful human condition."

The study suggests dendritic [cells](#) in the pancreas as new therapeutic targets for reducing any cellular stress on the pancreas from pancreatitis. Further research is needed to elucidate dendritic cell function and develop an immune-directed therapy against acute pancreatitis.

Provided by New York University School of Medicine

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