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Short Communication

Pancreatic Cancer Cells for Starvation Death Prevention.

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ABSTRACT

In new findings published online March 18, 2021 in the journal Cancer Cell, an international team of researchers, led by scientists at University of California San Diego School of Medicine and Moores Cancer Center, describe how pancreatic cancer cells use an alternative method to find necessary nutrients, defying current therapies, to help them grow and spread.

INTRODUCTION

Pancreatic cancer accounts for roughly 3 percent of all cancers in the United States, but it is among the most aggressive and deadly, resulting in 7 percent of all cancer demises yearly. Pancreatic cancer is particularly deadly once it metastasizes, with the number of people who are alive five years later declining from 37 percent to just 3 percent.

All cancer cells require a constant supply of nutrients. Some types of cancer attain this by creating their own vascular networks to pull in nutrients from the host's blood source. But other cancers, particularly pancreatic ductal adenocarcinoma, are enclosed by a thick layer of connective tissue and extracellular molecules (the so-called tumor stroma) that act not just as a sort of an in-between line between malignant cells and normal host tissues, but also as a hindrance to cancer cells obtaining sufficient resources, counting blood source.

As a result, pancreatic and other nutritionally harassed cancers employ a number of adaptive mechanisms to avoid death by starvation, a risk chiefly high in rapidly growing tumors. One such mechanism is autophagy or self-eating. Autophagy lets nutritionally harassed cancers to digest intracellular proteins, particularly denatured or damaged proteins, and use the liberated amino acid building blocks as an energy source to fuel their metabolism.

Past research representative autophagy is elevated in pancreatic cancer gave rise to the idea that constraining self-eating might be used to starve tumors. Yet, multiple clinical trials using compounds that inhibit autophagy protein degradation combined with traditional chemotherapy did not produce any added therapeutic benefit likened to chemotherapy alone, and Pathology at UC San Diego School of Medicine. Macropinocytosis enables autophagy-compromised and nutritionally stressed cancer cells to take up exogenous proteins (found outside the cell), digest them and use their amino acids for energy generation. In experiments using mouse cancer models and human pancreatic cancers grown in mice, Su and colleagues found that a combination of autophagy and macropinocytosis inhibitors resulted in rapid and nearly complete tumor regression.

CONCLUSION

It delivers another example of the plastic nature of pancreatic cancer metabolism, said senior author Karin. "It also shows that combined inhibition of the two major nutrient procurement pathways can result in a successful blockade of energy supply resulting in tumor starvation and consequent shrinkage. These findings are exciting and support the idea that we will make significant impact against this very difficult disease in the near-future

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